
Effect of the 2020–2022 War in Northern Ethiopia on Archaeological and Historical Heritage and the Environmental Context in Amhara National Regional State

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Abstract

In 2020, the war in northern Ethiopia spilled over from Tigray into the Amhara region. Tigrayan People's Liberation Front (TPLF) troops occupied a large area in the north and east of the Amhara region for several months, including the town of Lalibela and its surroundings, where the Solomonica-Zagwe Encounters (SolZag) Project has been conducting archaeological and related work for many years. Once the occupation was over in the Lalibela area, project members undertook a three-stage impact assessment to address the effects of the war on the local communities, heritage sites, and environment of the area, as well as a brief evaluation of the situation in the Däse and Ḥayq areas. In addition to the immediate, acute impacts of the war on the local population, which included cases of murder, robbery, and displacement, there were chronic, on-going effects such as the lack of electricity and water supplies, food shortages, rising prices, and especially the collapse of tourism, the principal source of revenue for Lalibela. Environmental consequences included damage to farmland due to the excavation of fortifications and widespread deforestation for the production of charcoal for cooking, given the lack of electric power, and the deliberate burning of forested lands to expose those hidden inside. The cultural property in the area appears to have been exposed to very minor damage, with the marked exception of the Däse museum, which was ransacked during the occupation.

Keywords: impact assessment, heritage, environment, tourism, North Ethiopia

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1. Introduction

One of the most destructive forces that affect archaeological and historical heritage resources is war. The impacts of armed conflicts on natural and cultural environments are immediate and vivid, wherever in the world they occur. There are plenty of examples in Africa and neighbouring regions where fighting has resulted in significant harm to society, cultural heritage, and ecological systems (Panella 2010; Irwin 2016). The severe damage caused to the historic Great Umayyad Mosque in Aleppo, Syria, with the complete demolition of its 11th-century minaret, and the on-going destruction of ancient temples and outstanding architectural heritage in Yemen are depressing indictments of humanity in this century (Stouhi 2019). The UNESCO resolution on heritage protection in the event of war (First Protocol, The Hague, May 14, 1954, and Second Protocol, The Hague, March 26, 1999) stressed that in times of civil war and conflict, cultural heritage is often a primary target since wars are imbued with explicit or veiled objectives of imposing one side's interests and identity on the other, and heritage resources are manifestations of the latter's history, culture, values, and identity (UNESCO 1954b; 1999). This very nature of our heritage gives no comfort to invaders.

The SolZag Project (Solomonic-Zagwe Encounters Project⁸) has been working in the North Wällo Zone of Amhara Regional State since 2009, investigating the social, political and cultural context of the transition from the Zagwe to the Solomonic dynasty in the 13th century and the expansion of Solomonic domains in the following centuries (Tadesse 1972). There are few records that attest to the final years of Aksum, which declined in the 7th century, after which the centre of political and religious power shifted some 250 km south from Aksum to the highlands of Lasta, an area inhabited by Agäw-speaking people. There, the Zagwe dynasty ruled for some 300 years from the late 10th century on, retaining many aspects of Aksumite civilization, until it was overthrown by King Yəkunno Amlak in 1270. It is the change and continuity involved in this succession that the SolZag Project seeks to document and analyse.

During the recent military conflict in northern Ethiopia (2020–2022), forces of the Tigrayan People's Liberation Front (TPLF) occupied and controlled parts of Amhara Regional State for several months in late 2021, notably the World

⁸ www.solzagproject.org

Heritage Site of Lalibela and its surroundings in North Wällo, home to numerous monuments of major historical, architectural, artistic, and archaeological significance, including sites where the SolZag Project has been working (Yəmərəhännä Krəstos, Zazəya Šəllase, Arba'tu Ənsəssa, Bəlbäla Giyorgis, Bəlbäla Čärqos Gännätä Maryam, Əmäkina Mədħane 'Aläm, Wägädät Qirqos and Wašša Mika'el). To escape anticipated TPLF targeting, young men of military age were forced to flee the area on foot, leaving their families behind. They included project members living, studying, and/or working in Lalibela, who managed to send messages describing the situation to the project director, Tania Tribe, in the United Kingdom. Prompted by these worrying reports, and fearing for the safety of the local communities and the integrity of the monuments and archaeological sites, she and Christopher Tribe, zooarchaeologist and project treasurer, decided in consultation with project members in Ethiopia and Europe to organise an impact assessment to be conducted in the area as soon as the situation on the ground permitted.

Between January and April 2022, with the support of the Ethiopian Authority for the Research and Conservation of Cultural Heritage (ARCCH, now the Ethiopian Heritage Authority – EHA) and Addis Ababa University (AAU), SolZag project members carried out this assessment on the impact of the war on heritage resources and the environmental context at selected sites around Lalibela (Figure 1). This area was occupied and controlled by TPLF forces from August until December 2021. One objective of the assessment was to identify, document and analyse the nature and extent of any damage caused by the conflict to heritage sites. These sites include religious monuments and places of interest to the SolZag Project, such as the grotto church of Yəmərəhännä Krəstos and the rock-hewn church of Gännätä Maryam, both in Lasta *wäräda* (district), and Wašša Mika'el church, which occupies an enlarged cave on the high plateau in Gazo *wäräda*. The survey was also briefly extended into the South Wällo Zone to include the regional museum in Däse and the monastery of Däbrä Ĥayq Əstifanos, which SolZag plans to study in the near future. In parallel, the assessment aimed to determine the effects of the war on the local inhabitants and the environment in all these areas, with a view to identifying adverse effects on the local economy and possibly proposing actions to help address these effects. Ultimately, the team intended to gauge the social, cultural, emotional, economic and political problems that the military conflict had brought to the local communities, and to consider what could be done in the short and medium term to further the conservation and care of the local heritage in general and ensure the continuity of the SolZag Project in particular.

2. Background to the Research and the Study Area

In 1990, Andah commented on the previous two decades of national and international conflicts and wars that had affected peoples around the world, pointing out that in times of conflict, cultural property becomes a primary target (Andah 1990). That is because heritage voices the history, identity, and cultural manifestations of a society and a nation (Mengistu 2004). The dominant group or the winning party often has a tendency to impose its own culture and supremacy over the defeated. Conflicts in the form of civil and ethnic wars, genocide, colonial subjection, and dictatorial oppression cause physical damage to heritage resources and psychological trauma to the people, and leave behind a negative impact on human history and material culture.

To prevent or minimize the impact of armed conflict upon heritage, international organizations such as the United Nations Educational, Scientific, and Cultural Organization drew up conventions to protect cultural and natural heritage (UNESCO 1954a; 1972). The Convention for the Protection of Cultural Property in the Event of Armed Conflict, also known as the Hague Convention, was signed on May 14, 1954. Its First Protocol, on moveable cultural property, was adopted on the same date, whereas the second protocol updating the Convention was signed on March 24, 1999. At present, 130 countries have signed this agreement, including Ethiopia. Ethiopia ratified the Hague Convention in proclamation number 373/1996.

The Convention requires signatory states to protect their heritage in times of war. It also requires winning nations in armed conflicts to protect cultural heritage in their area of occupation, to the extent of relocating movable assets to safe zones. The convention also provides for persons who damage cultural property to be prosecuted under national and international law.

Ethiopia has issued a number of laws, proclamations, and policy documents to demarcate and protect its cultural and natural heritage, including clauses in the 1995 Constitution (Federal Democratic Republic of Ethiopia, 1995; 1997; 2000). The instruments put into effect are generally consistent with and in support of the international conventions (World Bank 2000).

In line with the above national and international legal framework, this study investigated the impact of the recent armed conflict in northern Ethiopia on the World Heritage Site of Lalibela and its surroundings, looking particularly at the status of the cultural property in the area, and the effects on society, the environment, and the tourism sector.

Lalibela, named after the Zagwe king who reigned there in the second half of the 12th century, is situated in the Lasta district of North Wällo zone in Amhara regional state. The site is known for its medieval rock-hewn churches, which, prior to the COVID-19 pandemic and the armed conflict, attracted thousands of tourists annually. The site testifies to the medieval and post-medieval architectural civilization of Ethiopia, while, to Orthodox Christians, it remains a holy place and a centre of pilgrimage (Mengistu 2004; Ayalew 2003).

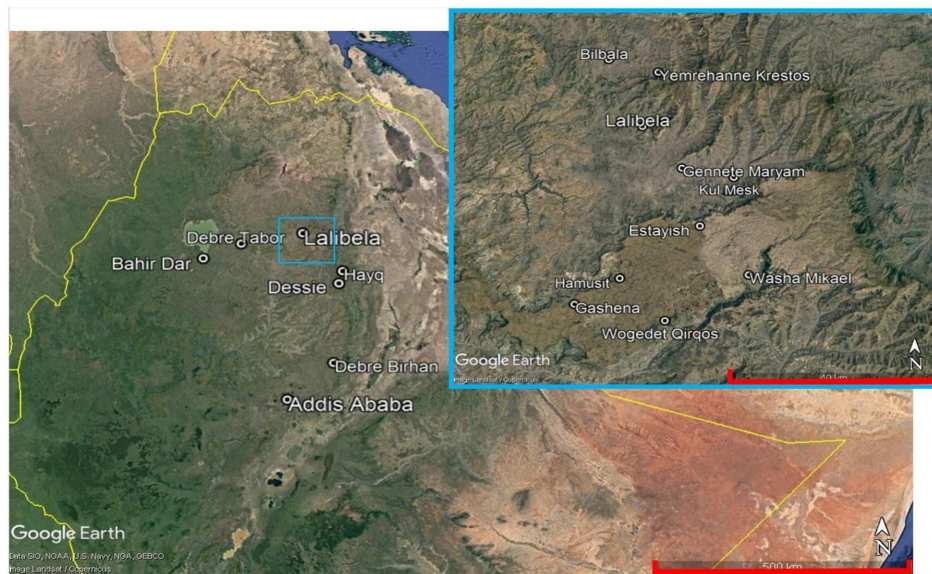


Figure 1: Northern Ethiopia showing localities mentioned in the text (scale bar 500 km). Inset: Assessment sites and other localities around Lalibela (scale bar 40 km). Source: Google Earth. Data SIO, NOAA, U.S. Navy, NGA, GEBCO. (Image Landsat/Copernicus).

The impact assessment took place in three stages. In the first stage, in early January 2022, soon after the withdrawal of the TPLF from Lalibela, Mesfin Getie, an archaeological officer at the EHA, assisted by Dessale Mamo, manager of the Lalibela Cultural Centre, visited several sites in villages around Lalibela to conduct a preliminary examination of the state of the monuments and the immediate effects of the recent occupation on the local people. A second survey was conducted in greater depth in February 2022, led by Dr. Alemseged Beldados, Associate Professor of Archaeology at AAU,

assisted by Mesfin Getie. It focused in particular on an environmental evaluation of the consequences of village bombardments and the destruction of forests and farmland. Thirdly, in April 2022, Eshetu Abey, an EHA expert based in the Lalibela culture office, briefly visited Ḥayq and Däse, which had recently been liberated by Federal forces, to investigate reports of damage and destruction of local heritage resources, including the Däse Museum.

3. Initial Assessment

The purpose of this assessment survey, conducted by Mesfin Getie Wondim, assisted by Dessale Mamo, in January 2022, was to gain an overview of the situation in the immediate aftermath of the TPLF occupation, not least to see if any severe damage had occurred that would require urgent remedial work. Despite logistical difficulties such as fuel shortages, damaged infrastructure, and the ban on GPS (Global Positioning System) use due to the presence of Ethiopian federal forces in the area, this initial survey covered the following sites surrounding Lalibela: Yəmrəḥannä Krəstos, Zazəya Šəllase, Arba'tu Ənsəsa, Bəlbäla Giyorgis, Bəlbäla Čärqos, Gännätä Maryam, Əmäkina Mädhane 'Aläm (all in Lasta *wäräda*), Wägädät Qirqos (Wadla *wäräda*) and Wašša Mika'el (Gazo *wäräda*).

3.1. Methodology

The methodology used for this stage of the assessment involved pedestrian surveys and interviews. At each site visited, the investigators examined the state of the cultural property and took notes, photographs and, where permitted, GPS coordinates of the monuments and specifically of any damage. The photographs were later compared with images taken prior to the conflict so that the extent of the damage could be assessed. They also interviewed local culture and tourism officers, religious leaders and community members, using a questionnaire drawn up by the authors. The questions were grouped into three parts, covering details of the locality and informant, the impact of the conflict on the community, and the impact of the conflict on heritage sites and artefacts. The informants were asked to show the investigators any damage that had not already been documented. The impact of the war on the current environment of the study area was also assessed on the basis of physical observation and information acquired from informants. The investigators also discussed with the informants the measures potentially needed to minimise any damage already caused and the best way to protect the monuments and avoid damage in any future conflict.

3.2. Results

The TPLF had withdrawn from the Lalibela area in December 2021, and this preliminary assessment was conducted between January 4 and 17, 2022, when Federal forces were in control. According to the informants, nobody else had yet visited the sites to conduct any kind of assessment, except in the case of Wägädät Qirqos (see below). Our survey revealed that the impact of the conflict on the local communities and environment varied from place to place, but thankfully little or no damage had been done to heritage assets at any of the sites visited.

Local markets were generally open, but food items were in very short supply because the war had disrupted farming activities and food distribution, and in some places, the community had been forced to feed troops and militias for months. There was no electricity or telephone service, and public transport was not operating because of the lack of fuel. Schools, banks, health centres, and flour mills were closed. In the worst-affected localities, there had been robbery, rape, and killing. In all cases, what the local inhabitants reported they needed most of all was a return to peace and stability, as well as food, cash for essentials, electricity for grinding grain and lighting, fuel for transport, health care, and schooling for their children.

Informants believed that the TPLF had been more interested in targeting members of the Federal Forces and Amhara *militias* and their families and supporters than in destroying the local heritage resources. As a result, none of the churches and archaeological sites surveyed appeared to have suffered any damage during the war, except for some areas at Gännätä Maryam that had previously been found to be rich in lithic artefacts (see below), and no moveable heritage objects had been removed either by the occupying forces or by looters taking advantage of the insecurity.

Site-specific results are presented as follows:

Yəmrəhännä Krəstos church: The site was assessed on January 6, 2022. Interviews were conducted in the vicinity of the church. Informants selected for interview were *Märiqeta* Tadesse Hailu, aged 43, a teacher at the church; Deacon Gizachew Dessale, 35, a Lasta *wäräda* police officer; and *W/ro* Gebyanesh Gezu, 30, a merchant.

TPLF forces reached the Yəmṛəhännä Krəstos area but did not engage in any fighting, looting, or cause any damage. Their only action there was to take four government cars for their own use. The local inhabitants did not flee.

Zazəya Śəllase and Arba'tu Ənsəsa: These sites were assessed on January 16, 2022. Interviews were conducted at the churches. Informants selected for interview were: *Qes* Adane Hailu, 38, Zazəya Śəllase church treasurer; *Ato* Tadesse Tesfaye, 60, farmer and elder at Zazəya Śəllase; and *Ato* Girmaye Adane, 68, farmer and security guard at Arba'tu Ənsəsa church.

TPLF forces did not reach these sites, which are located beside the road between Bəlbäla and Yəmṛəhännä Krəstos, but some local inhabitants fled as a precaution. Although the area was not under the control of any military forces, the community was affected by the disruption and insecurity caused by the war.

Bəlbäla Giyorgis: This site was assessed on January 16, 2022. An interview was conducted at the church. The informant selected for the interview was *Märiqeta* Debash Dingelich, 46, a teacher at the church.

TPLF forces occupied this site in Bəlbäla village and used it for military purposes, although there was no fighting. Bəlbäla is located on the road from Lalibela north to Säqota and Tigray, at the junction with the road to Yəmṛəhännä Krəstos. A small group of the community fled to a deserted area for their own safety, but by the time of the interview, they had all returned.

Bəlbäla Čärqos: This area was assessed on January 14, 2022. Interviews were conducted at the church. Informants selected for the interviews were: *Qes* Tebeje Zewuldie, 60, a church treasurer; and *Ato* Abey Tadesse, 47, a farmer.

The TPLF occupied the site for military purposes, although no fighting took place there. No local people were killed or injured, but a small group, including teachers and the families of fighters in the Amhara Special Forces, *Fano* (a youth *militia* group), and other *militias*, fled for their own safety to unoccupied areas, such as Baḥər Dar, Däbrä Tabor, Däbrä Bərhan and Addis Ababa. The TPLF raided homes, looted weapons and money, and destroyed property (but not heritage resources). Subsequently, the area was occupied by Amhara Special Forces and *Fano*, who also caused damage. The local community had to feed these troops for more than two months, leading to severe economic hardship.

Gännätä Maryam: This area was assessed on January 4–5, 2022. Interviews were conducted at the church. Informants selected for interview were: *Qes* Yiheyis Alemu, 58, chairman of the Gännätä Maryam church board of administration; and *W/ro* Habtam Wudu, 50, merchant.

TPLF forces occupied Gännätä Maryam village and used it for military purposes, as it sits astride the old road from Wäldəya to Lalibela. Fighting took place there for two hours on one day, and five local people – three men and two women – were hurt when the invaders tried to extract information from them about where members of the Amhara Special Forces and *militias* lived. Many local people, especially young men, fled to unoccupied areas or to cities such as Bahər Dar, Däse, or Addis Ababa. The majority had returned home to Gännätä Maryam by the time of the survey.

During the occupation, the invaders did not damage or destroy any property or infrastructure in the village, and they did not reach the rock-hewn church, which is located roughly 600 meters north of the road. However, by collecting rocks and excavating trenches and earthworks to make fortifications, they exposed or destroyed sites that had previously been identified as rich in lithic artefacts, which the SolZag Project had planned to excavate scientifically.

Əmäkina Mädhane ‘Aläm: This area was assessed on January 17, 2022. Interviews were conducted at the church. Informants selected for interview were: *Qes* Birara Tarekegn, 54, a church treasurer; and *Ato* Birara Bahiru, 47, a security guard at the church.

TPLF forces occupied this site on the mountain above Gännätä Maryam, but no fighting was reported there. Several local people fled for their own safety, including local government officials, Amhara *militia* and Special Forces families. By the time of the interviews everybody had returned home. The invading forces consumed the local people’s food supplies (sheep, goats, and chickens), but no other damage was done.

Wägädät Qirqos: This site was studied on January 12, 2022. Interviews were conducted at the church. Informants selected for interview were: *Qes* Mullu Sitotie, 65, church treasurer; and *Qes* Amare Gebeyaw, 60, church accountant.

This was the only one of the sites included in this assessment that had been visited by another team: a group from Däbrä Tabor University had come a week earlier to investigate social, human, and economic problems in Wägädät

qābāle (administrative ward) in the aftermath of the war; they also collected data on the moveable and immoveable heritage at the church.

Wägädät Qirqos lies close to the route between Dälanta and Hamusit and was therefore a strategic site for forces on both sides of the conflict. It was occupied by the TPLF, although no fighting took place there. A small group of local people fled to unoccupied towns such as Baḥər Dar, Däbrä Tabor, Däbrä Bərhan, and Addis Ababa for their own safety, but most had returned by the time of the interviews. The TPLF raided homes and took weapons and food (chickens, goats, sheep, grain, and other crops). Afterwards, Ethiopian troops, Amhara Special Forces and Fano were stationed next to Wägädät Qirqos church, causing damage to harvested crops. The local community fed the Ethiopian army and treated the wounded for more than two months, which resulted in severe economic hardship.

Wašša Mika’el: This area was assessed on January 10, 2022. Interviews were conducted inside and outside Wašša Mika’el church. Informants selected for the interviews were: *Qes* Fekade Tesfaye, 43, a church administrator; *Qes* Mihret, 35, a church treasurer; and Abbay Mihret, 30, a housewife.

The TPLF forces did not reach the church or its surrounding valley, although they were seen a few kilometres away. Therefore, there was no direct impact at Wašša Mika’el or at Mäloṭ Amba, a site nearby in the Žiṭa valley where the SolZag Project has also been working.

3.3. Conclusions Drawn from the Initial Survey

In the above sites surveyed, the most common effects of the war included, firstly, the displacement of people in occupied areas, especially government employees, due to the disruption and insecurity caused by the war. Their migration routes were to unoccupied areas such as Baḥər Dar, Däbrä Tabor, Däbrä Bərhan, and Addis Ababa. Secondly, the occupied areas were economically damaged as a result of the plundering of government vehicles, the excavation of farmland to make trenches, the piling up of rocks to make fortifications, and the burning of harvested crops. In the course of these activities, sites that had not yet been studied and surveyed were lost.

From their discussions with the informants at the various sites, the investigators concluded that appropriate measures to protect heritage resources for the future should include the following:

- All sections of local society should be made aware that heritage resources are the property of all citizens and should be protected by the whole community. Local heritage protection committees might be formed.
- The international heritage conventions to which Ethiopia is a signatory must be respected by all parties in any future conflict.
- Heritage professionals from the federal to district levels should be fully trained in heritage preservation, conservation, and protection and should collaborate with one another and with the communities towards the same objectives.
- Specialized training and supervision should be provided for heritage keepers and owners.
- The physical state of the churches and other heritage resources should periodically be assessed and documented (including through detailed photographs) and reports submitted to the bodies responsible, to aid in future research and conservation activities. Any conservation or repair work should likewise be meticulously documented.
- Systematic registration of moveable cultural property can also play an important role in fighting theft and illicit trafficking.

4. In-depth Environmental Research

The primary objective of this research, conducted in February 2022 by Dr. Alemseged Beldados with assistance in the field from Mesfin Getie Wondim, was to assess the environmental consequences arising from the bombardment of villages and the destruction of forests and farmland during the war. Related issues resulting from the war, such as landscape alteration (geomorphological change on the surface of the earth) and the migration of people and animals, were also addressed.

4.1. Methodology

Team members conducted field research for this assessment for one week, February 1–7, 2022. Data collection was based on three approaches: individual and group interviews, field observation on the basis of the interviews and previously acquired information, and mapping of major war-affected locations with the help of GPS coordinates. In all of these stages, the data collected were associated with photographic documentation.

A questionnaire consisting of nine questions was prepared. The themes of the questions covered the impact of the war on the environment, forests, and farms; the effects of the war on geomorphology/landscape; and the effects of the war on water and environmental pollution, biodiversity, and food security. Questions were also included to assess the effects of landmines on people and natural resources. We conducted group interviews only in the towns of Lalibela and ἔstayəš, the administrative centre of Gazo wäräda. In both localities, four different individuals participated in each group interview. The number selected is in accordance with methodological recommendations given in the literature; i.e., 4–6 participants in group interviews (David and Kramer 2001). The selection criterion was that individuals should be very closely matched to the questions set in the questionnaire.

The informants chosen were high-ranking priests, government officials, environment and forestry experts, farmers, and young people who had migrated out of their homeland to the surrounding cities and rural areas during the time of the war and the occupation by the TPLF. Informants were selected purposively. The total number of people interviewed was 16, two of whom answered as one, making a total of 15 respondents. The following were regarded as key informants: Dessale Mamo, age 35, the manager of Lalibela Cultural Centre; Assefa Shiferaw, age 35, the vice-general manager of the Water and Sewerage Authority; *Abba* Gebre Eyesus Gebre Mariam, age 47, *abun* of Yəmrəḥannä Krəstos Church; Temesgen Amare, age 17, and Fikre Awoke, age 19, students; *Qes* Yeheyes Alemu, age 58, vice-administrator of Gännätä Maryam Church; Getie Enanye, age 32, a natural resources expert; and Mesganaw Molla, age 35, an agricultural expert.

The areas chosen for the interviews were the town of Lalibela itself; the village of Yəmrəḥannä Krəstos, some 42 km by road north of Lalibela; the village of Gännätä Maryam, 29 km to the south-east of Lalibela; Gašäna, a major TPLF focus and battlefield area, 60 km south of Lalibela at the junction with the Baḥər Dar–Wäldəya highway; and ἔstayəš, 30 km north-east of Gašäna towards Wäldəya.

4.2. Findings and Interpretations: Socio-economic, Cultural, and Environmental Impacts

As stated above, the investigators surveyed the study areas intensively for the socio-economic, cultural, and environmental impacts of the war in northern Ethiopia. Complementing the physical observation of the sites, the questions

asked of the informants were intended to assess information on the short- and long-term impacts of the war on their society and the environment in which they live. Below, seven of the nine questions, which are the most relevant to the themes of this article, are discussed.

4.2.1. Impacts of the War on the Local Environment (Forests, Farmland, Transport and Irrigation)

Our key informants and the additional eight who participated in the group interviews in Lalibela and Īstayəš agreed that the war had environmental consequences. This means that 100% of our respondents were convinced that the artillery used during the war had an impact on villages and destroyed forests, farms, transport systems, and irrigation networks.

According to our informants in Lalibela, the war resulted in massive deforestation for charcoal production at the village of Šamsa and at a specific locality called Tawla over the four months of occupation by the TPLF. When the federal government was in control prior to the occupation, the area had been designated or protected as an area of forest plantation.

There was no damage to the transport sector, and asphalted roads were not damaged. However, during the war, all roads leading to Lalibela, including the main roads from Gašāna and Kul Mäsk, were blocked. Therefore, in practice, there was no active transportation to and from Lalibela.

Another sector of the economy that was affected in relation to farming was irrigation. Farmers were unable to carry out their routine work of ploughing the land and irrigating it with water. At the time, there was also a shortage of spare parts for irrigation implements.

One informant told us that heavy artillery was used in Lalibela during the war, including Zu-23 anti-aircraft autocannons and mortars around the area of the “Mar Museum”. For instance, heavy artillery was installed near Mount View Hotel, and the TPLF forces fired towards Nä’akuto Lă’ab and Yoħannəs Amba churches. The vibration from the artillery may also have affected nearby heritage resources.

There was extensive burning of forests during the war in Hamusit, Țalet, and Waro. Farmland was also widely affected as the TPLF forces excavated fortifications that are 17 km long to the south of the main Baħər Dar–Wäldəya road and 5 km long to the north of it. At the time, there was no transport

system in operation, and irrigation works were interrupted. Although attempts to gather information from the literature and online to estimate the baseline amount of forest cover and farmland before the war was not successful, according to our local informants, most of the relatively more forested patches and farmland in Hamusit, Ṭalet, Waro, and Boya were burned and destroyed. This was also confirmed by our survey and measurements on the ground.

According to our group informants in Ḫstayəš, heavy artillery caused fires that burned seedlings and other plants. Fortifications were also excavated on farmland. At Boya, half-way between Gašāna and Ḫstayəš, for instance, excavators were used to dig trenches up to 6 km in length. Irrigation works were also affected, and spare parts for irrigation equipment were unavailable. Seedlings grown for distribution to farmers were burned while in the nursery.

Our informant from Gännätä Maryam reported that the effect on the forest was not directly related to the armed conflict. Rather, it was related to the lack of electricity for a long period in the aftermath of the war. The local inhabitants cut down a vast area of forest for the production of charcoal, which they used for cooking. At the end of the war, however, at a locality called Warka Mäšagärəya, heavy artillery was fired and burned farmland. Market chains were interrupted due to the absence of transportation during the war. This also resulted in a shortage of fertilizers and selected seeds and the unavailability of spare parts for irrigation equipment.

Since forest clearance was increasing all the time, local inhabitants were being told to stop or at least reduce it by the church, by elders, and by local self-help associations (*əddər*).

4.2.2. Effects of the War on the Landscape and Geomorphology

Out of the 15 respondents to the questionnaire, 13 (86.7%) replied that the current war had had an impact on the landscape or geomorphology of the area. Only two (13.3%) stated that the war had had no impact on the local landscape.

Some of our informants argued that heavy artillery like Zu-23s and tanks were actively used in Lalibela and its environs. These weapons did not cause any visible impact on the rock-hewn churches, but the vibration arising from their frequent movement must surely have led to impacts on the conservation of cultural and natural resources. According to our informants, the only locality where there was a minimal effect was Yəmrəhännä Krəstos.

Other informants told us that the TPLF was using a type of tank called PTR, which they used for fighting in urban areas. The tank is fast, and when they drove it around, it damaged the roads and also farmers' fields.

The TPLF forces excavated an area for the mass burial of their own deceased fighters around the Chinese camp, in the southern outskirts of Lalibela. Another mass burial was also observed by the authors at a site called Šägəla, near the Islamic burial site.

Our informants from Gašāna told us that the geomorphology of the area had been affected by mass burials in Hamusit, at Qurqur Iyäsus church, and in various places in farmland. Large areas of farmland were excavated to create fortifications in Hamusit (Figure 2). Artillery such as mortars, tanks, DShK machine guns, and Bren guns also affected the landscape of the area. We observed the effects of tank movements in many places in Hamusit town. In Gazo wäräda there are 17 *qäbäles* and TPLF forces were stationed in all of them. Fortifications and other earthworks were excavated in almost all the *qäbäles*. For instance, a mass burial of TPLF forces was observed in Əstayəš secondary school.



Figure 2: Effect of the war on the landscape/geomorphology.

4.2.3. Effects on the Balance of the Environment (Burning of Forest, Grassland and Bush).

Of the 15 respondents to the questionnaire, 13 (86.7%) said that the current war had disturbed the balance of the environment. Only two (13.3% of the respondents) said there had been no impact on the environmental equilibrium through the burning of forest, grassland, and bush. These two respondents who answered no were again from the Yəmṛəḥännä Krəstos area.

Our respondents from Lalibela informed us that in some places, like around Sora Lodge, thatch-roofed huts were burned as a result of the war. The smoke from the fires had covered the surroundings for quite some time. In the same area, many people were also reported to have been killed in their houses and villages. Around Mašäl Meda, on the road from Lalibela to Yəmṛəḥännä Krəstos, a forest and crops were burned.

Both forest and farmland burnings were reported by the respondents and confirmed by the authors through personal observation (Figure 3). In Əstayəš town and its environs, in Ṭalet *qäbäle*, Waro *qäbäle*, and Sololaj *qäbäle*, farmland had been burned.



Figure 3: Forest burning, dominantly eucalyptus, as a result of the war.

4.2.4. War and Associated Reasons for Migration of Human Beings and Animals

All of our respondents (100%), including those in Yəmərəhannä Krəstos, answered yes to this question: did the war and associated factors trigger migration of human beings and animals?

According to our informants from Lalibela, people migrated to neighbouring areas out of fear, many walking as far as Bahər Dar (300 km). Others left due to the shortage of food and drinking water. We were also told that quite a significant number left the town of Lalibela for the countryside, where they could find water in rivers. At the time of this impact assessment, for instance, there was a serious shortage of water; this was due to the lack of electricity since the water supply to the town's inhabitants depended on electric power for pumping and distribution. As a stop-gap remedy, the federal government was bringing in water by truck and rationing it out to the townspeople. We witnessed long queues of people carrying jerry cans (Figure 4).



Figure 4: Because of the water shortage, jerry cans were lined up waiting for their turn to be filled with water

According to Lalibela's Vice-General Manager of Water and Sewerage Services, there was a serious shortage of water. His office was rationing the water supply for the town's inhabitants to once every two weeks. Additionally, 19 water tanks with a capacity of 10,000 or 25,000 litres had been placed in 10 different neighbourhoods of the town. To fill these containers, the office was using three trucks rented for the purpose by the Catholic Church, twice a day.

The water that was currently in use was not suitable for drinking. Due to this sanitation problem, many children have become victims of sickness (diarrhoea). This means there was a water-quality problem on top of the shortage of food and cereals.

In comparison with other towns in Amhara Regional State, there were few cattle and other livestock in Lalibela, but recently the lack of pasture land and water had led the animals' owners to send them out to the countryside.

Some inhabitants of Hamusit and Gašana migrated west to Gayənt district, while others escaped to Däse via Dälanta *wäräda* in the south. When they left their villages, they took their livestock with them. At the village of Abdiqom, there had been no electricity for the last six months, nor had water been available, so to use the electric grinding mill, inhabitants had to come all the way to Hamusit. Due to the absence of transportation, the cost of cereals and other foodstuffs had sky-rocketed.

According to our informants from Əstayəš, there were migrations from Əstayəš to Däse and Baḥər Dar and from the town to the countryside. Cattle, sheep, and goats were herded along with the people. There was a shortage of water and food, and there was no food distribution. Due to the lack of electric grinding mills, people reverted to using traditional stone grinding tools. Electric grinding has become expensive; for instance, it now costs 12 birr to process 1 kg of flour.

Government employees left Gännätä Maryam for the regional capital, Baḥər Dar since they were not being paid their monthly salaries. The local youth of Gännätä Maryam also migrated to Baḥər Dar and other cities. Cattle, sheep, and goats were in constant movement from highlands to lowlands and vice versa, from village to village, and from *qäbäle* to *qäbäle*. Unlike Lalibela, however, the shortage of water at Gännätä Maryam was minimal since there is a local groundwater source.

4.2.5. Specific Impacts on Biodiversity

Out of the 15 respondents to the questionnaire, 8 (53.3%) answered that there were specific impacts of the war upon the biodiversity (flora and fauna) of the region, whereas the remaining 7 answered that there were no specific impacts on biodiversity. This means that 46.7% of our respondents considered that biodiversity had not suffered in the war.

According to our informants from Lalibela, the war might have primarily affected an animal species called *əškoko* (Ethiopian rock hyrax, *Procavia habessinica*), which was not being seen as frequently as it had been previously. The local inhabitants had destroyed the protected forests that were under government control: thinking that the government was no longer in control, they cut down the trees (*Eucalyptus* and *Juniperus*) for charcoal production. This had become a profitable business now that there was no electric power supply for stoves and electric griddles. Fifty kilograms of charcoal was being sold for 350 birr. Our informants from Gašäna and Əstayəš informed us that *Eucalyptus* trees were among the worst-affected plant species. TPLF soldiers hunted for chickens and eggs for immediate consumption. Cattle and sheep were either consumed by the TPLF forces or simply slaughtered. In villages like Zäha and Yäšalay in Gazo *wäräda*, most cattle, sheep and goats were killed or confiscated.

4.2.6. Polluting Effects of Heavy Artillery (Smoke and Dust) on Cultural and Natural Resources

Of the 15 respondents, 7 of them (46.7%) answered that there were pollution effects of the heavy artillery on cultural and natural resources, whereas the remaining 8 (53.3%) thought that the heavy artillery had caused no pollution effects on these resources.

Our informants from Lalibela said that the effect of smoke was minimal, but vibration from the movement of heavy artillery might have impacted the heritage. This is a very valid argument, as Lalibela's ancient monuments, which are more than 800 years old, could easily be affected by minor movements in the surroundings. Apart from heavy artillery, there are weight constraints for heavy truck movements. For instance, TPLF forces stationed Zu-23 autocannons and tanks in the south-western outskirts of Lalibela at the locality called Old Abyssinia, near the Roha Hotel. Very close to this point, there are ancient churches such as Yoħannəs Amba and holy water sources. In the mountains surrounding Yəmrrəħannä Krəstos (Bučälla Mätaya and Säqo

Gare, in front of the telecommunications tower), the TPLF stationed artillery such as DShKs and Bren guns. However, they did not use it in military engagements.

Between Gašāna and Ǝstayəš, and specifically at Fit, according to our informants, forest burning was observed to be a major pollutant of the environment.

4.2.7. Land Mines, Cluster Munitions and other Explosive Remnants

Out of the 15 respondents to the questionnaire, 11 (73.3%) replied that there was no known threat of land mines, cluster munitions, and other explosive remnants in the region. On the other hand, 4 individuals (26.7%) expressed their belief that such material did pose a risk in some places in the study area.

According to our informants from Lalibela, the TPLF forces buried their dead on school grounds (at Qäbära primary school, for instance). There is a fear that land mines may have been deliberately buried in that school, and the children and teachers do not dare set foot on the premises. In other places, like the Chinese camp (locally known as Lāwəz) near the church of Nä'akuto Lā'ab, there is another mass grave. This place is very suitable for agriculture and has a residential quarter. However, people are avoiding the area out of fear of land mines.

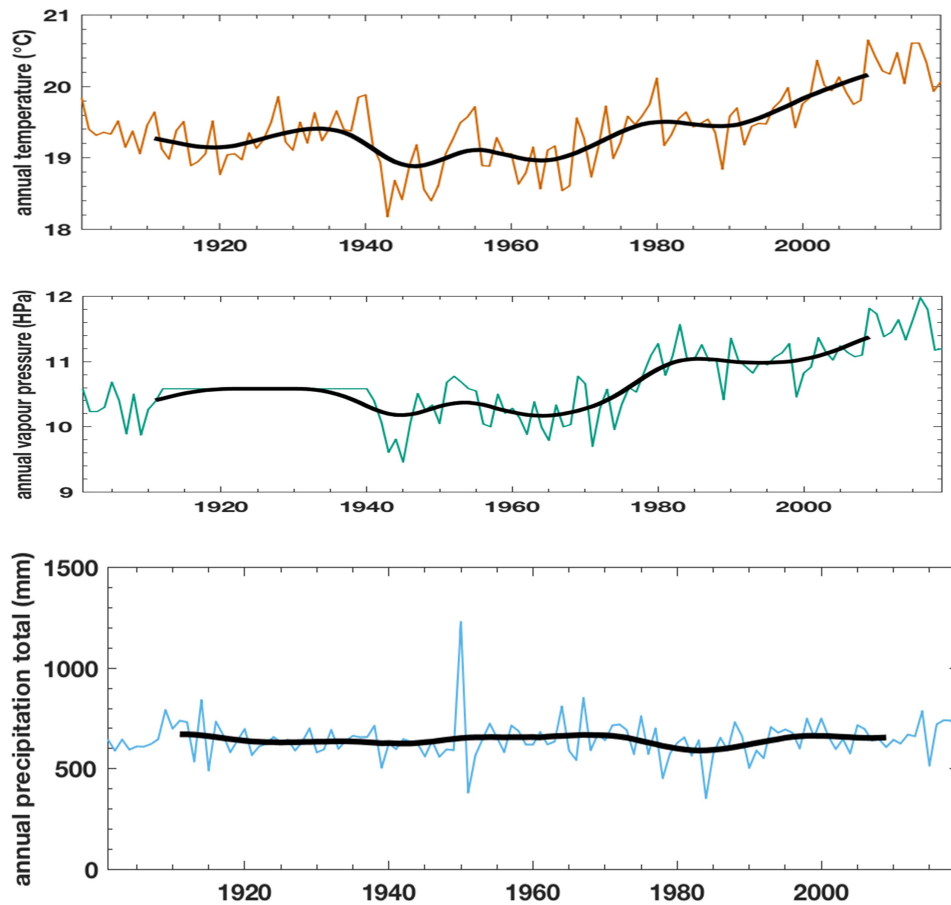
Respondents from Gašāna and Hamusit told us that there is a possibility that land mines were left behind in farmers' fields and in places where mass burials were undertaken. They asserted that they had also observed large numbers of bullets in the ground at the Hamusit mass grave.

The landmine threat exists wherever the TPLF forces are stationed. They had fortifications in all 17 *qäbäles* of Gazo *wäräda*, according to our informants from Ǝstayəš. However, most of our informants agree that, in practice, careful field investigations are needed to give a credible answer to this question.

4.2.8. Impact on Local Temperature and Oxygen

This question was not included in the assessment questionnaire for the respondents. Instead, it is meant to be addressed by comparing pre- and post-war temperature changes, annual rainfall, precipitation, and water vapour. Although it is not yet easy to assess changes in temperature and the local environment at this early stage, the effects will be visible in the coming 2 to 3 years, due to the massive deforestation that has been taking place in the

region. Here, the current temperature, vapour pressure, and precipitation of Lalibela and its surroundings are compared with the 120-year data retrieved from the National Meteorological Agency (Graph 1). Currently, Lalibela has a mean annual temperature of 20°C, 700 mm of precipitation, and 41% humidity. The temperature has been rising since 1995; prior to that, it had not exceeded 19.5°C. In view of the current anthropogenic impact on the environment, the annual temperature is likely to rise further. The graph below may be used to compare pre-war and post-war temperature differences. The graph stops at the year 2020, which is ideal for comparison since the war intensified post-2020.



Graph 1: Annual temperature, water vapour pressure, precipitation, 1900-2020 (National Meteorological Agency)

4.3. Concluding Remarks on the Environmental Survey

- As discussed above, there is a serious shortage of water in the town of Lalibela and the surrounding areas. This shortage of water is affecting the daily livelihood of the inhabitants, their cattle, and their farmland. The only water source for the inhabitants of Lalibela is on the outskirts of the town, from where it has to be fetched and distributed. Groundwater is available near the airport at a depth of 180 metres. There are five groundwater sources in this area with discharge capacities of 6.5 litres/second, 16.6 litres/second and 20 litres/second. These water sources need to be tapped wisely to make a supply available to the inhabitants.
- The electricity supply for Lalibela is normally acquired from Alamaṭa, but since the town of Alamaṭa remained under TPLF's control, the electricity supply was disrupted until January 2023. One major negative side effect of the lack of electricity is the people's total reliance on firewood and charcoal for cooking, which has resulted in uncontrolled deforestation, which in turn is affecting the environmental equilibrium by increasing desertification and reducing rainfall (see the trend of temperature rise in Graph 1; data supplied by the National Meteorological Agency).
- Currently, there seem to be no immediate conservational challenges at the World Heritage Site of Lalibela. However, vibrations from the movement of heavy artillery and the firing of these weapons will surely have affected the church buildings and structures.
- Towns like Lalibela generate most of their income from tourism. For tourism to flourish in a given area, peace is a pre-requisite. The lack of tourism has severely affected hotels, tour operators, and above all, the local inhabitants. Unless peace prevails, Lalibela and its surrounding areas will fail economically and cease to be a centre of attraction.
- In most places that we visited, fortifications had been dug out using mechanical excavators, especially on farmland. Refilling these trenches should be an immediate priority since farmers need to go back to focusing on their routine work of cultivating the land. Conducting further research on how to deal with these trenches may also be another option. These, together with the mass burials, have affected the landscape and disturbed the geomorphological status quo.

5. Brief Assessment Visit to Däse and Ḥayq

The main purpose of this visit by Eshetu Abey to South Wällo Zone in April 2022 was to see whether the war had adversely affected the monastery of Däbrä Ḥayq Ḥstifanos, which is of interest to the SolZag Project because of its association with the first post-Zagwe, Solomonic ruler, Yəkunno Amlak. At the same time, the project director requested that Eshetu follow up on reports of damage and looting at the Däse regional museum, 30 km from Ḥayq, which held important historical, archaeological, and palaeontological collections.

5.1. Results

Däse

In Däse, the investigator first visited the heritage sites comprising the 19th-century palace complex of King Michael of Wällo. The palace is large, and the architectural style employed to construct it is also unique. An informant at the palace reported that when the town was captured by the TPLF, the local community took advantage of the situation and stole a variety of materials, such as cement, metal, and lime that had been purchased for the restoration and maintenance of the monuments. No damage was done to the monuments themselves. However, the palace of King Michael of Wällo is already in a bad state of preservation.

At the Däse Museum, run by the Däse Culture and Tourism Office, the investigator found the door sealed and, therefore, he was unable to enter. When he asked why the museum was closed, local people informed him that when the TPLF took over the town, all the government officials had fled, and gangsters from the community had immediately looted the museum for valuable artefacts. This eyewitness information differs from the version given in a press release by Fana Broadcasting Corporate (Addis Ababa) on December 16, 2021,⁹ which reported a statement made by the Head of the Culture, Tourism, and Sports Department of Däse Town Administration, Seid Aragaw, that TPLF members had been responsible for looting and ransacking the museum. Objects stolen or destroyed included Emperor Menelik II's telephone, weapons seized from the Italians at the Battle of Adwa, and objects made of silver and gold. At the time of the visit, it was not possible to gain access to the museum or gather any further information about the state of the building and its contents.

⁹ <https://www.fanabc.com/english/terrorist-tplf-looted-and-vandalized-dessie-museum/>

Ḥayq Ḥṣṭifanos

Ḥayq Ḥṣṭifanos Monastery is a self-governing institution located on a promontory, formerly an island, in Lake Ḥayq. At the time of the assessment visit, monastery life appeared to be continuing as normal, with nuns at the neighbouring Margäbeta Giyorgis nunnery selling traditional dress and monks from the monastery selling religious books or tending their fields and orchards. The museum appeared to be the same as it had been on a previous visit some years earlier.

5.2. Concluding Remarks on the Assessment Visit

- The Däse Museum has been severely plundered and damaged, and an all-round effort needs to be made to recover stolen objects. The museum has to be restored and renovated.
- The 19th century palace of King Michael of Wällo needs to be renovated over a short period of time and be accessible to visitors.
- Taking advantage of the current prevailing peace, the Museum in the monastery of Däbrä Ḥayq should be promoted and popularised by the zonal and regional Culture and Tourism Bureaus. In due course, the monks will benefit by selling their handicrafts.

6. Conclusions

People's lives in many parts of the study area are gradually returning to normal after the withdrawal of the TPLF, but numerous serious challenges remain. These include the lack of electric power for domestic and public utility uses; the resulting water shortage; shortages of food due to disruption of production and distribution chains; disruption of farming due to the damage done to fields and seedling nurseries, the loss of livestock seized or killed by the invading forces, and the lack of electric power and spare parts for irrigation; and rapidly rising prices. Education has been affected in some places due to mass burials and the risk of landmines on school grounds. Some communities have also faced severe economic hardship in part because they have had to feed large contingents first of TPLF fighters and then of federal forces. In Lalibela itself, however, the primary economic impact of the war has been the total collapse of tourism, which was especially bitter since the town had just suffered a very lean year caused by the COVID-19 pandemic. Only now are tourists beginning to trickle back to the town, and it will be some time before the necessary infrastructure has been restored to an extent that enables the town to thrive again.

The environmental consequences of the war include the landscape effects of military earthworks and mass graves, but the most severe impact has been the massive deforestation for charcoal production, to compensate for the lack of electricity. Forest cover in the area was already low, and some tree-planting schemes were being undertaken prior to the war. Now a widespread and vigorous programme of reforestation is needed to remedy the situation, but this will take many years. In the meantime, deforestation is likely to result in higher temperatures and lower rainfall, exacerbated by global climate change.

The impact on heritage resources and archaeological sites in and around Lalibela appears to have been minimal, with only some concentrations of lithic artefacts having been damaged by military earthworks; however, the long-term effects on the monuments of the vibrations caused by heavy artillery bombardments and vehicle movements have yet to become apparent. More immediately serious is the situation in Däse, where the museum was ransacked and its collections looted or destroyed. In the absence of any further news, we can only hope that steps are being taken to conserve what remains and to try to recover items that were stolen.

Finally, the war has exposed both the resilience of communities and the potential fragility of environmental protection and heritage conservation. People migrated to escape atrocities and the threat of starvation, but most returned as soon as they could to resume their lives in their home communities. However, in order to survive, they had to resort to depredation of the environment by felling trees for charcoal production, even in protected areas. The religious monuments of Lalibela and its surroundings emerged from the war and occupation apparently unscathed. It would be comforting to think that the TPLF forces refrained from damaging them perhaps because of their faith, but there may also have been more pragmatic reasons, such as fear of the international condemnation that would have ensued had this UNESCO World Heritage site been desecrated, and perhaps there were negotiations between the rebel leaders and the church authorities in Lalibela to prevent this from happening. In Däse, unfortunately, whoever destroyed the museum collections had no such compunction.

To help avoid such problems in the future, the work of cataloguing, photographing, and registering heritage collections and individual items needs to be stepped up, and security systems should be installed or upgraded with some urgency. The state of all monuments and other resources should be regularly assessed and documented. Most of all, it is important to raise

awareness among all sections of society that heritage resources are not only a valuable economic asset that can benefit everyone but also a cultural asset of humanity that local people have a duty to safeguard.

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List of key informants

No	Site	Name	Age	Occupation
1	Yəmrəḥännä Krəstos	<i>Märiḡeta</i> Tadesse Hailu	43	Church teacher
2		Deacon Gizachew Dessale	35	Police Officer
3		<i>W/ro.</i> Gebeyanesh Gezu	30	Merchant
4		<i>Abba</i> Gebre Eyesus Gebre Mariam	47	<i>Abun</i> of Yəmrəḥännä Krəstos Church
4	Zazəya Šəllase and Arba'tu Ənsəssa	<i>Qes</i> Adane Hailu	38	Church treasurer
5		<i>Ato</i> Tadesse Tesfaye	60	Farmer/church elder
6		<i>Ato</i> Girmaye Adane	68	Farmer/security guard
7	Bəlbäla Giyorgis	<i>Märiḡeta</i> Debash Dingelich	46	Church teacher
8	Bəlbäla Čärqos	<i>Qes</i> Tebeje Zewuldie	60	Church treasurer
9		<i>Ato</i> Abay Tadesse	47	Farmer
10	Gännätä Maryam	<i>Qes</i> Yiheyis Alemu	58	Church chairman
11		<i>W/ro.</i> Habtam Wudu	50	Merchant
12	Lalibela town	<i>Ato</i> Desale Mamo	35	Cultural Centre Manager
13		<i>Ato</i> Assefa Shiferaw	36	Water & Sewerage Authority
14	Gašäna wäräda	Temesgen Amare	17	Student
		Fikire Awoke	19	Student
15	Əstayəš wäräda	Getie Enanye	32	Natural resources expert
16		Mesganaw Molla	35	Agricultural expert.