



Project Report

On

**Population status, threats and community-based conservation awareness for
the critically endangered White-backed Vulture (*Gyps africanus*) in urban
areas of Tigray region, Northern Ethiopia**



Duration: 12 months, from July 2025 to June 2026.

Funded: African Bird Club (ABC).

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Aksum University, Axum, Ethiopia, on 20th June, 2026

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Executive Summary

Urban environments provide important alternative habitats for vultures, particularly in regions where natural habitats are increasingly degraded. This study assessed the diversity, abundance, habitat use, and threats affecting vulture populations in selected urban areas of Tigray, Northern Ethiopia. Field surveys were conducted in Shire, Mekelle, and Axum, focusing on dumpsites, abattoirs, residential areas, urban parks and associated roosting areas. A total of 2,593 vultures belonging to six species were recorded, comprising Hooded Vultures (*Necrosyrtes monachus*), Lappet-faced Vultures (*Torgos tracheliotos*), White-backed Vultures (*Gyps africanus*), Rüppell's Vultures (*Gyps rueppelli*), Egyptian Vultures (*Neophron percnopterus*), and White-headed Vultures (*Trigonoceps occipitalis*). Hooded Vultures were the dominant species, accounting for 93.4% of all observations. Most recorded individuals were adults (95.26%), while juveniles and immature birds represented only 4.55% and 0.19%, respectively. Shire areas supported the highest species richness and abundance, indicating the importance of its landfill and surrounding habitats as key refuges for urban vultures. Vultures were primarily observed feeding on organic waste and livestock carcasses and roosting in nearby Eucalyptus trees. Seasonal variation was evident, with higher vulture abundance during the wet season than the dry season. Respondents and field observations identified several threats, including human disturbance, waste burning, free-ranging domestic animals, poisoning, electrocution, hunting, habitat loss, and changes in waste management practices. The findings highlight the ecological significance of urban waste disposal sites for sustaining vulture populations and underscore the need for targeted conservation measures to mitigate anthropogenic threats and promote the long-term survival of vultures in urban landscapes.

Keywords: Vulture, urban ecology, dumpsites, anthropogenic threats, species diversity, conservation, Tigray, Ethiopia

1. Introduction

White-backed Vulture is among the most successful scavenger vultures, playing an essential ecological role by effectively removing carcasses of dead animals from the environment. Its feeding behavior, where it strips carcasses bare, prevents the growth of harmful spores, thereby halting the spread of deadly diseases (Ogada et al., 2016). In addition to its ecological significance, the species provides significant tourism value, as it attracts birdwatchers and nature enthusiasts (Whelan et al., 2015). However, over the past three decades, the White-backed Vulture has experienced a significant population decline (63-89%), primarily due to anthropogenic activities including poisoning, habitat loss, lack of food (decline ungulate populations), illegal trade by hunting, human persecution and power line collisions (Ogada et al., 2016; BirdLife International, 2021). As a result, the species has been listed as critically endangered on the IUCN Red List of Threatened Species (IUCN, 2024).

White-backed Vulture is the most widespread and common vulture in Africa ranges from Senegal, Gambia and Mali in the west, throughout the Sahel region to Ethiopia and Somalia in the east, through East Africa into Mozambique, Zimbabwe, Botswana, Namibia and South Africa in the south. It typically resides in open savannas and dry woodlands with scattered trees, such as *Acacia* and *Ficus* species, which serve as roosting and breeding sites. These vultures are also found near human settlements, including slaughterhouses, dumpsites, open markets, and grasslands. Globally, several studies show that their distribution is shrinking (McKean et al., 2013; BirdLife International, 2021), and they are increasingly relying on human-modified habitats, such as abattoirs, landfills, and urban parks (Beselam et al., 2022; Weldemariam and Alembathan, 2023). This shift highlights the urgency of conservation efforts, especially as the White-backed Vulture is facing rapid declines, particularly in urban areas where threats are more concentrated. The declining vulture population is concerning, as vultures face a higher extinction risk than many other species due to their slow reproductive rates and numerous threats. Immediate action is needed to assess the current distribution, population size, and threats facing vultures at regional, national, and continental levels.

Although Nikolaus (2006) reported that the populations of the White-backed Vulture were stable in Ethiopia, there have been no continuous scientific studies or recent data to confirm the current population status over the past nine years. In Ethiopia's Tigray region, no scientific data exists regarding the distribution ranges, population size, and threats facing the White-backed Vulture. The recent conflict in the Tigray region (2020-2022) further exacerbated the situation, leading to the mismanagement of urban areas, including open dumpsites, backyard slaughter sites, and other activities that create risks for scavenger birds. The on-going lack of proper waste management and conservation measures along with low community awareness in these urban settings has increased the threats to the species. Without data to inform targeted conservation actions, protecting the White-backed Vulture in the region has become a significant challenge. This information gap presents a critical barrier to conservation efforts, particularly as the threats to the species in urban areas are becoming more pronounced.

Therefore, this project aimed;

- To assess population status and distribution ranges of the White-backed Vulture and other vulture species in the study area
- To identifying the key threats to the survival of the species
- To sensitize the local communities on the importance of vultures in the ecosystem services

The study findings are important in determining new interventions for conservation of vultures in Urban areas of Ethiopia. While vultures including White-backed vultures are experiencing a catastrophic global decline, largely due to limited data from a lack of scientific research on population trends, our study provides crucial baseline information that will support the on-going conservation and monitoring efforts of White-backed vulture in Ethiopia. The project also addressed the need for effective community engagement and awareness. Local communities were educated on the ecological importance of vultures and the critical threats they face, particularly in urban environments. By working with local stakeholders, including residents, governmental officials and conservationists, the project promotes sustainable practices that support vulture conservation.

2. Materials and Methods

2.1. Study sites

The study was conducted in Mekelle, Axum, and Indaselasse Shire towns Tigray region, Ethiopia. Tigray is located in northernmost part of Ethiopia, positioned between latitudes 12° 12' and 14° 82' N and longitudes 36° 30' and 40° 30' E. It shares borders with **Eritrea** to the north, **Sudan** to the west, Amhara region to the south, and the Afar region to the east. The region's topography is predominantly plateau, with elevations ranging from 500 to 3,935 meters above sea level. The region consists of six administrative zones, one city administration, and 88 districts. Municipal abattoirs and dumpsites are located near the towns' borders. Following the recent war and siege, numerous local dumpsites and backyard slaughter sites have emerged. These areas are also characterized by large *Eucalyptus* and *Acacia* trees.

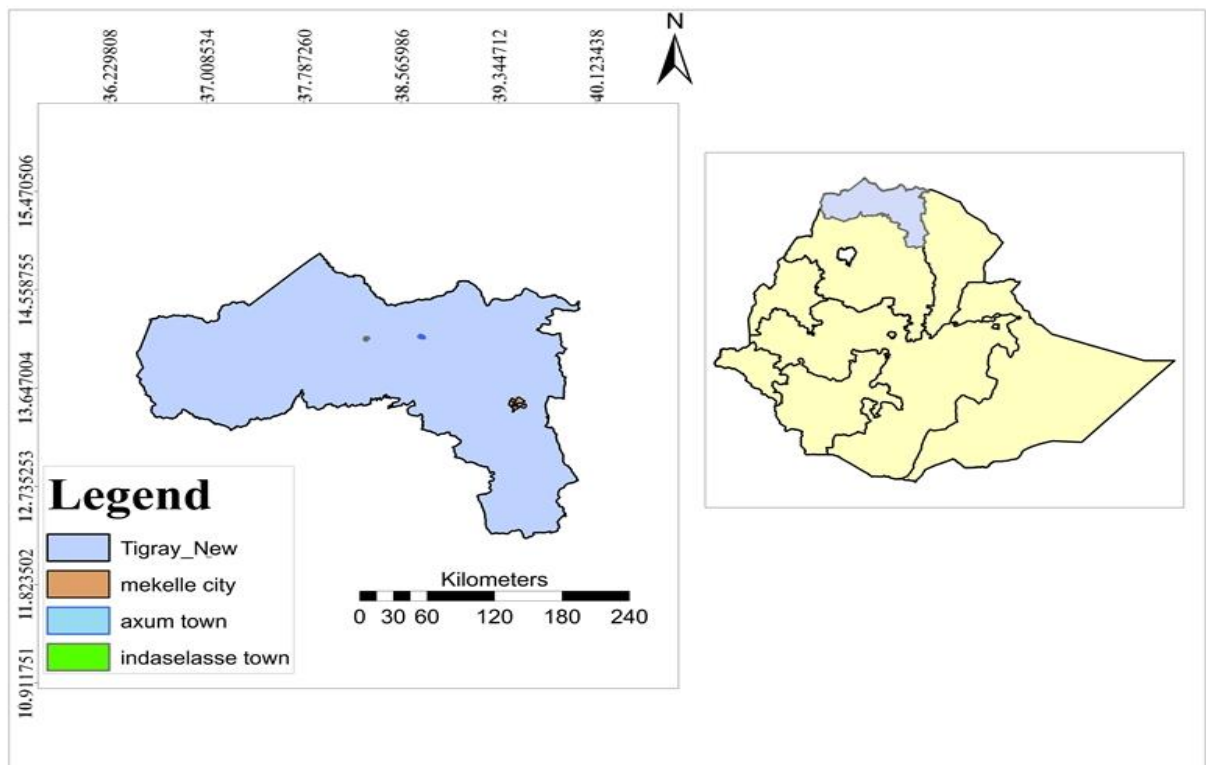


Figure 1: Map of Tigray region with study sites (left) and Ethiopia with regions (right).

2.2. Materials used

During the field survey we used the following field materials

- Binocular (10*40)
- Colored Field guide books of birds of east Africa
- GPS
- Digital Camera
- Notebook
- Pen and pencil
- Bird field data sheet

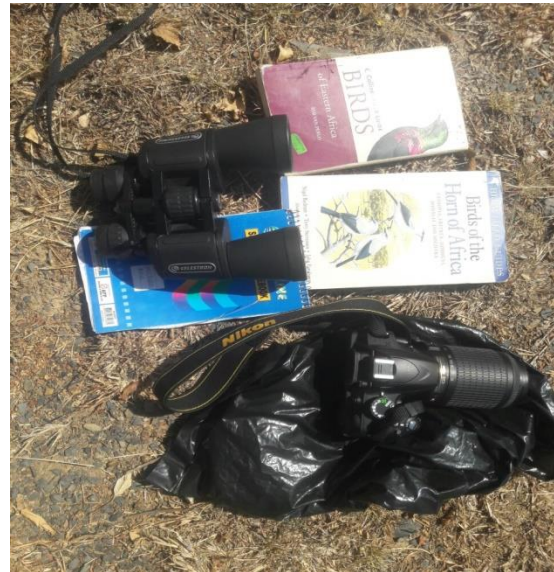


Figure 2: Main equipment used during the field vulture survey.

2.2. Method of data collection

2.2.1. Field survey

A preliminary survey was conducted to gather basic information about the study areas. Landscape types of the towns were identified and 23 study sites (7 dumpsites, 6 abattoirs, 5 residential areas and 5 urban parks), where carcasses and other food scrapes for White-backed vulture are found situated at different geographical locations (cities) of Tigray region were selected. A total count technique was employed during the field survey to assess White-backed Vulture and other vultures population size (Pomeroy, 1992). Counting of vultures was conducted in their roosting and foraging sites, from a fixed area and fixed time (Sutherland, 2006). The counting was made as quickly as possible to reduce that risk of double-counting. To minimize disturbance during counting, a waiting period of 3 to 5 minutes was applied prior to counting, and then count was made for a period of 15 minutes. Field data was collected from July, 2025 to

May, 2026. Data was collected every two weeks twice a day early in the morning from 6:00 a.m. to 10:00 a.m. and late afternoon from 4:00 p.m. to 6:00 p.m. when the bird activity is high (Shimelis and Afework, 2008). Vulture age group, activity, behavior, and nesting sites were recorded. Binocular was used for vulture observation, and then species was identified using standard field guides (Redman et al., 2009). Photographs were also taken to confirm the species identification and its activity patterns.



Figure 3: Research team during vultures count at Shire dumpsite with Aksum University Research Directorate delegate for project supervision, July, 2025 and January, 2026. Photo by Dr. Alembrian Assefa

2.2.2. Threats assessment

Threats that affecting the distribution and population status of White-backed Vulture was determined through direct field observation. Local communities' practices against the species, availability of food sources and management of sites were also recorded. Moreover, interview with randomly selected local communities (teachers, students, residents, people working at abattoirs and dumpsites, conservationist and government authorities) was conducted to assess the major threats of the vulture. The total number of respondents from each town were determined based their total population using Cochran (1963) formula.

$$n = \frac{\frac{Z^2 * P * (1 - P)}{e^2}}{1 - r} = \frac{n_0}{1 - r}$$

Where, n is sample size, p is proportion of the people who interact with vulture (p = 0.5), (1-p) is proportion of the people who do not interact with vulture, e is margin error (e = 0.05), Z is the value of the standard normal random variable at 95% level of confidence is Z =1.96, and r is non-response rate, r = 10%.

2.2.3. Capacity building training

Capacity building training through workshop and educational programs was provided to about 300 local communities and other concerned bodies to increase their awareness on economic and ecological benefits, current threats and the urgent need of conservation of White-backed Vulture in particular. Moreover, vulture outreach campaign was made in school communities of the study area. The campaign has been an opportunity to explain to the community members about the ecological role of vultures, threats they are facing today, and the urgent need of their conservation.

2.3. Data analysis

Microsoft Excel and SPSS were used to analyze the data. ArcGIS was used to prepare the distribution map of the species.

3. Result and Discussion

3.1.Vulture species composition and abundance

During the study period, a total of 2,593 vultures belonging to six species were recorded in the study area. These comprised 2,422 Hooded Vultures, 71 Lappet-faced Vultures, 41 White-backed Vultures, 23 Rüppell's Vultures, 22 Egyptian Vultures, and 14 White-headed Vultures (Tables 1–3; Figure 4). Hooded Vultures were by far the most abundant species, accounting for 93.4% of all recorded individuals. Moreover, several species of bird groups were observed in the study area, including marabou, crows, eagles, hawks, storks, kites, and egrets, indicating the area's importance as a habitat for diverse avifaunal communities.

Regarding age structure, 2,470 (95.26%) of the recorded vultures were adults, 118 (4.55%) were juveniles, and only 5 (0.19%) were immature individuals (Table 4), indicating a predominance of

adult birds within the surveyed population. Species richness varied among the study sites. Six vulture species were recorded in Shire, whereas only four species were documented in both Mekelle and Axum.

Hooded Vultures were the most abundant species across all sites, with the highest number recorded in Shire ($n = 1,234$), followed by Mekelle ($n = 656$) and Axum ($n = 532$). Similarly, the highest numbers of Lappet-faced Vultures ($n = 52$) and White-backed Vultures ($n = 20$) were also observed in Shire. These findings suggest that Hooded Vultures are strongly associated with urban environments, consistent with previous studies (Getachew et al., 2016; Weldemariam and Alembrian, 2026).

Compared with the other study sites, the Shire dumpsite appeared to provide the most suitable alternative habitat for vultures. This may be attributed to the greater availability of food resources from solid waste disposal, as well as the presence of extensive nearby plantations such as Eucalyptus that offer suitable roosting sites.

Most vultures were observed at feeding sites associated with dumpsites and abattoirs. Large congregations were frequently recorded feeding on discarded waste and livestock carcasses, while roosting primarily in Eucalyptus trees located near landfills, abattoirs, and residential areas. Seasonal variation in vulture abundance was also evident, with a higher number of individuals recorded during the wet season ($n = 1,419$) than during the dry season ($n = 1,174$). This difference may be related to seasonal fluctuations in food availability and resource distribution (Weldemariam and Alembrian, 2023).



Figure 4: Flock of Vultures at Shire dumpsite, July 2025 Photo by Dr. Alembrian Assefa

Table 1: Seasonal population size of Vultures among urban landscapes of Shire town, Tigray region, Ethiopia

No.	Species	Shire Town										Total
		Abattoir		Dumpsite		Residential Area		Urban Park		Backyard Slaughter site		
		W	D	W	D	W	D	W	D	W	D	
1.	Hooded Vulture	76	23	602	378	94	41	8	12	-	-	1234
2.	Rueppell’s Griffon Vulture	-	-	19	4	-	-	-	-	-	-	23
3.	White-backed Vulture	2	-	14	4	-	-	-	-	-	-	20
4.	White-headed Vulture	-	-	8	3	-	-	-	-	-	-	11
5.	Lappet-faced Vulture	4	2	9	11	2	16	-	8	-	-	52
6.	Egyptian Vulture	-	-	3	3		3	-	-	-	-	9
	Total	82	25	655	403	96	60	8	20	-	-	1347

Where, W = wet, D = Dry

Table 2: Seasonal population size of Vultures among urban landscapes of Axum town, Tigray region, Ethiopia

No.	Species	Axum Town										Total
		Abattoir		Dumpsite		Residenti al Area		Urban Park		Backyard Slaughter site		
		W	D	W	D	W	D	W	D	W	D	
1.	Hooded Vulture	-	-	138	165	74	21	-	3	88	43	532
2.	White-backed Vulture	-	-	-	-	-	-	-	-	3	2	5
3.	White-headed Vulture	-	-	-	-	-	-	-	-	3	-	3
4.	Lappet-faced Vulture		-	2	-	-	-	-	-	-	-	2
	Total	-	-	140	165	74	21	-	3	94	45	542

Table 3: Seasonal population size of Vultures among urban landscapes of Mekelle city, Tigray region, Ethiopia

No.	Species	Mekelle city										Total
		Abattoir		Dumpsite		Residenti al Area		Urban Park		Backyard Slaughter site		
		W	D	W	D	W	D	W	D	W	D	
1.	Hooded Vulture	47	63	143	245	23	54	-	7	36	38	656
2.	White-backed Vulture	2	-	9	5	-	-	-	-	-	-	16
3.	Lappet-faced Vulture	-	-	-	19	-	-	-	-	-	-	19
4.	Egyptian Vulture	3	-	7	3	-	-	-	-	-	-	13
	Total	52	63	159	272	23	54	-	7	36	38	704

Table 4. Age group of vultures among urban landscapes of Tigray region, Ethiopia

Site	Adult	Juvenile	Immature
Shire town			
Municipal Abattoir	89	18	-
Dumpsite	1007	46	5
Residential Area	151	5	-
Urban park	25	3	-
Backyard Slaughter site	-	-	-
Axum town			
Municipal Abattoir	-	-	-
Dumpsite	287	18	-
Residential Area	95	-	-
Urban park	3	-	-
Backyard Slaughter site	133	6	-
Mekelle city			
Municipal Abattoir	112	3	-
Dumpsite	421	10	-
Residential Area	68	9	-
Urban park	7	-	-
Backyard Slaughter site	74	-	-
Total	2,470	118	5

3.2. Threats to Vultures in urban areas of Tigray

Although urban areas can serve as important alternative habitats for birds including vultures, they are also subject to numerous anthropogenic pressures that threaten wildlife populations. In the present study, respondents identified a range of human-induced activities occurring in and around urban landscapes that negatively affect biological resources, including vulture populations. All respondents (100%) reported that intense human disturbances at dumpsites such as the activities of waste collectors and their vehicles or carts, waste burning, and the presence of free-ranging domestic animals (cattle, dogs, cats, and goats) constitute the major threats to vultures and their habitats (Figure 5). Other important threats identified by respondents included poisoning, electrocution, hunting, and food shortages. In addition, the loss of nesting and roosting trees, expansion of human settlements, and changes in waste disposal practices at abattoirs and landfill sites were perceived as emerging threats to vulture conservation.

Field observations conducted during the study further confirmed the prevalence of these threats across the study sites. Researchers observed frequent disturbances from livestock, carts, bulldozers, and people collecting food leftovers, scrap metals, and other reusable materials within landfill areas. Such disturbances can adversely affect the survival, distribution, diversity, and abundance of vultures by reducing feeding opportunities and increasing habitat degradation.

Daily waste-collection activities, waste burning, and the presence of free-ranging dogs, cats, and cattle were common at most landfill sites. These activities can interfere with feeding behavior and other essential ecological activities of vultures (Getachew et al., 2016). Furthermore, free-ranging dogs and cats may pose additional risks, particularly to juvenile and immature birds, by causing direct mortality or disrupting feeding and roosting activities (Seyoum and Bezawork, 2018).

During the study period, it was observed that vultures frequently abandoned feeding sites when human activity intensified around landfills and abattoirs, retreating to nearby forests, utility poles, and buildings. They typically returned only after disturbance levels had declined. Similar behavioral responses were observed at informal slaughter sites located near roadsides, where heavy pedestrian and vehicle traffic often forced vultures to temporarily leave feeding areas.

These findings highlight the significant influence of human disturbance on the behavior and conservation of urban vulture populations.



Figure 5: Human based threats in Mekelle and Shire dumpsites, 2026 Photo by Dr. Alembrian Assefa

From the capacity building training, inadequate knowledge and awareness of vultures is still a problem to vulture conservation where many persons do not know vultures and confuse them with others big birds of prey like some eagle species. Also they don't know the roles of vulture in their daily life and wellbeing (Figure 6). This training contributes to deliver detail ecological, economic and social roles of vultures and then the community take a promise to take the stewardship in conservation and protection of vultures and their habitats. The awareness-raising campaign participated above 750 school community members was also helps to share the ecological role of vultures, their threats and conservation. The community members and students were invited to discuss and share stories about vultures and the role they contribute to the ecosystem. The central message was about the role community members around vulture sites can play in supporting the conservation of vultures in Tigray, Ethiopia.



Figure 6: Capacity building training in Axum, April, 2026 (left) and School community based conservation campaign (right)

4. Conclusion and Recommendation:

This project identified six species of vultures across the urban landscapes of Shire, Axum and Mekelle towns. On the basis of counts at feeding sites, a population of 2,593 individuals of Vultures was estimated. And 1,419 individuals of Vultures were estimated during the wet season of the survey and 1,174 individuals were counted during the dry season. Six species vultures were identified in Shire urban areas and only four species were recorded from Axum and Mekelle sites. Hooded Vultures were the most abundant species, demonstrating a strong association with urban habitats, particularly dumpsites and abattoirs. Shire areas supported both the highest species richness and abundance, highlighting its importance as a critical refuge and feeding ground for vultures in northern Ethiopia. Dumpsites are the most suitable feeding sites of vultures than other areas.

Despite the importance of urban habitats, vultures face numerous threats arising from human activities. Disturbance from waste collection operations, waste burning, free-ranging domestic animals, habitat degradation, poisoning, electrocution, hunting, and changing waste disposal practices were identified as major conservation concerns. These threats not only reduce habitat quality but also disrupt feeding, roosting, and breeding activities, potentially affecting the long-term viability of vulture populations.

In general, study demonstrates that urban waste disposal sites currently provide essential resources for vultures; however, increasing anthropogenic pressures pose significant challenges to their conservation. Effective management interventions are therefore required to ensure the continued survival of these ecologically important scavengers.

Based on the findings of this study, the following recommendations are proposed:

- Conduct nationwide vulture surveys and monitoring programs to assess population status, distribution patterns, and major threats across Ethiopia, thereby providing a robust basis for national conservation planning.
- Undertake detailed ecological and movement studies focusing on roost-site selection, feeding and breeding ecology, migration patterns, and the impacts of waste management practices on vulture populations to fill critical knowledge gaps.
- Develop and implement a national vulture conservation action plan based on scientific evidence, with a focus on protecting key habitats, reducing anthropogenic threats, and strengthening conservation advocacy at local and national levels.
- Integrate biodiversity conservation into urban planning and management by establishing bird-friendly infrastructure, minimizing habitat disturbance, controlling free-ranging domestic animals, reducing collision and electrocution risks, and implementing long-term urban biodiversity monitoring programs.

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6. Appendixes

Representatives of field and others photo



Images 1: Vultures at backyard slaughter sites of Axum town, August 2025 photo by Dr. Alembrian Assefa



Image 2: Vultures observed in Axum dumpsite and residential areas, November 2025 photo by Dr. Alembrian Assefa



Images 3: Flock of Vultures at Shire dumpsite, July 2025 photo by Dr. Alembrian Assefa



Image 4: Vulture counting at Mekelle dumpsite, December 2025 Photo by Dr. Alembrian Assefa



Image 5: PI of the project counting Vulture population in Axum (above) and Shire dumpsites (bottom), August, 2025 Photo by Dr. Alembrhan Assefa



Latitude: 14.129977
Longitude: 38.280718
Elevation: 1915.81m
Accuracy: 1.5m
Time: 06-06-2026 16:47
Note: Shire Dumpsite.D8

Image 6: Research team at Shire dumpsite during the dry season, 2026 Photo by Dr. Alembrian Assefa



Image 7: Flock of Hadada Ibis resting on trees found at Shire dumpsite, December 2025, Photo by Amleset Gaim



Image 8: Introduction of domestics animals at Shire dumpsite, 2025 Photo by Dr. Alembrhan Assefa



Image 9: Carts dumping wastes at Shire dumpsite, August 2025 Photo by Dr. Alembrian Assefa



Image 10: Human disturbance inside Mekelle dumpsite, January 2026 Photo By Dr. Alembrhan Assefa



Image 11: Capacity building training in Axum town, February, 2026.