

Review of the Gaps in Wildlife Laws, Policies, Strategies, and Current Challenges in Implementing Wildlife Laws in Ethiopian Wildlife Conservation Sector

Taye Lemma Geleta

Ethiopian Wildlife Conservation Authority,
Abijata Shalla Lakes National Park, Po.Box 27,
Negelle Arsi/Dole Harowani,
Ethiopia

ABSTRACT

The focus of this paper is to study review of policy related to Ethiopian wildlife conservation and management. The purpose is to provide information on wildlife policy, legal issues, challenges in implementing the existing wildlife laws, and gap analyses. The methodology used literature and document review. Ethiopia has wildlife policies and laws to conserve, protect, and develop its wildlife. The reviewed data analysed through SWOT (Strength Weakness Opportunity Threats) analysis techniques. The study revealed gaps in Ethiopian wildlife strategy policies and laws, including private management of protected areas, the need for environmental impact assessments, and community benefits. Besides, weak law enforcement, illegal wildlife trafficking, and limited technology in combating wildlife crimes are observed in wildlife conservation while implementing the existing law (i.e., Proclamation No. 575/2008). Despite policy and law gaps, their availability could attract international and national organizations to contribute to ecotourism development. It is concluded that, filling in the gaps in policy and legal matters on wildlife strategy requires working with law enforcement, strengthening the prosecutors' skills, leveraging modern technologies, and creating plans to reduce poaching and trafficking.

Key words/phrases: Poaching, Trafficking, Wildlife conservation, Wildlife laws, Wildlife policy and strategy.

1. INTRODUCTION

Policy and law are two tools to achieve sustainable wildlife management. Ethiopia has various policies and laws at the federal and regional levels that address wildlife protection and wildlife crime (FDRE Criminal Code, 2004; FDRE/WSE, 2005). The FDRE/WSE (2005) describes comprehensive technical policies, legislation, and institutions to protect the country's wildlife resources. Policy and laws are important in transferring natural resources to future generations by careful planning and management (Gemalmaz, 2022). The conference in Rio de Janeiro (1992) stressed the obligation to protect the environment and natural resources from exploitation, rule, and occupation. Moreover, the Earth Summit of Agenda 21 (United Nations Conventions on Environment and Development) indicated the importance of protecting natural habitats for conserving and managing biological resources for development (Siboni, 2020). Based on the above declarations and management of categories in the protected areas system (IUCN, 1994), the country established different PAs, both in-situ and ex-situ (IBC, 2005), to develop, conserve, and utilize biodiversity, forest, and wildlife resources. In-situ conservation is the main category of PAs in Africa and Ethiopia. The country has established more than sixty wildlife PAs (EWCA, 2017). National parks have been the most established conservation areas (Chen *et al.*, 2023). Protected areas have been playing roles in the economic, ecological, recreation, eco-tourism, employment, and social structure of the community, with significant roles in conservation. For instance, the country obtained revenue of 63.5 million birr in 2015 from tourism and other utilizations (SDPASE/EWCA, 2015). The study also showed that the ecosystem services of 14 wildlife PAs in the country were estimated at 325 million USD in 2015 (SDPASE/EWCA, 2015). Presently, most of the wildlife PAs is affected by ineffectiveness and conflicts between local people living in or adjacent to the parks (Taye Lemma and Girma Mengesha, 2021; Kidane Esayas *et al.*, 2024), unwise utilization of resources (Muluken Abayneh, 2020), habitat destruction, and fragmentation (Mengistu Wondimagegn, 2020). Furthermore, state accountability and transparency (poor governance, corruption, and misuse of power) might result in the unsustainable use of wildlife resource management (Endalkachew Teshome, 2021; Bichel and Hart, 2023). Therefore, it is imperative to investigate the challenges of legal issues in the country. Policies and laws can deal with challenges and solve problems. The existing wildlife policy, strategies, and laws cover extensive focal points (Kahsay Gebretensae and Mitiku Gebremicael, 2018). However, there are gaps in the wildlife legal

frameworks with its implementation. Despite identifying gaps in the legal framework and challenges in wildlife policies, the unaddressed gaps, further require studies for policymakers to identify and address these issues.

2. MATERIALS AND METHODS

2.1. The Study Area's Description

The country is located between 3° N and 15° N latitudes and 33° E and 48° E longitudes, having a land area of 1.12 km² (Figure 1). The land configuration above sea level is 4543 m and below 110 m, respectively. Friis *et al.* (2010) reported that Ethiopian biomes (i.e., large, naturally occurring communities of flora and fauna occupying major habitats) based on vegetation types (i.e., considering the altitude and climatic conditions) have been divided into five major groups (i.e., *Acaccia commiphora*, *Combretum terminalia*, dry Afromontane, moist Afromontane, and others (e.g., various aquatic biomes) (Figure 1). Generally, the country has multiple habitats of a wide range, ranging from the semi-deserts along the eastern border to the tropical highland forests in the south to the extensive afromontane in the northern and south western parts (en.m.wikipedia.org).

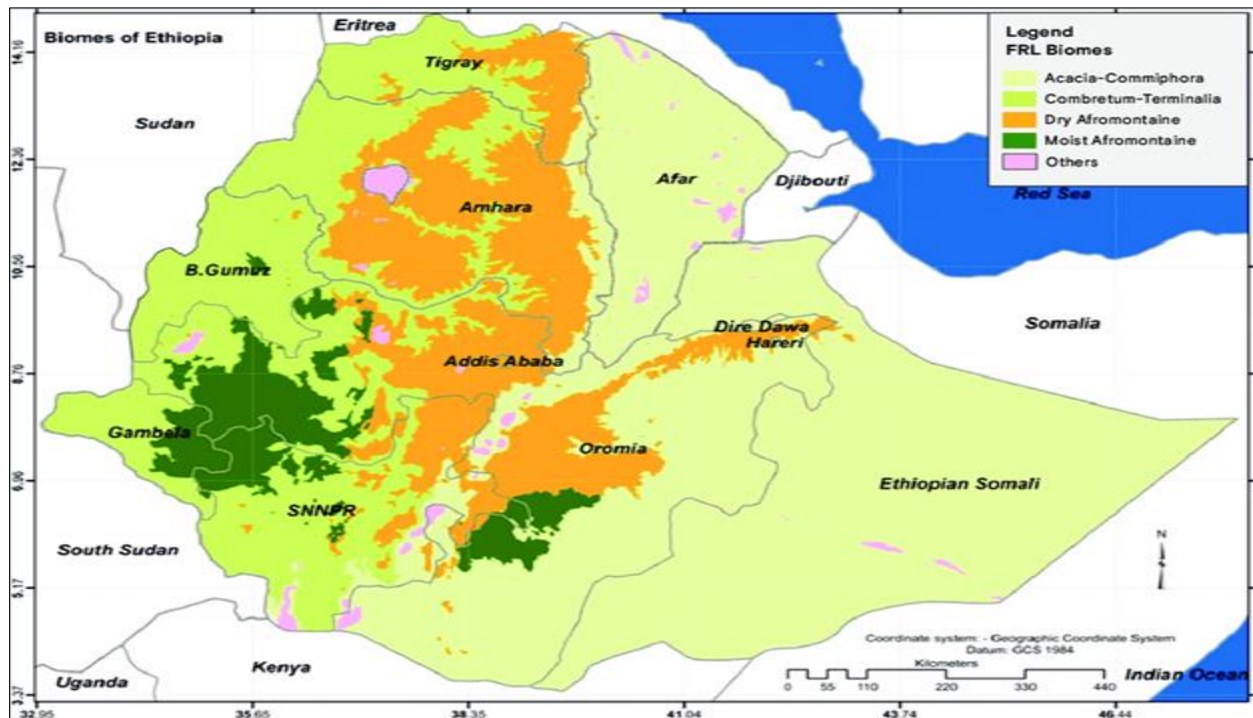


Figure 1. Map of Ethiopia locating nearby countries and its flora biomes (Soure: Friis *et al.*, 2010)

2.2. Methods

This paper reviews the literature on Ethiopia's wildlife management sector, international conventions, national conservation strategies and wildlife policies and laws. It includes historical data from the country's oldest regulations, wildlife hunting regulations, the establishment of the Ethiopian Wildlife Conservation Organization, scientific publications, newsletters, reports, and unpublished country wildlife sector reports. Generally, it is accessed between March and November 2024.

2.3. Data Analysis

The reviewed data were analysed through SWOT (Strength Weakness Opportunity Threats) analysis techniques (Appendix table 1). Moreover, the descriptively (qualitatively) thoughts and numerically (quantified) numbers were also used while analysing the gaps in policy and wildlife laws, and implementing challenges in conserving the wildlife resources of the country.

3. RESULT AND DISCUSSION

3.1. The Gaps in Wildlife Laws, Policies, and Strategies

3.1.1. Wildlife Policy and Strategies

Ethiopia's Wildlife Policy and Strategies (EWPS) address wildlife conservation through decrees, laws, and policies (FDRE/WSE, 2005). It also implements multilateral environmental agreements like CITES, CBD and IUCN, ensuring legal frameworks in national legislation. The wildlife policy aims to protect and develop the country's wildlife and habitats sustainably, enabling the sector to contribute to economic development. It comprises five main parts: wildlife development, resource utilization, investor participation, wildlife research, education, and information services (FDRE/WSE, 2005). The Ethiopia Wildlife Policy Strategy

(EWPS) has identified gaps in wildlife development and protection, including the lack of community ownership in wildlife habitats, wildlife resource utilization, investor participation, data base development, the establishment of trust funds for disaster protection, and the absence of modern veterinary units. The sound conservation of wildlife species and their habitats, with re-demarcation, re-gazettement, effective management, and development of protected areas (PAs) are priority concerns. Proper and sustainable utilization is essential for incurring conservation fees. The Wildlife Policy Strategy (WPS) is implemented at federal and regional levels, allowing regional states to create their own wildlife policies. The relevant line ministry ensures implementation through programs, projects, and regulations (FDRE/WSE, 2005). Wildlife Policy Strategy (WPS) offers opportunities for wildlife conservation and development, attracting international and national organizations and tourists who are willing to pay for tourism experiences, taxes, and tariffs (Thomsen, 2022; Mugabe *et al.*, 2024; Okumu *et al.*, 2024). Hence, this might be important to collect more possible share of tourists. Existing wildlife policy and strategy overlook various issues, habitat loss/ destruction, habitat fragmentation, rapid population growth, settlement, agriculture, and others human induced factors (Appendix table 1) influencing many PAs in the country, with major suggested gaps being discussed.

Lack of Stakeholders' Role

Working with stakeholders outside the PAs can reduce conflict between humans and wildlife (Mekonen, 2020; Kc *et al.*, 2024). Early protected areas laws used co-management and developed a legal history for lawyers and managers to serve as legal tools in protected areas legislation for decades (Bruce, 2023; Herman, 2024). For instance, Uganda practiced collaborative management (i.e., stakeholders, especially local communities with the nearby PAs) in the conservation of natural resources (i.e., peculiar to conservation areas) (Bugabo *et al.*, 2023; Katswera, 2023). In Ethiopia, there is a lack of stakeholders' roles outside protected areas in wildlife management. Most stakeholders are not involved in conservation activities due to the absence of a coordinating body, endless interest-driven conflicts among the various stakeholders, and a top-down management approach (Jadallah, 2023; Pouliot and Thérien, 2023). Effective stakeholder collaboration is required for managing the wildlife conservation of Ethiopia (Simeneh Admasu *et al.*, 2023; Mekuria Wolde and Hailelassie Amare, 2024). Lack of stakeholder's role might challenge or threats for public managers (Appendix table 1). Thus, collaborative management (i.e., with stakeholders outside the PAs) can enhance biodiversity protection for the long-term success of PAs (Maretti *et al.*, 2023; Vis *et al.*, 2024).

Limited Private Administration

According to the Ethiopian Constitution Article 40(3), land and other natural resources are publicly owned. In the country, All Protected Areas are governed by federal and regional governments except for some conservation and hunting areas. Limited private administration of PAs is one of the gaps in the country's PAs. Similarly, Tesema *et al.* (2010) reported that about 2.5% of PAs in the country are governed by the private sector. Private investors have the capital to conserve the resources. For example, most African countries better manage their resource and generate income than Ethiopia through privatizing their conservation areas and promoting community conservation, which reduces their government investment in conservation (Pas *et al.*, 2023; Takahashi *et al.*, 2024). Even in Ethiopia, most PAs have no more supervision vehicles, and it is old enough or not available. As a result, the opportunities for illegal activities are prevalent. So, privatization can be good for supporting conservation and promoting wildlife policy. But, in some cases, they overexploit resources and excavating sand (Appendix table 1) in some areas of the country. However, there are hunting companies engaged in sport hunting in the country. But, presently, due to a lack of incentive mechanisms in the investment, some private investors are unwilling to continue in the sector (EWCA annual report, 2023). So, private stakeholders in the administration of conservation areas have to increase to support government investment in the sector.

Land Use Planning and Zoning

No land use plan indicates a separate place for wildlife zones in Ethiopia. Weak project design, logging, agriculture, development near PAs, deforestation, ecological integrity, geological hazardous might showed that due to absence of land use planning and zoning occurred in the country (Appendix table 1). Land use planning and zoning for wildlife is another gap indicated in the wildlife sector policy. However, there is a practice for allocating the given conservation areas. For instance, the regional government requests the federal to carry out the study (i.e., wildlife assessment). After the study is carried out and fully meets the criteria of the IUCN categories of protected area management, the sector will support technical demarcation and finally appeal to councils of ministers (parliament) or regional governments to assign PAs; after that, it will be gazetted. Buffer zones and ecological corridors are used to support conservation areas (Gregory *et al.*, 2021; Wen *et al.*, 2024). For instance, the Botswana Wildlife Conservation Policy described wildlife migration and crop raiding as reduced due to the availability of animal corridors in the PAs (LaRocco, 2024). However, in Ethiopia, there is a lack of land use planning and zoning for wildlife in the wildlife policy. Even due to limited corridors, human-wildlife conflict is prevalent in most PAs.

Absence of Environmental Impact Assessment

There was no integrated policy linking infrastructure development with wildlife conservation work. The state and private development of commercial farms and railway construction by the state around PAs were affecting the wildlife and its habitats (Markakis, 2021). So, presently, many development works affect wildlife conservation. The absence of an environmental impact assessment (EIA) is also another policy gap observed. For instance, the Omo-Kuraz sugar factory took over about 1/3 of the park, and several wildlife died (EWCA annual report, 2017). In Awash National Park, pastoralists also claim that infrastructure development (mainly access roads and railways) at federal and regional levels has affected the survival of animal populations in the park. Many were eyewitnesses to the road kills of several animals on the Addis-Dire Dawa asphalt road and Addis-Dire Dawa railway (Solomon Abebe, 2014). Even in BES, about 10,000 ha were given to private investors, and elephant corridors became agricultural lands (Yirmed Demeke, 2008). However, some African countries, like Zimbabwe, address impact assessment in their policies (Muchapondwa and Ntuli, 2024). In Ethiopia, habitat loss, habitat fragmentation, and escalation of environmental problems (Appendix table 1) occurred in the country due to developmental activities that were practiced inside or around the PAs that have no EIA in most cases. But, this might be a risk to wildlife conservation works.

Disposing the Confiscated Items and Handling of the Rescued Wild Animals

Presently, in Ethiopia, live animals and wildlife products are arrested by illegal traders, hunters, or poachers. The live animals in the wild, but the wildlife products have no place to stay (EWCA annual report, 2017). lack of transparency and accountability, limited deterrence effect, improper disposal methods and resource recovery, potential for re-trafficking due to security risks and market resilience, neglecting alternative solution like overlooking sustainable practices and missed education opportunities, impact on conservation narratives through negative perception and diverting attentions) are the difficult situation observed in the country while disposing the confiscated items (Appendix table 1). Moreover; health risks (disease transmissions and in adequate veterinary care), Behavioural challenges (habituation to humans and, stress and trauma), ecological impacts (disruption of local ecosystems and competition for resources), legal and regulatory issues (compliance with laws and permitting and licensing), funding and resources (lack of funding and inadequate facilities), public perception and support (misinformation and ethical concerns) and long term viability (sustainability of programs and monitoring post release) (Appendix table 1) are other constraints while handling the rescued wild animals. Generally, mechanisms are absent for disposing of confiscated items and handling the rescued wild animals in the country's wildlife conservation policy. The policy does not describe where to put the rescued animals and wildlife products after a seizure. Similarly, Kahsay Gebretensae and Mitiku Gebremicael (2018) reported that the country has no legally supported mechanism to dispose of confiscated wildlife products. However, it lives on the site of PAs. Hence, it is probably easy to commit corruption. Generally, amending the issues into a policy amendment can be required. For instance, dishonesty or corruption is more prevalent where elephants are available (i.e., due to capturing the ivory trade).

Lack of Community Benefit

There are various types of fees provided in tourism. The nearby communities did not benefit from the entrance fee, conservation fee, and others. However, they participated in development works like road or bridge construction or maintenance, boundary demarcation, wildlife censuses, and other related activities in the conservation areas. Similarly, Melkamu Abebe and Tesfaye Tura (2023) and Amare Wondirad (2020) reported that the availability of policies might be an opportunity for ecotourism development even though communities lack the benefit of the income generated. However, other scholars have described that not only policy but also local community involvement is necessary to save wildlife and forest resources from being damaged if they obtain benefits from the PA income generated (Endaylalu Gulte *et al.*, 2023; Alemitu Worku, 2024). For instance, the Zambia Wildlife Authority gets about half of its income from community land hunting concessions and makes a benefit share to local communities (Chiposa *et al.*, 2024). Muriuki *et al.* (2024), Kenya supports governing communal parks through community-based development projects. So, policies for wildlife conservation have to acknowledge the need for local communities to benefit from PAs in addition to having land ownership and control over the use of natural resources (Bontempi *et al.*, 2023; Dixit *et al.*, 2024). The exclusion of local communities from the management of PAs has had a severe social and ecological impact on the resources of many countries (Henok Bekele, 2023; Mestanza-Ramón *et al.*, 2023; Mutanga *et al.*, 2024). Hence, it is relevant power to allow people to exercise their capacities to manage resources, make decisions, and control activities. Insufficient community engagement, economic disparities, cultural insensitivity, HWC negative impact on livelihood and inadequate conflict resolution mechanisms, policy inconsistencies, and weak enforcement and external economic pressure are factors that hinders the community benefit in the wildlife management (Appendix table 1). In general, a lack of community benefit might be one factor in the ineffective management of wildlife and forest resources. So, the policy needs amendments.

Human-Wildlife Conflict Resolution Mechanism

Conflict might occur during forage, water, or corridor shortages (i.e., wild animals migrate to neighboring areas where settlement and agriculture are available and bring crop raiding). For instance, Taye Lemma and Girma Mengesha (2022) reported that in the Babile Elephant Sanctuary (BES), out of 244 incidents of Human Elephant Conflict, 121 (i.e., more than 49%) incidents were crop raiding recorded in the study areas over the last five years (2016-2020). Conflict prevention and dispute resolution mechanisms are necessary to reduce the impact on Protected Areas from human-wildlife conflict. There are no prevention and dispute resolution mechanisms for human-wildlife conflict in wildlife strategy and policy in the country (Kahsay Gebretensae and Mitiku Gebremicael, 2018). The absence of compensation fees for wildlife causes damage to the property of local communities. In Africa, South Africa, Nigeria, Kenya, and Uganda have established a wildlife tribunal that hears appeals from the decisions of the wildlife authority (Mbarga, 2024). For instance, Kenya pays compensation fees for loss of life and personal injuries for human-elephant conflict (Manoa and Mwaura, 2024). Ethiopia has no resolution mechanism for human and elephant conflict incorporated in their wildlife regulation. So, amending the policy and governance (i.e., legislation and conflict resolution mechanisms), conflict mitigation strategies (such as- buffer zone fencing and barriers, and alternative livelihoods), technology and innovation (i.e., wildlife trafficking using GPS collars and drones, and smart phone applications), and partnerships and collaborations with multi-stakeholders are necessary mechanisms that directly or indirectly important to reduce the HWC impact. Moreover, compensation fees, measures such as free wildlife zones, translocation, sometimes culling or attracting animals away from areas of concern, training, or empowering the communities within or around the wildlife range can be possible for reducing human and wildlife conflict (Appendix table 1).

3.2.2. Wildlife Laws

Wildlife regulation was introduced in 1908, during the reign of Imperial Menelik II, and has a nine-article law strictly forbidding the hunting of young elephants (EWCA, 2012). During this time, ivory exports were at their highest rate between 1900 and 1909 and decreased sharply in 1910 (Donham and James, 2002). Fitha-Negest (i.e., the law book of the time), justified as causing harm to wildlife, was prohibited. For instance, the biblical commandment prohibits causing harm to wild animals. On the contrary, the absence of provisions on conserving and protecting wildlife was a gap in the law. In Article 27 of its 1956 constitution, as indicated, the King has the supreme power to define the powers and duties of all institutions. In the 1930 and 1956 constitutions, the legal provisions enabled us to undertake better activities regarding wildlife conservation. Even so, there are provisions for natural resources: water, air, lakes, and rivers. For instance, in 1944, the first Preservation of Game Proclamation was issued, which defined wildlife as a finite natural resource. Following the establishment of the Department of Forestry, Game, and Fishery by the Ministry of Agriculture in 1945 was endorsed (EWCA, 2012). In the 1960s, based on UNESCO, the country established a semi-autonomous conservation organization (EWCO) under the Ministry of Agriculture (MoA) in 1965 (Young, 2012). Through negotiation (i.e., by giving fewer compensation fees to local peoples), protected areas began. For instance, Solomon Abebe (2014) reported that during the establishment period of ANP, the Emperor took over the land and provided 600 gasha (250 km²) of land to the Kereyou people as compensation. In 1974, Derg overthrew the imperial government through a coup d'état and assumed power. Then, following this, the country had no constitution for 13 years, except for proclamations and regulations. Some of the proclamations, such as Proclamation No. 192/1980, were issued on wildlife conservation. In 1988, based on the ideology of socialism, the military government proclaimed No. 1/1988, which describes the natural balance preserved and that natural resources such as land, water, forest, and wildlife are conserved and utilized by the people (i.e., Article 10 of 1988). For instance, the 1975 land reform policy following the replacement of the Imperial regime by the socialist "Derg" was not supportive of genuine land-holding rights for local communities. The privatization of forests (i.e., Proc. No. 226/1965) and private wildlife conservation areas (i.e., Game Proc. No. 61/1944), were also transferred to government ownership. In general, in the Derg regime, the private and community ownership were ignored.

The existing Constitution was ratified in 1995; and consists of 11 sections and 106 articles. Three government bodies are under the democratic system. They are the legislative (i.e., the parliament), the executive (i.e., the Council of Ministers), and the judiciary as autonomous. According to Article 51(5) of the 1995 Constitution, the parliament issues legislation on the conservation of land, natural resources, and historical heritage. Consequently, the regional governments administer land and natural resources by the law issued by the federal government (Article 52(2d) of the Constitution). After 2007, a revision was made in Ethiopia, governing wildlife matters were justified under Proclamation No. 541/2007. However, there are different gaps in the existing wildlife law based on sound wildlife conservation, utilization, and protection in the country (Kahsay Gebretensae and Mitiku Gebremicael, 2018). For instance, when we look at the role and benefit sharing of local community legislation (under Proclamation No. 541/2007), we find the following provisions: 1st: Based on agreements made between a national park or wildlife sanctuary management and the surrounding communities, seasonal utilization of natural resources may under controlled conditions. 2nd: The authority shall transfer 85% of the revenue from trophy hunting, live exports, and filming. When we look at the first provision, the legislation does not clearly show the partnership that should exist between the park and the local community. The participation of local communities in resource utilization depends on the well-being of the management. The benefit-sharing provision shows

revenue between the federal government and regional government (15% and 85%, respectively), which does not indicate whether the regional government uses its share for local people. Thus, the proclamation and regulation of Ethiopian wildlife do not ensure the active participation of the local community in wildlife management and the benefit of the park. Gohori (2024) reported that, in Mozambique, ambiguous wildlife legislation has to constrain local influence over wildlife resources. Weak enforcement mechanisms (limited resources and corruptions), political instability (change in governance and conflict), Lack of public awareness (education deficits and cultural attitudes), economic pressure (development Vs conservation and poaching and illegal trade), inadequate legislation (outdate laws and gaps in coverage), globalization (transnational crime and invasive species), climate change (habitat loss and species migrations), community disengagement (lack of local involvement and conflicts with livelihoods) are various constraints that affect the wildlife management and it has to be considered while amending in the wildlife laws of the country (Appendix table 1). In Ethiopia, absence of detailed elaborations on the wildlife term “wildlife” (i.e., only to wild animals and does not include the total natural resources and the habitats of wildlife), lack of law regarding the disposal of confiscated items, and handling of rescued wild animals; limited powers of EWCA officers and absence of special wildlife prosecutors; absence of a legal framework to establish a trust fund and utilization of the funds; absence of provisions of protection for witness and victims of wildlife offenses; lack of consistency between federal and regional legal frameworks and absence laws related to partners to manage and develop PAs were the identified gaps occurred in the existed wildlife law of the country (Kahsay Gebretensae and Mitiku Gebremicael, 2018).

3.2. Challenges in Implementing the Existing Wildlife Laws

3.2.1. Intelligence Gathering, Information Exchange and Investigation Techniques

Wildlife crimes or other illegal activities threaten national, regional, and international conservation efforts. Wildlife crimes pose a significant threat to conservation efforts, with poaching, habitat destruction, illegal trafficking, and trade in live fauna and flora being major drivers (Narreddy and Shashidhar, 2024; Mozer and Prost, 2023). In Ethiopia, poaching has led to the extinction of elephants and other wildlife resources (Taye Lemma and Girma Mengesha, 2021; Aster Gebrehiwet, 2024). Effective enforcement power, investigation techniques, data collection, transmission, and analysis are crucial for combating wildlife crime (Liu; 2023; Hu, 2024). Intelligence is a key tool; it is not practiced in Ethiopia, resulting in a lack of credibility, legitimacy, accuracy and relevance (Kahsay Gebretensae and Mitiku Gebremicael, 2018). Law enforcement bodies must motivate the public to report wildlife offenses and employ multi-dimensional and disciplinary approaches. Challenges in Ethiopia include ineffective information, weak communication, limited data, knowledge gaps, identification of wildlife products, a lack of effective law enforcement, a networked approach, and limited trans-border collaboration. Additionally, a lack of skill, poor collaboration, complex and hidden ways of wildlife crime, inadequate evidence, unwillingness of eyewitnesses, and a lack of awareness of intelligence gathering and investigation techniques were observed in the wildlife conservation sector of Ethiopia (Mekbebe Tesema, 2017). Generally, intelligence gathering, information exchange and investigation techniques can be enhanced by the integration of technology through community involvement and robust training, enhanced collaborations (inter-agency partnerships and community involvement), advanced technology utilization, public awareness and advocacy (education campaign and community advocacy), international cooperation (global networks and joint operations) and funding opportunity (attracting grants and public private partnership) (Appendix table 1).

3.2.2. Prosecution Process

Public prosecutors in criminal cases have a unique role in representing the public and must adhere to ethical and professional standards to ensure a fair legal process (Mekbebe Tessema, 2017). However, in Africa, the content and enforcement of wildlife laws and penalties lead to low penalties and awareness among judges (Davids, 2020; Gbadegesin, 2023). In Ethiopia, low penalties and awareness have hindered the prosecution process of wildlife criminals. The current law imposes fines between 5,000 and 30,000 Birr, with imprisonment for up to five years (Figure 2). As indicated in (Figure 2) below, most of the offenders were penalized with the minimum fines (between 5,000-9,000 ETB) whereas some offenders penalized with maximum fines (30,000ETB). This difference might show that the judge’s decision does not consider the significance of wildlife for socio-economic and cultural values. The prosecution process faces challenges such as inadequate skills, knowledge gaps, and awareness of wildlife crimes, poor communication, and lack of penalty advice. To improve the effectiveness of the prosecution process, judges must be raised on the seriousness of wildlife crimes and the importance of respecting the principles and rules of the laws (Mekbebe Tessema, 2017; Kahsay Gebretensae and Mitiku Gebremicael, 2018).

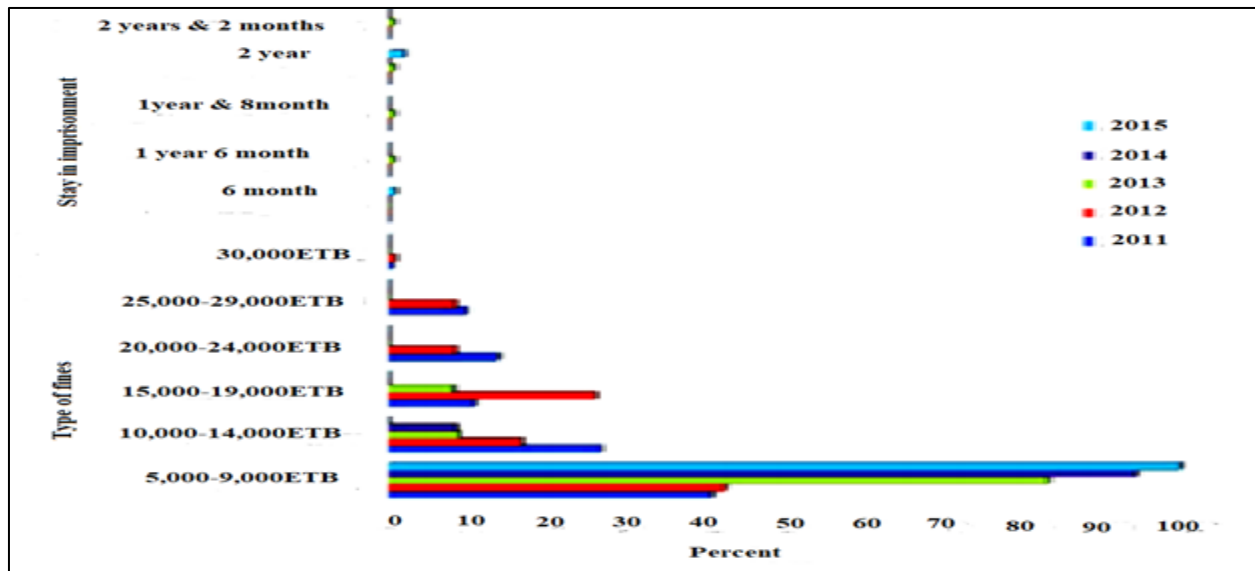


Figure 2. Court Decisions Made to Penalize illegal Wildlife Traffickers Arrested at Bole Intl. Airport from 2011 to 2015 (Source: EWCA, 2016 cited in Mekbebe Tessema, 2017)

3.2.3. Limited Operational Security and Inter-Agency communication

Ethiopia's wildlife conservation mainly faces challenges from illegal human activities such as poaching (Taye Lemma and Girma Mengesha, 2021; Shimelis Tekletsadik and Taye Lemma, 2024), habitat loss due to deforestation, and human-wildlife conflict (Mekbebe Eshetu *et al.*, 2019). The country's weak legislation and illegal trafficking and trade contribute to these issues (CITES Secretariat, 2014). Collaboration between federal and regional law enforcement agencies, communities, and international organizations is crucial to reducing wildlife crime (EWCA, 2016). However, constraints such as a lack of awareness of wildlife policy, wildlife crime, and illegal trafficking and trade can limit stakeholder collaboration (Mekbebe Tessema, 2017). Insider threats (corruption and information leaks), resource limitations (funding shortages and in adequate training), community relations (local resistance and misinformation), cross-border challenges (transnational crime and jurisdictional issues), political and legal obstacles (weak legal frameworks and political instability), political influence, conflicting interests, public distrust, legal barriers, short term focuses, turnover and staff changes and cultural resistance are the threats for operational security and inter agency communication while implementing the existing wildlife laws in the country (Appendix table 1). Besides, Kahsay Gebretensae and Mitiku Gebremicael (2018) reported that ineffective protected area management and conflict management strategies can hinder stakeholders' efforts during operational security and interagency communication. Therefore, effective communication among inter-agencies, local communities, and other partners is crucial for creating a good working environment and reducing wildlife crime.

3.2.4. Weak Law Enforcement

Wildlife law enforcement in Ethiopia is often weak due to political determination and poor management of conservation activities. Settlements in some protected areas (PAs) and lack of political (Meharu Fekadu *et al.*, 2022) can complicate law enforcement implementation. However, financial rewards (Qiming *et al.*, 2022) can motivate local politicians to invest in protecting natural resources. Other factors such as lack of skill, experience in resource management, and lack of effective prosecution services can also affect law enforcement (Mekbebe Tessema, 2017). Resource limitations (funding and personnel shortages), lack of training awareness of regulations, corruption and bribery, judicial challenges (weak legal framework and prolonged legal), lack of public engagement and support (community relations and public awareness), technology gaps (lack of technology and data management), geographical challenges (difficult terrain and cross-border issues), cultural and economic factors (cultural attitudes and economic pressure) are factors affecting the country's law enforcements (Appendix table 1). According to Kahsay Gebretensae and Mitiku Gebremicael (2018), challenges in the judiciary process occurred while a lack of clear judgment, awareness of wildlife policy, poor evidence handling, and delayed court processes. Insufficient support and funding also contribute to weak law enforcement (Francis and Jared, 2020). Generally, to improve law enforcement, it is essential to motivate staff and conduct regular patrols (i.e., with game scouts and forest guards) on conservation areas (Ayuk *et al.*, 2021).

3.2.5. Illegal Wildlife Trafficking and Poachers

Poaching and wildlife trafficking are organized crimes since they use high-powered technology and weapons (Federico and Maria, 2022). They use modified weapons, light cannons, and toxic substances to kill wild animals and traffic wildlife products. Poaching and trafficking networks are spread through advanced financial means, secretly gathered information, and land or air means of transport (Weru, 2016). The increase in poaching and illicit wildlife trafficking in eastern Africa has reduced elephant populations (Aster Arefaine, 2024). Most poachers are not handlers, but some traders transfer ivory or rhino horns to criminal networks across borders (Jacopo, 2020). Increased poaching, cross boarder challenges, public indifference, inconsistent enforcement, corruption and bribery (compromised enforcement and loss of trust), resource limitations (underfunded agencies and insufficient personnel),weak legal frame works (ambiguous laws and inadequate penalties), community resistance (economic pressure and lack of engagement), and technological challenges (limited surveillance) are a driving forces for illegal wildlife trafficking and poachers to be prevalent in the country (Appendix table 1). Wildlife crime is one of the crimes, alongside drug, arms dealing, and human trafficking (UNODC, 2015). For instance, the global illegal Ivory trafficking routes have multitudes of directions, as indicated in Fig. 3. Most of the large-scale ivory seizures occurred in Africa. For instance, South Africa, Tanzania, and Kenya were the sources of illegal ivory trafficking in transit countries (Malaysia, Vietnam, the Philippines, and Hong Kong) and destination countries (Thailand and China), as indicated below in Fig. 3. In general, to secure African wildlife products, trafficking, blocking increasing demand, strengthening combat zones and community engagement is an important point to consider.

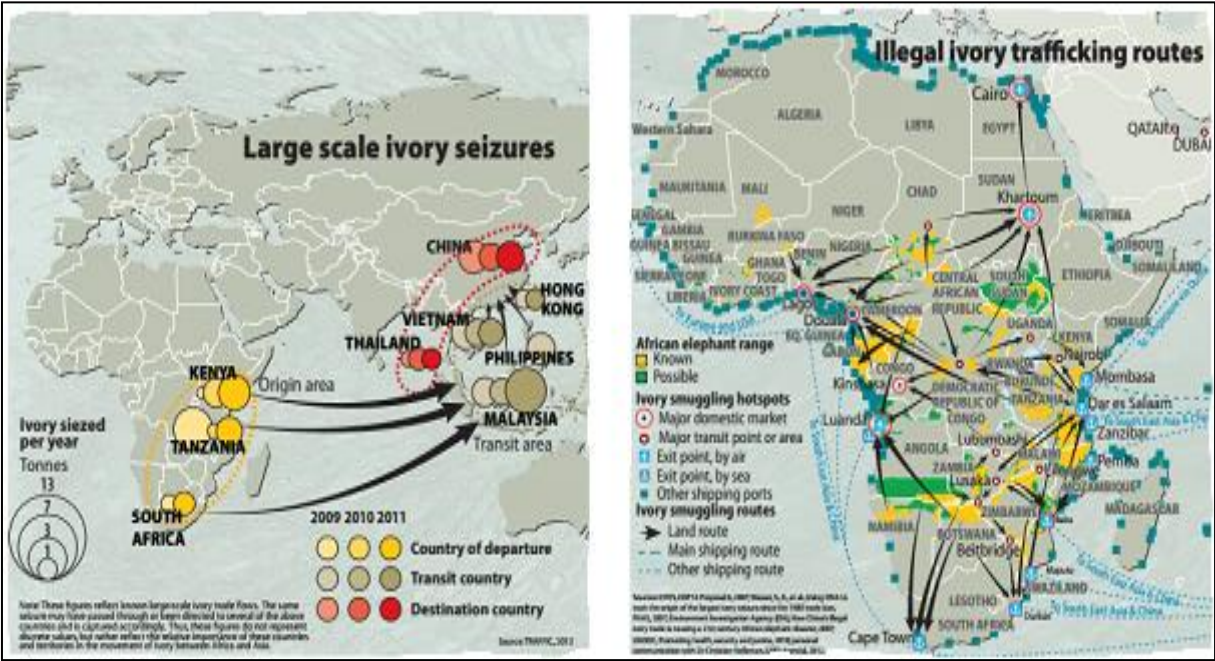


Figure 3. Global Illegal Ivory Trafficking Routes (Source: Riccardo Pravettoni, GRID-Arendal; cited in Bradley & Johan, 2014; Wildlife Poaching: Africa’s Surging Trafficking Threat).

Ethiopia has nine major sites for wildlife trafficking routes, with severity across varying sites (Figure 4). The most common sites are Bole International Airport, the Ethio-Dijoubti border, Togo Wuchalle, Moyale, and Jigjiga. Seasonally, wildlife crimes occur sometimes in Gambella, Kurmuk, and Gizen. Metema and Humera are less frequent (Table 1) (EWCA annual report, 2017). Currently, Ethiopia establishes checkpoints at customs, borders, and airports to regulate the illegal wildlife trade (EWCA, 2017). Over 82% of wildlife trafficking occurs by foreigners illegally, with 72% enacted by Chinese people (Figure 4). Therefore, there has to be careful monitoring around Bole International Airport (BIA).

Table 1. List of Sites Used as Key Trafficking Routes (overland and air) in Ethiopia (Source: Mekbeb Tessema, 2017).

S/N	Site name	Location
1	Humera	Ethio-Sudan border, Tigray Regional Administrative
2	Metema	Ethio-Sudan border, Amhara Regional Administration
3	Kurmuk and Gizen	Ethio-Sudan border,Beneshanguel-Gumuz Regional Administration
4	Gambella	Ethio-South Sudan boarder, Gambella Regional Administration
5	Moyale	Ethio-Kenya boarder, Oromia/Erhio-Somali Regional Administration

6	Jigjiga	Ethio-Somali-border, Somali Regional Administration
7	Togo Wuchalle	Ethio-Somali-border, Somali Regional Administration
8	Dewale	Ethio-Dijoubtiborder,Afar Regional Administration
9	Bole International Airport	Addis Ababa

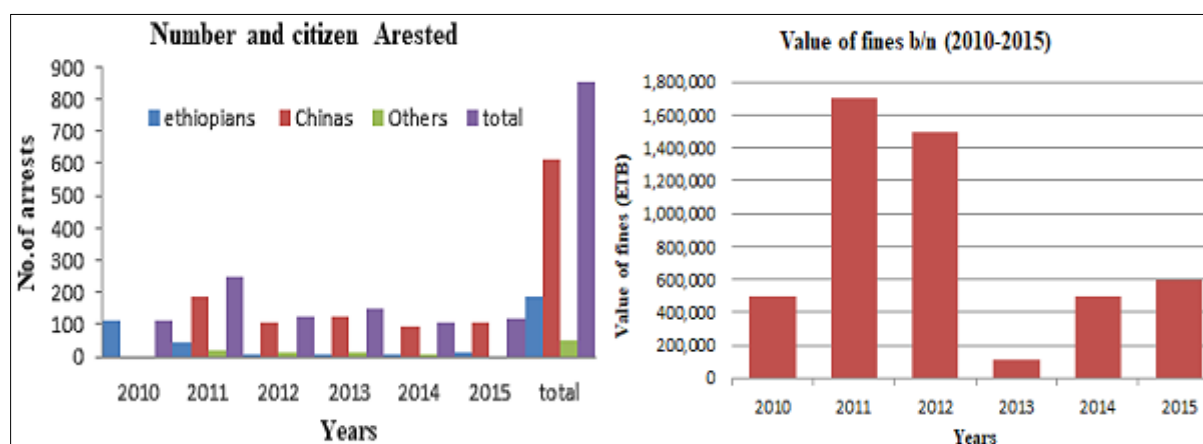


Figure 4. Number of Arrests and Value of Fines (ETB) Penalized for Wildlife Trafficking at Bole International Airport (BIA) in Ethiopia (Source: EWCA, 2016)

Ethiopia is addressing the smuggling of wildlife (Kahsay Gebretensae and Mitiku Gebremicael, 2018), but challenges include insufficient high-tech supplies, facilities, detection skills, awareness, and collaboration among organizations (Mekbebe Tessema, 2017). To reduce the impact of illegal wildlife trafficking and poaching, institutional capacity, effective intelligence gathering, and anti-poaching unit measures are crucial.

3.2.6. Limited Technology in Combating Wildlife Crime

Wildlife detector or sniffer dogs (AWF, 2014; EWCA, 2017 and EWCA-AWF, 2024) are crucial in combating wildlife crime, particularly in tracking down and preventing illicit wildlife trafficking (AWF, 2014; EWCA-AWF, 2024). In Ethiopia, these dogs are used to detect contraband like drugs, weapons, cigarettes, and cash. However, they specifically trained them for wildlife crime detection (EWCA, 2017) and established special controlling unit (canine unit) and officially signed (Figure 5), focusing on the country boundary areas of air and land transit sensitive areas of Bole International Airport (BIA), Metema, Kurmuk, Moyale, Djibuti and Somali boundary (EWCA-AWF, 2024) (source:www.ethiopianreporter.com; accessed date-October 25/2024). For instance, Chita skin and Tiger skin were seizure around Kenya and Somale boundary of the country when illegally trafficked (source: EWCA-AWF report, 2024), however, it is small when related with other African countries like Kenya and others. High-tech equipment techniques, such as Unmanned Aerial Vehicle Systems (UAVS), audio sound traps, mobile technology, radio frequency identification tags, and DNA testing, are also used to detect wildlife crime (<http://www.cybertracker.org>). Criminal adaptations (Technology use by poachers), overreliance on technology (neglect of traditional methods), data privacy and ethical concerns (surveillance issues), high cost and accessibility (financial barriers), data management challenges (information overload), technical expertise gaps (skill shortage), environmental factors (interference from nature), legal and regulatory challenges (compliance issues), and in equitable resource distribution (global disparities) are various factors that influences technology while in combating wildlife crime in general in the globe and in particular in the country Ethiopia (Appendix table 1). Generally, Ethiopia may benefit from exchanging information with international organizations to obtain training on sniffer dogs and enhance technologies for effective wildlife crime prevention.



Figure 5. Graduation for the Established Special Controlling or Canine Unit (A) for Dog Detecting Wildlife Crime (B) at Bole International Airport, Ethiopia (Photo source: EWCA-Public Communication Service Department, November 2024)

CONCLUSION

Ethiopian governments have given attention to wildlife conservation and development activities. To conserve wildlife resources, governments made different decisions by appointing the responsible bodies. For instance, restructuring the responsibility bodies by setting up different proclamations, such as the establishment of the Ethiopia Wildlife Conservation Organization (EWCO) (Order No. 65/1970) and the Ethiopia Wildlife Conservation Authority (EWCA) (Proc. No. 575/2008). Moreover, Proclamation No. 61/1944 on Wildlife Conservation; Forest and Wildlife Conservation Proc. No. 192/1980 and its amended Proc. No. 441/1994; Wildlife Conservation and Development Laws (Proc. No. 541/2007); and regulations like Hunting Regulation No. 5/1909, 416/1971, 445/1974, and others. Besides, different regional wildlife conservation strategies and policies, laws, and regulations were declared. Both federal and regional governments have the conservation of wildlife, but some gaps in wildlife laws, policies, and strategies and challenges in implementing the existing wildlife laws.

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DECLARATION

Abbreviations: AEWA-African Eurasian Water bird Agreement; AWF-African Wildlife Foundation, BWCP- Botswana Wildlife Conservation Policy; CAFTA-DR -The US-Central America Free Trade Agreement - Dominican Republic; CBD-Convention on Biological Diversity; CMS-Convention on Migratory Species of wild animals; CITES-Convention on International Trade in Endangered Species of wild fauna and flora; CSE-Conservation Strategy of Ethiopia; EPA-Environmental Protection Authority; EIA- Environmental Impact Assessment; EWCA-Ethiopia Wildlife Conservation Authority; EWCO-Ethiopia Wildlife Conservation Organization; FPS-Forest Policy Strategy; FAO-Food and Agriculture Organization; FDRE-Federal Democratic Republic of Ethiopia; IBC-Institute of Biodiversity Conservation; ICCWC-International Consortium on Combating Wildlife Crime; ICED-International Cooperation on Environment and Development; INTERPOL- International Police; IUCN-International Union for Conservation of Nature; NBSAP-National Biodiversity Strategic Action Plan; NGOs-Non Governmental Organizations; NP-National Park; PAs-Protected Areas; SDPASE-Sustainable Development Protected Area System of Ethiopia; SMART-The Spatial Monitoring and Reporting Tool; TDP-Tourism Development Policy; TRAFFIC- Trade Record Analysis of Flora and Fauna in Commerce; UNCTOC- United Nations Convention against Transitional Organized Crime; UNCHE- United Nation Conference on Human and Environment; UNCHED-United Nation Convention on Human Environment and Development; UNEP-United Nation Environmental Program; UNESCO – United Nations Educational Scientific and Cultural Organization; UNODC-United Nations Office on Drug and Crime; URT-United Republic of Tanzania; USAID-United State Agency for International Development; WCMC-World Conservation Monitoring Centre ;WCO-World Custom Organization; WSE-Wildlife Strategy of Ethiopia; WWF-World Wide Fund for Nature (formerly World Wildlife Fund).

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Appendix Table 1. Strength Weakness Opportunity Threats (SWOT) analysis

S/N	Actions (activities)	Strength	Weakness	Opportunity	Threats
I. Gaps in Wildlife policy, strategy and implementation					
1.1.	Wild life Policy and Strategy	Identifying the benefit of wildlife, promoting eco-tourism	Lack of effective implementation	Potential of flora and fauna, expansion of PAs, Potential of tourism destination	Habitat loss/ destruction, habitat fragmentation, rapid population growth, settlement, agriculture, and others
1.2	Stakeholders Role	Build trust, reduce conflict, increase support & ownership, engage with local community, environmental experts & government agencies	Delayed & increased costs, reputational damage, regulatory & legal challenges, impact on future project	Creation of trust fund & trust beneficiaries, generating financial support or fund for ecosystem mgt,	Challenge for public managers,
1.3	Private Administration	Improving sustainability (wildlife mgt), enabling private sector, reduce habitat loss & conserve ecosystem, promote ecological services	Exhausted regulation frame work for land governace, weak EIA, tenure risks to local inhabitants and government	Offers incentives, land owner interest, outdoor recreation, increasing wildlife number, create conducive habitat,	Logging, mining, excavation of sand, overexploitation of resources
1.4	Land Use Planning & Zooning	Improved management, efficient use of natural resource use, mitigate land use conflict, resolution of wildlife land use conflict, minimizing negative effects of land use	Weak political will, lack of institutional support,	Appropriate management practice(SLUM), collaborative conservation, wildlife habitat manipulation in mgt and use of NRs ecosystem	Weak project design, logging, agriculture, development near PAs, deforestation, ecological integrity, geological hazardous
1.5	Environmental Impact Assessment (EIA)	Evaluate ecological impact, mgt tool for development project, wildlife health, environmental management,	Time and cost, subjectivity and complexity, potential conflicts and delays, inadequate governance,	Predict the impact on the environment, learn experience, set priorities, optimize strategy, generate practice	Habitat loss, habitat fragmentation, escalation of environmental problems
1.6	Disposing the Confiscated Items	Deterrence of illegal trade, Conservation of biodiversity, Public awareness and education, strengthening legal frame works, supporting sustainable practices, community involvement, international collaborations by strengthen networks and sharing best practices,	Resource waste, lack of transparency, public backlash, limited deterrence effect, improper disposal methods and resource recovery, potential for re trafficking, neglecting alternative solutions by missing education opportunity and exploring alternatives,	Public awareness and advocacy, strengthening legal frame works, community engagement, Deterrence effect on trafficker's, promotion of sustainable practices through encouraging legal alternatives and support for eco-friendly business, international collaboration, gathering data and research, symbolic act of commitment,	Perceived waste of resources, lack of transparency and accountability, public backlash and cultural sensitivity, limited deterrence effect, improper disposal methods and resource recovery, potential for re-trafficking due to security risks and market resilience, neglecting alternative solution like overlooking sustainable practices and missed education opportunities, impact on conservation narratives through negative perception and diverting attentions)
1.7	Handling of the Rescued Wild Animals	Rehabilitation and release of restoration of population and genetic diversity, Public awareness and education, strengthening legal frame works, Research and data collection, strengthen conservation networks, promotion of ethical practices, emergency response and preparedness planning, Economic opportunities through ecotourism potential and job creation,	Resource limitations, in appropriate rehabilitation practices, Ethical dilemmas in captivity concerns and HWC, logistical challenges, legal and regulatory barriers, public conception and mis understanding, Impact on ecosystem, limited research and data.	Species recovery and rehabilitation, public engagement and education, research and data collection, strengthen legal frame works, community based conservation for local empowerment and sustainable livelihoods, emergence preparedness and quick response teams, promotion of ethical standards, collaboration and partnerships for strengthening networks and international cooperation.	Health risks, Behavioural challenges, ecological impacts, legal and regulatory issues, funding and resources, public perception and support (misinformation and ethical concerns), long term viability (sustainability of programs and monitoring post release),
1.8	Community Benefit	Economic empowerment, cultural relevance, enhance	Limited engagement, inadequate resources,	Community based conservation, sustainable	Insufficient community engagement, economic

		social cohesion, education and awareness, participatory governance, generally empower local people, promote sustainable practice and foster a sense of shared responsibility.	conflict interest, policy inconsistencies, lack of enforcement, cultural mis understanding, unequal distribution of benefits and dependency on external funding resources for conservation project.	livelihood, cultural integration, improved governance, conflict mitigation, monitoring and research opportunity.	disparities, cultural insensitivity, HWC negative impact on livelihood and inadequate conflict resolution mechanisms, policy inconsistencies, and weak enforcement, and external economic pressure.
1.9	HWC-Resolution Mechanism	Community involvement through local engagement and empowerments, and adaptive management, education and awareness, conflict mitigation tools(e.g., physical barriers and compensation schemes), collaborative governance(e.g., multi stakeholders partnerships and shared responsibilities), research and monitoring, and legal framework (e.g., clear policies and enforcement mechanisms)	Lack of local involvement, ineffective communication, resource limitations, inadequate monitoring and evaluation, limited governance and policy support, habitat loss and climate change, inflexible strategies, human attitude and perception (negative stereo types and fear and misconception),	Community engagement and education, conflict mitigation strategies (buffer zone fencing and barriers, and alternative livelihoods), monitoring and research, Technology and innovation, Policy and governance (legislation and conflict resolution ,mechanisms), partnerships and collaborations (multistakeholders engagement and interdisciplinary approaches), wildlife conservation incentives,	Inadequate policy frameworks, insufficient funding resources, community resistance, human economic pressure, climate change impacts, lack of coordination and limited stakeholders involvement, access to technology and data mgt issues, political and social instability, wildlife poaching and trafficking,
1.10	Wildlife Laws	Enhancing legal frame works, increased penalty and enforcement, community involvement, public awareness and educations, monitoring and reporting, collaboration and partnerships, and sustainable development integration (balanced development and conservation),	Inadequate legal frameworks, insufficient enforcement, weak penalties, lack of community engagement, poor public awareness, fragmented policies, and inadequate monitoring data (insufficient data collection and limited monitoring approaches)	Legal reforms and update, strengthening international cooperation, community engagement and empowerment, public awareness and education, innovative funding mechanisms (conservation financing and public private partnerships), enhance monitoring systems and research collaborations, and sustainable development integrations,	Weak enforcement mechanisms, political instability, Lack of public awareness, economic pressure, inadequate legislation, transnational crime and invasive species, climate change, community disengagement (lack of local involvement and conflicts with livelihoods),
II. Challenges in implementing existing wildlife laws					
2.1	Intelligence Gathering	Prevention of illegal activities, targeted enforcement operations, improved coordination, data driven decision making, community engagement, enhancing training and capacity building, international support and funding (attracting resources and global network),	Resources limitations, data quality and reliability, technological challenges, coordination issues, community distrust, complexity of wildlife crime, legal and ethical constraints, and lack of training and expertise,	Enhanced collaborations, advanced technology utilization, capacity building, policy development, public awareness and advocacy, international cooperation (global networks and joint operations), improved reporting mechanisms, and funding opportunity (attracting grants and public private partnership),	Data security risks, corruption and misuses, community distrust, inadequate training and expertise, political and legal challenges, resource constraints (limited funding and insufficient technology), and operational challenges,
2.2	Information Exchange	inter-agency cooperation and international partnership, informed decision making, improved resource allocation, community engagement, capacity building, real-time monitoring, strengthen legal frame work, and enhanced public trust (transparency and community support)	Lack of standardization format, limited access to information, resource constraints, inadequate training and capacity, cultural and institutional barriers, ineffective communications, legal and regulatory, and threats to data security (cyber-security risks and data integrity issues),	Improved collaborations, enhanced data collection and analysis, community involvement, capacity building , real time monitoring and reporting, policy development and advocacy, funding and resource mobilizations (attracting grants and public private partnerships), enhanced transparency and accountability (building trust and accountability mechanisms),	Data misinterpretation, privacy concerns, cyber security risks, inconsistent sharing of information among different stakeholders, political bureaucratic barriers, cultural sensitivity, lack of standardization format and protocols, resource limitations, information overload, and technological barriers,
2.3	Investigation Techniques	Data collection and analysis, forensic techniques, intelligence gathering,	Resources limitations, technological challenges, legal and administrative	Advancements in technologies, enhanced data sharing and collaborations,	cyber-security risk and equipment malfunctions, corruption and misconduct,

		technology and software(mobile applications and data mgt systems), training and capacity building, legal framework and policy support (strengthening laws and judicial support),	barriers, corruption and lack of accountability, community relations, international cooperation issues (cross-border challenges and varied legal standards), and limited public awareness.	community engagement, capacity building and training (special training programs and workshops of seminars), forensic science applications (wildlife forensic and trace evidence analysis), policy and legal frame work improvements, and innovative reporting mechanisms.	political and legal obstacles, community resistance, funding and resource constraints, global trafficking networks, public apathy and lack of awareness (low public engagement negative media portrayal),
2.4	Prosecution Process	Legal framework, enforcement agencies, interagency cooperation and NGO partnerships, community involvement and education campaign, judicial systems, data collection and monitoring, challenges in corruption and under reporting.	Insufficient resources, complex legal frame work, lack of awareness and training, weak penalties, corruption and bribery, challenges in gathering evidence and witness intimidation, public engagement and support, and global trade issues.	Strength legal frameworks, increased funding and resources, enhanced training and awareness, utilization of technology, public private partnerships, international cooperation (cross boarder collaboration and shared resources), community based approaches, public awareness campaign (education initiatives and advocacy and activism),	Corruption, lack of political will, limited budgets and personnel shortages, ambiguity in laws and over lapping jurisdictions, difficulties in collecting evidence and witness intimidation, weak penalties and sentences, and lack of public engagement and misinformation.
2.5	Operational Security	Legal framework, training and capacity building and resource allocation, interagency cooperation and partnerships with NGOs, community involvement, technology utilizations, deterrent effects and judicial support, and adaptive management (regular review and adaptation)	ambiguities in laws and lack of specificity, limited enforcement resources, poor interagency coordination, weak community engagement, corruption and mal practice, technological gaps, weak legal penalties and slow judicial process, and adaptive challenges.	Data protection and privacy, collaboration with NGOs and regional cooperation, operational security training and community engagement, technology integration, legal framework enhancement, monitoring and evaluation (regular audits and feedback mechanisms),	Insider threats (corruption and information leaks), cyber security risks and surveillance, resource limitations, local resistance and misinformation, transnational crime and jurisdictional issues, political and legal obstacles and climatic change and natural disasters),
2.6	Inter-Agency Communication	Information sharing, coordinating actions, expertise integration, policy development, public awareness and education, conflict resolution, and monitoring and evaluation,	Lack of coordination, inconsistent messaging, limited resources, bureaucratic barriers, cultural differences, information silos, technology gaps, training and capacity issues, and resistance to change,	Enhanced collaboration, holistic approaches, innovative solutions, strengthened public engagement, data integration, cross-training opportunities, policy advocacy, crisis response, and building trust.	Political influence, resource constraints, conflicting interests, public distrust, legal barriers, technological challenges, short term focuses, turnover and staff changes, and cultural resistance,
2.7	Law Enforcement	Legislation and regulatory framework ,resource allocations, training programs and collaborations, use of technology and data management, community engagement, judicial support, monitoring and evaluation (assessment mechanisms and accountability systems),	Resource limitations, training awareness of regulations, corruption and bribery, judicial challenges (weak legal framework and prolonged legal), public engagement and support, technology gaps, difficult terrain and cross-border issues and cultural and economic factors.	Enhanced training and capacity building, community engagement and support, use of technologies, interagency of collaborations, strengthening legal frameworks, international cooperation (cross boarder initiatives and participation in global agreements), public private partnerships and investigating research and innovative approach),	Corruption, insufficient resources, political interference, weak legal frame works, community apathy and cultural attitudes, remote areas and cross-border trafficking, technological limitations, economic pressure, lack of coordination, and climate change.
2.8	Illegal Wildlife Trafficking	Increased enforcement efforts, enhanced legal frameworks, interagency collaborations, resource allocation, public awareness campaigns, international cooperation, community engagement, training and capacity building, & data collection and research.	Resource strains, corruption, lack of coordination, insufficient training, inadequate legal frameworks, community disengagement, high demand, technological gaps, and public apathy	Increased awareness, strengthened collaboration, enhanced training and resources, development of new technologies, policy reform, public private partnerships, international cooperation, community engagement, informed research and data collection,	Increased poaching, corruption, resource diversion, weak legal frameworks, cross boarder challenges, public indifference, inconsistent enforcement, technological limitations and community resistances,
2.9	Poaching	Law probability of access, weak enforcement of laws, high demand for wildlife	Insufficient funding and resources, corruption, weak legal frameworks,	Strengthening legal frameworks , enhancing enforcements capacity,	Increased wildlife decline (species extinction and ecosystem disruption),

		product, organized crime involvement, Legislation, enforcement, community involvement, technological advancements, judicial system, and global cooperation,	limited community engagement, judicial challenges, ineffective surveillance and monitoring (technical gaps and limited data collection), international coordination (fragmented efforts and varying legal standards),	community engagement and education, utilizing technologies, international collaboration, promoting sustainable alternatives (economic incentives and community based conservation), raising public awareness (media coverage and advocacy campaigns),	corruption and bribery, resource limitations, weak legal frame works (ambiguous laws and inadequate penalties), community resistance and technological challenges.
2.10	Technology in Combating Wildlife Crime	Monitoring and surveillance (Drones, camera traps), data analysis, Trafficking and training (GPS collars, Block chain technology), community engagement(mobile app, social media), law enforcement support (forensic technology, DNA analysis and training tools), public awareness and education (digital campaigns- online platforms),	High costs (implementations and maintenance), limited accessibility (remote areas), information management, technical expertise, resistance from local communities (trust issues), dependence on technology, evolving tactics by poachers (adaptation), environmental challenges, legal and ethical concerns (privacy issues),	Enhanced monitoring and surveillance, improved data collection and analysis, community reporting and engagement (mobile application and social media campaigns), supply chain transparency , training and capacity building (virtual reality training and online education), collaboration across boarder (international data base and joint operations),public awareness campaign (digital outreach)	Criminal adaptations (Technology use by poachers), overreliance on technology (neglect of traditional methods), data privacy and ethical concerns, high cost and accessibility (financial barriers), data mgt challenges, technical expertise gaps, environmental factors, legal and regulatory challenges, in equitable resource distribution.