



ENVIRONMENTAL CRIME SERIES ENVIRONMENTAL CRIME SERIES ENVIRONMENTAL CRIME SERIES

COMBATING POACHING AND ILLEGAL LOGGING IN TANZANIA

VOICES OF THE RANGERS – HANDS-ON EXPERIENCES FROM THE FIELD





Editorial Team

Frode Smeby, Consultant, GRID-Arendal

Rune Henriksen, Consultant, GRID-Arendal

Christian Nellemann, GRID-Arendal (Current address: Rhipto
Rapid Response Unit, Norwegian Center for Global Analyses)

Contributors

Benjamin Kijika, Commander, Lake Zone Anti-Poaching Unit

Rosemary Kweka, Pasiansi Wildlife Institute

Lupyana Mahenge, Lake Zone Anti-Poaching Unit

Valentin Yemelin, GRID-Arendal

Luana Karvel, GRID-Arendal

Anonymous law enforcement officers from across Tanzania. The rangers have been anonymized in order to protect them from the risk of retributions. The authors gratefully acknowledge the sharing of information and experiences by these rangers, who risk their lives every day in the name of conservation.

Cartography

Riccardo Pravettoni

All photos © Frode Smeby and Rune Henriksen

Norad is gratefully acknowledged for providing the necessary funding for the project and the production of this publication.

COMBATING POACHING AND ILLEGAL LOGGING IN TANZANIA

VOICES OF THE RANGERS – HANDS-ON EXPERIENCES FROM THE FIELD

EXECUTIVE SUMMARY	5
WILDLIFE CRIME	6
ILLEGAL LOGGING	9
CHARCOAL	10
GENERAL INTRODUCTION	12
WILDLIFE CRIME	15
EXPERIENCES	16
CHALLENGES	17
SITUATION OF THE LAKE ZONE ANTI-POACHING UNIT	21
FIELD EVALUATION OF LAKE ZONE ANTI-POACHING UNIT	23
UGALLA GAME RESERVE	29
ILLEGAL LOGGING	35
CORRUPTION AND WEAK GOVERNANCE	36
HOW IS ILLEGAL LOGGING DONE?	38
LAKE ZONE DISTRICT	39
TANZANIA FOREST SERVICES AGENCY (TFS) – WESTERN ZONE	42
UGALLA GAME RESERVE	43
WHAT IS THE FUTURE ROLE OF CHARCOAL IN TANZANIA?	46
POPULATION GROWTH AND URBANIZATION	48
WHERE DOES CHARCOAL COME FROM?	50
ILLEGAL TRADE IN CHARCOAL	51
MEASURES TO IMPROVE PROTECTION OF WILDLIFE RESOURCES	54
TANZANIA ELEPHANT STATUS	56
FIELD TRIPS	58
RECOMMENDATIONS	59
WILDLIFE CRIME	59
ILLEGAL LOGGING	61
CHARCOAL	62
NOTES	64
REFERENCES	67

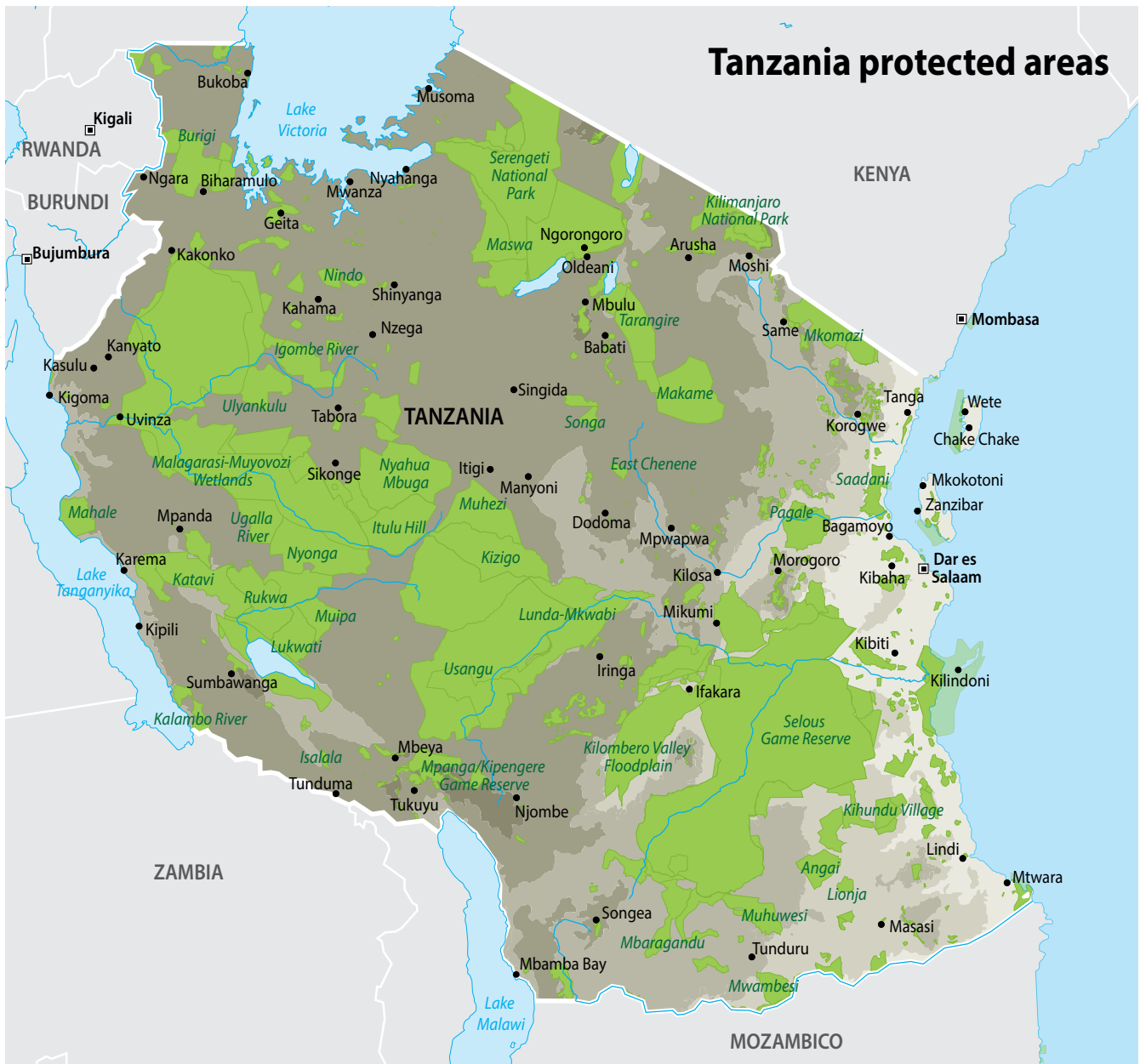


Figure 1. Tanzania protected areas

EXECUTIVE SUMMARY

Over the last few years, park rangers and game wardens in Tanzania have received training in tracking techniques and crime-scene management supervised by representatives from GRID-Arendal, the College of African Wildlife Management, Mweka (Mweka Wildlife College), and Pasiansi Wildlife Training Institute (PWTI).

In order to strengthen capacities for combating wildlife crime and illegal logging in Tanzania, field rangers and officers are trained on skills to more effectively apprehend suspects involved in wildlife and forest crime and to secure the evidence required for prosecution.

Poaching of wildlife is still a massive problem in Tanzania. Since 2011, the tracking and crime-scene management training programme initiated by GRID-Arendal under INTERPOL guidelines has provided more than 2,000 rangers and game wardens with new tools to help reduce the ongoing crime. This report assesses the impact the training has had on law enforcement and identifies gaps in support and further needs. The training philosophy has been to train local trainers, who in turn have trained more than 2,000 rangers in the field, within a short time frame and with limited resources.

Feedback from interviews with rangers, patrol leaders and commanders is overall very positive. The general feedback from the rangers attending the training sessions is that all the topics contained features that have made work against illegal logging and poaching more effective, as exemplified by numerous concrete cases. Improved tactics have been particularly useful for avoiding exchange of fire and conducting arrests safely without the use of force or prior to exchange of fire, thereby increasing safety for both officers and suspects. The training has thus directly contributed to avoiding loss of life among both officers and suspects in concrete incidents. Furthermore, by further securing the rights and safety of suspects, the process has been made more ethical.

In addition, wildlife and forest officers are regularly called on to provide evidence by the prosecution in court, and have informally repeatedly emphasized that the techniques in crime-scene management have been useful, not least to ensure that evidence is handled systematically. According to interviewed law enforcement personnel, the thorough work of securing

evidence from the field has proven vital in charging wildlife perpetrators in the judiciary system.

Overall, rangers and commanders are characterized by high motivation, high dedication, excellent skills and willingness to put to use very limited resources to defend forests and wildlife, as evidenced by a number of incidents. However, efforts could be much improved by providing further tactical training at the command level, among patrol leaders and at the ranger level to improve performance even further. Capacity could also be improved by extending the provision of basic equipment including maps, GPS, vehicles and radios. The situation is worst for forest rangers, with the fact that the illegal loggers seem to be very well organized and armed making it hard for the forest rangers to confront them. Tanzanian law prohibits forest rangers from arming themselves; only specially trained wildlife rangers have permits to carry arms. This means that the forest rangers/guards do not have the capacity to confront the armed loggers without support from armed wildlife rangers, who are rarely available. Sometimes a handful of unarmed forest rangers are responsible for the protection of vast forest reserves, with limited access to vehicles.

This reduces the effectiveness of both wildlife and forest rangers. Since there are very few of these law enforcement professionals relative to the vast areas they are responsible for protecting, illegal logging has become largely unchallenged. Unless both donors and the Government directly prioritize forest rangers substantially, illegal logging and deforestation will continue. In spite of vast resources given to preventing these practices, these have in no way been reflected on the front line.

WILDLIFE CRIME

It is a well-known fact that poaching is part of a transnational, organized and worldwide business with links to organized criminal groups and consumers on all continents. This business is highly valuable for many actors, and interrupting their income is in many ways a very dangerous activity. The poachers on the ground in the bush are often armed, and even though they are not the ones organizing the activity and earning the big money, they are often desperate enough to do whatever is necessary to protect their income derived from killing wildlife. This means, of course, that they will do their best to outsmart law enforcement officers and park rangers, and if confronted they will often prefer to fight rather than surrender. This ongoing battle between poachers and wildlife- and forest rangers has indeed resulted in many rangers being killed.

Corruption in Tanzania is relatively widespread. Individuals even up to the legislative and executive levels seem to give in to bribes offered by the organizers of wildlife crimes, making the struggle to stop this devastating business a highly demanding task. However, the work that the rangers perform on the ground

in the bush remains as important as ever. In order to arrest and prosecute the key figures who organize poaching, it is vital to stop the poaching front line, including apprehending the actual people killing wildlife. Even if prosecution is successful, ultimately it is too late for the animals that have already been killed. And yet, disruption of poaching activities has a value in itself. For poachers, higher detection rates have a deterrent effect, as do variable penalties.

Thus rangers need enhanced ability to demonstrate their presence in the bush, disrupt poachers and secure evidence of wildlife crime. An organized and systematic approach to crime-scene management is necessary in order to secure the often readily available evidence in such a way that prosecutors can convince judges that apprehended criminals are inextricably linked to crime scenes, not just there in the wrong place at the wrong time.

The game and forest reserves in Tanzania span vast areas, while park rangers, game wardens and anti-poaching officers are few in number. Therefore, it is particularly crucial that





these law enforcement officers master techniques that enable them to plan more targeted patrolling to prevent and prosecute crime. Patrols are most effective and efficient when they are based on (1) pre-identification of poaching “hot-spot” areas, and (2) tracking techniques to secure apprehensions when in the field.

Resources are very limited and rangers lack suitable basic tools. For example, patrols are often executed on foot, but due to the long distances and the enormous areas that rangers are supposed to monitor, proper off-road vehicles are needed. The vehicles provided (mostly Toyota Land Cruisers) are perfect for

the task, but are too few in number, and the harsh conditions in which they operate mean that they require extensive maintenance. The short supply of such maintenance resources leads to expensive attrition of vehicles. Similarly, other basic kit such as GPS for marking incidents and for generating patrol reports, topographical maps, and sufficient ammunition for proper live-fire training, are all in short supply.

Sustainable salaries are of course essential to the rangers, but those provided are often low. When the market for trophies such as ivory and the money involved are as high as at present, some might be tempted to enter into illegal activities instead.



Rangers on patrol in Tarangire National Park, November 2014

ILLEGAL LOGGING

Tanzania has the fifth highest annual loss of forest in the world, with about 400,000 hectares disappearing every year. Illegal logging accounts for 96 per cent of this figure, according to Tanzanian authorities. Organized criminal actors involved in this activity in Tanzania smuggle thousands of cubic metres of trees every month and drive some species to the brink of local extinction. In a trend similar to the poachers laying waste to African wildlife, armed loggers enter forests at night, cut both protected and non-protected species and transfer profits to highly organized syndicates.

As mentioned previously, the fact that the illegal loggers seem to be very well organized and armed makes it hard for the forest

rangers to confront them. Tanzanian law prohibits forest rangers from arming themselves; only specially trained wildlife rangers have permits to carry arms. This means that the forest rangers/guards do not have the capacity to confront the armed loggers without support from armed wildlife rangers, who are rarely available. Sometimes a handful of unarmed forest rangers are responsible for the protection of vast forest reserves, with limited access to vehicles. This reduces the effectiveness of both wildlife and forest rangers. Since there are very few of these law enforcement professionals relative to the vast areas they are responsible for protecting, illegal logging has become largely unchallenged.



Confiscated illegally cut wood at zonal forest reserve management headquarters in Tabora

CHARCOAL

As in much of sub-Saharan Africa, charcoal is the predominant source of household energy in urban areas of Tanzania. It is favoured for its convenient format and reasonable price. Africa as a whole officially produced 32.4 million tons of charcoal in 2014, with an estimated value of USD 9.7–26.2 billion. Tanzania officially produced 1.8 million tons in the same year, but this is likely a very large underestimate of the total production. The official production numbers take no account of import and export, for example, and the unofficial production numbers are by some estimates 2.5 times higher than the official ones.

Tanzania has a rapidly growing population and increasing urbanization. Dar es Salaam, which accounts for about half of the country's charcoal consumption, is set to reach 10 million inhabitants by 2030, which is double its present population. The country's population is estimated to reach 79 million by 2030 and 129 million by 2050. This has dramatic consequences for charcoal demand. The minimum projected wood requirements for charcoal alone in 2050 surpasses total industrial wood production (which includes all wood products, including firewood) in 2014. Today about 40–60 per cent of deforestation in Tanzania can be attributed to charcoal production, with an annual deforestation rate of 1.1–1.5 per cent, which will rise to 2.5 per cent in 2050.

About 80 per cent of charcoal production is illegal, since producers and transporters have not sought the required permits. Tanzania's Government is losing at least USD 100 million in revenue per year from the informal charcoal economy. Production is largely artisanal, as an in-depth investigation showed in Kenya, where the average producer made about 30 sacks of charcoal per month, and where there were more than 250,000 separate producers in 2005. This example showed a level of unofficial production 4–8 times higher than the official numbers reported to the Food and Agriculture Organization of the United Nations (FAO) indicate.

There are several challenges associated with the illegal production of and trade in charcoal. An illicit economy breeds corruption at all stages. Attempts at reducing this through outright bans on production have proven unsuccessful, leading to corrupt law enforcement personnel being used to protect shipments, while production increases in protected areas; since it is illegal everywhere, there is no particular reason to



avoid protected areas. A 2013 investigation saw a fully licensed and legal charcoal transport travelling 150 km being stopped 16 times, and having to pay a total of USD 230 in illegal bribes



Timber illegally cut in Democratic Republic of the Congo (DRC) for sale in Mwanza, September 2015

to law enforcement personnel. This shows that corruption is endemic, and becomes very hard to reverse. It undermines public trust in the forces of law and order, and governance

more generally. When corruption pervades a segment of the economy to such an extent, it becomes ripe for being taken over by transnational organized crime.

GENERAL INTRODUCTION

The UNEP/INTERPOL rapid response assessment The Environmental Crime Crisis, launched at the first session of the United Nations Environment Assembly (UNEA 1), noted that the responses on the ground against wildlife crime and illegal logging “are still behind the scale and development of the threat”.¹ It recommended investment in capacity-building to national environment, wildlife and law enforcement agencies.² This report details one such effort by focusing on activities in the bush in Tanzania, examining capacity-building efforts among Anti-Poaching Units in the field. This is a practical follow-up to UNEA 1, providing a unique insight into the challenges and experiences faced by rangers in their efforts to combat poaching, and giving recommendations for a systematic approach to using tracking and crime-scene management on a wider scale.

This report addresses training efforts in anti-poaching – used in its wide sense to include illegal logging and charcoal production – in Tanzania. It is structured around an evaluation of training on tracking and crime-scene management techniques that have been taught through the two main wildlife training institutes in Tanzania, principally through the Organised Forest Crime project (ORGFORC) funded by the Norwegian Government, which took place between 2013 and 2015. The training has been conducted by personnel from the UNEP collaborating centre GRID-Arendal since 2011 at a rate of 1–4 visits per year.

The training philosophy has been to train local trainers, who in turn have trained more than 2,000 rangers in the field. A full-time representative from GRID-Arendal has been in charge of this during the project period. This training has supplemented the curriculum at these two institutions, rather than being an integral part of the curriculum, which is directed by central Government, and therefore not easily changed. This has been a pragmatic way of conveying the training to as many rangers as possible during the project period.

This report provides some context to understand the dynamics and size of the poaching problem in Tanzania. This sets the stage for a better understanding of the experiences conveyed from the field. Anti-poaching law enforcement personnel openly shared experiences and their views on the challenges they face. Their identities have been anonymized to protect the rangers’ security. This was a choice made by the editors of the report together with rangers in the field, based on a judgment of the risk of repercussions by criminal actors and/

or corrupt colleagues from sharing their experiences, versus the comparatively marginal benefit of supplying the report with named references.

This report does not aim to provide comprehensive new data about the situation in Tanzania. It is not an academic or original research report, and as such it is structured thematically instead of culminating with a section of original findings. For that reason, a lot of the information found in the background sections of the report will be familiar to those who know the subject matter well. The principal added value is the field perspective, which gives voice to rangers’ experiences. As such, the report shows how findings such as in the Rapid Response Assessments *Elephants in the Dust*³ and *The Environmental Crime Crisis*⁴ remain relevant, and more importantly, how they appear to those who operate on the front line on a daily basis. While the recommendations are not innovative, they reflect a view that has been apparent throughout the project period; namely that simple, relatively inexpensive, practical solutions in the field are still urgently in short supply, despite some welcome acknowledgement of their centrality. One should bear in mind that shortages in training (most importantly), but also in basic supplies like vehicles, vehicle maintenance, fuel, GPS units, maps and ammunition for firearms training continue to exist against a backdrop of increased focus on use of expensive systems such as drones.

Another added value is the evaluation of the degree to which tracking and crime-scene management has been implemented in the field, focusing on the case of the Lake Zone Anti-Poaching Unit, whose commander generously allowed the editors access



Rangers examining Baobab tree used by honey gatherers in Tarangire National Park, November 2014

to one of his teams over a week in November 2015. Other observations and interviews have been made during earlier (and one later) visits around the country (see chapter 9). A follow-up to the November 2015 session was scheduled for April 2016, but was interrupted by large-scale cattle trespassing in protected areas in the Lake Zone area of responsibility. This occupied all of the key personnel during our visit in a key trial, and in administrating the cattle.

The Lake Zone evaluation aimed to gauge the degree to which the methods taught were subsequently applied in the field. It also hoped to identify possible improvements and expansion of training necessary to achieving significant progress against

poachers. More systematic operations planning is necessary to avoid spontaneous operations against the least challenging types of poachers, at the expense of the more challenging pursuit of professionals. The evaluation relied on participant observation in training sessions and on patrol during 2014 and 2015. Conversations and unstructured interviews on foot patrols and around the campfire are conveyed particularly in chapter 5 on wildlife crime, and chapter 6 on illegal logging. Chapter 7 shows the scale of the increasing reliance on charcoal as a household energy source, and its implications for Tanzania in the near future and medium term, while chapter 8 offers the principal Tanzanian trainer's view on the effectiveness of the training methods.

WILDLIFE CRIME

In 2010 GRID-Arendal initiated a training programme at the College of African Wildlife Management, Mweka (Mweka Wildlife College) in crime-scene management and tracking. The training was a supplement to the college's law enforcement course, and included ethics and the importance of professionalism in crime-scene and evidence handling, and tactics to apprehend suspects safely, thereby minimizing risk to both officers and suspects. It also entailed the rights of suspects, proper ethics and the importance of establishing good relations with local villagers while ensuring enhanced capability to protect wildlife and protected areas.

The course became part of the syllabus in the wildlife law enforcement module for the Diploma degree at Mweka Wildlife College, and each year students from Mweka have been trained at the Tarangire Kwakuchinja campsite in the practical features of law enforcement. An INTERPOL manual detailing the contents of the course was produced in English, French and Swahili.⁵

Following excellent informal feedback from students and staff, in August 2012 the course was introduced at Pasiansi Wildlife Training Institute (PWTI) and the Lake Zone Anti-Poaching Unit (LZ APU) in Mwanza as a pilot project following approval by the Director of Wildlife.

Written feedback was sought towards the end of the project period, but according to local partners this required travelling around the country to collect feedback in person, which proved too demanding on current resources.

Number of trained personnel to date:

- 1,728 students at Pasiansi
- 179 students at Mweka
- 130 rangers trained at their duty stations at game reserves and APUs
- 24 rangers from Serengeti and Tarangire national parks.

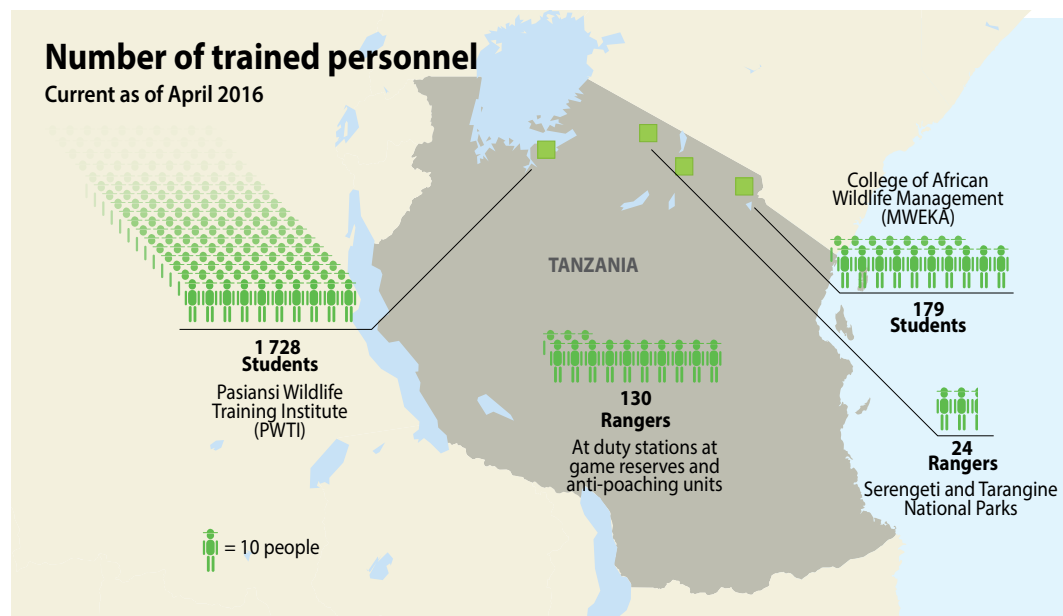


Figure 2. Number of trained personnel



Among the students trained at Pasiansi and Mweka have been rangers from different protected areas, including Wildlife Management Areas and Forest Reserves. The training has included individual rangers and game wardens from Ugalla, Rungwa, Maanzoni APU, Selous, Piti, Lukwati, Iringa, Tarangire, Rubondo, Iluma, Ilunga, Moyowosi/Kigosi and Maswa.

The field-training courses have varied in duration from 3 to 12 days, focusing primarily on a theoretical and practical introduction to tracking and crime-scene management. In 2015 and 2016, some training in first aid and land navigation has also been added. These field-training courses have been in addition to the curriculum given at Pasiansi Wildlife Institute, which only offers one hour per year of tracking and crime-scene management. The extra training has been funded by GRID-Arendal in order to ensure that these critical techniques are taught more comprehensively than in the government-controlled curriculum at Pasiansi. In total 1,728 personnel have received training at Pasiansi. Individuals who have received the training have given on-the-spot informal

and overwhelmingly positive feedback to instructors. This includes feedback from experienced rangers in the game reserves. All training has been carried out in full coordination with either Mweka or Pasiansi, and with the approval at all times of managers of the parks/reserves and the APUs, as well as that of the Director of Wildlife.

EXPERIENCES

The general feedback from the rangers attending the course is that all the topics contained features that have made anti-poaching efforts more effective. More formalized planning would help apply the techniques, and might in turn enable their use to be more formally evaluated. The emphasis in the training is on simple practical techniques that require as little theoretical input as possible, in order to be useful for illiterate as well as more academically trained personnel.

Training often focuses on tactics to follow tracks safely. Given that many wildlife rangers are killed and injured by poachers, and on occasion the rangers walk into ambushes set by armed poachers, the Y-formation technique – which involves active use of flankers in the column to counter potential ambushes – has proven highly effective when it comes to security measures.⁶ Using such simple but highly effective patrol formations when following tracks from suspected perpetrators provides an important advantage in apprehending poachers, armed or not. Discovering the poachers before they discover the rangers provides the latter with a tactical advantage and the training has directly resulted in the lives of rangers being saved from armed ambushes.

According to anti-poaching law enforcement personnel, in 2013 wildlife rangers in Burigi Game Reserve tracked a poacher who crossed the border from Rwanda. The poacher was armed with a Belgian FN FAL calibre 7.62 rifle and started shooting at the rangers. A firefight ensued with the rangers, resulting in the poacher being killed.

In Moyowosi Game Reserve and Kigosi Game Reserve similar incidents have been reported. In these cases, the poachers were Tanzanian nationals, and the rangers tracking them deployed the taught Y-formation technique. The perpetrators were in most cases apprehended before they could initiate the ambush, and in some cases were shot when rangers returned fire while defending colleagues under fire from the poachers; no injuries to rangers were reported. Tactics have been particularly useful for avoiding exchange of fire or conducting arrests prior to exchange of fire, increasing safety for both officers and suspects.

Wildlife officers are regularly called on to provide evidence by the prosecution in court, and have informally repeatedly emphasized that the techniques in crime-scene management have been useful, not least to ensure that evidence is handled

systematically. According to these law enforcement personnel, the thorough work of securing evidence from the field has proven vital in charging wildlife perpetrators in the judiciary system. Without solid proof the poachers often walk free without any punishment or penalty. Implementing the detailed techniques provided during the classes, gives both the wildlife officers and the courts a highly increased possibility to actually prove poachers guilty in a court of law.



Confiscated bicycles used by poachers and illegal loggers, Tabora, September 2015

CHALLENGES

The reasons why poaching takes place are of course multifaceted and compound. As in all kinds of business and trade, there has to be both a market with end users and a pool of commodities, in this respect elephants, rhinos and other sought-after wildlife. The end users of ivory and rhino horn most often come from East Asia and the Middle East, where ivory is used as jewellery and carved artefacts and horn is considered highly valuable in traditional medicine. Although a lot has

been done to stop or minimize both the killing of wildlife and the trade in commodities, the market is still demanding more, giving organizers of illegal trade and poaching an opportunity to earn big money.

Repeated visits in the field between 2013 and 2016 involving extensive conversations with rangers while participating in training and on operations have given the following impressions of the challenges to anti-poaching in Tanzania. These impressions were collected using participating observation, a methodology known from anthropology.

In most cases, the personnel carrying out the actual poaching are local residents close to the area where the animals are killed. Often they are extremely poor and see no other way to support themselves and their families. There are many types of poaching, including trophy hunting and meat poaching, whereby village residents enter nearby protected areas to shoot, or trap, wildlife for meat. Illegal logging is another devastating business in Tanzania, and is often closely connected to wildlife poaching. While staying out in the bush, loggers needing food shoot animals for meat or buy bushmeat, and many of them also kill elephants and other protected wildlife if they have the opportunity.

The bushmeat poachers are not the ones earning the big money, but the income is far higher than what they would earn from a regular job, if they were even able to find a job at all. They will normally kill any animal if it has something valuable, and most animals do. For instance, the skin of a leopard will sell for a considerable amount of money at the local market, and the buyer will of course re-sell it to customers that are willing to pay a lot more. In order to face the challenges of local residents carrying out poaching, action in terms of alternative livelihoods will have to be taken in order to fight the extreme poverty in rural areas of Tanzania.

Another challenge is the strong population growth in Tanzania, at about 3.1 per cent per year,⁷ according to the World Bank. This increasing population places pressure on existing infrastructure, which leads to even more poverty, and may force residents into illegal activities.

More people will lead to a higher demand for food, which is likely to result in increased meat poaching. In addition,





Figure 3. How poaching is carried out

livestock farmers will need more grasslands, so livestock will be pushed into protected areas. This will disturb the wildlife's habitats, and complications between farmers and wildlife will rise. Predators will kill livestock, and human-elephant conflicts will occur. This means that poachers will have a more permissive environment in which to operate as both

human-wildlife conflict and the workload of anti-poaching law enforcement personnel increase.

Rangers' low salaries are another factor that undermines the protection of wildlife.⁸ Often the salaries are so low, or do not even materialize, that rangers are tempted to start poaching



Young cattle herders apprehended by anti-poaching rangers, Biharamulo Game Reserve, November 2015

in order to feed their families.⁹ Sometimes the high incomes from poaching will entice them to shoot elephants for their ivory, and due to their detailed knowledge about anti-poaching management and tactics, it can be comparatively easy for them to find and kill the animals undetected.

One cruel example of this is the slaughter of at least 62 elephants in Zimbabwe in October 2015 by rangers and game wardens.¹⁰ The wildlife rangers and other staff at Hwange National Park reportedly did not receive their already low wages and it is feared that they killed elephants in the park as a form of «protest» against management.

In recent years, poachers have implemented a new killing technique: poisoning. Cyanide is the preferred poison, and the poachers normally mix the deadly toxin in oranges, pumpkins and salt blocks to attract the elephants. In Zimbabwe even entire waterholes have been poisoned, meaning that not only are mature elephants with large tusks gruesomely killed, but also small elephant calves without tusks and all other wildlife that relies upon the water.

In Zimbabwe and Tanzania, cyanide is widely circulated and easily accessible due to the extensive mining industry. Efforts should be taken immediately to prevent the toxins from reaching poachers. Although no incidents of cyanide used for poaching have yet been reported in Tanzania, as long as the market is willing to pay as much as it is for ivory, it is only a matter of time before it happens. Indeed, incidents with poachers killing elephants by mixing tobacco and various toxins with pumpkins and other fruits have already been reported in Tanzania.

The Tanzanian general election that took place in late October 2015 resulted in a massive increase of livestock in the protected areas such as game/forest reserves and national parks. The candidates from the different parties understood that giving permits to big cattle owners would secure support, and took the opportunity. The result was catastrophic as the protected areas were flooded with cattle. The invasion led to huge problems for the park/game rangers and the Anti-Poaching Units (APUs). Not only was the wildlife disturbed and the vegetation destroyed, but the wildlife officers found themselves in a position where they could end up being indicted by officials or other high ranking personnel for

arresting cattle herders and confiscating cattle in protected areas – actions that normally would be within their remit. Tanzania’s Wildlife Conservation Act of 2009 states explicitly (18/2): “Any person shall not graze any livestock in a game reserve or wetlands reserve” and that this is punishable with a fine of TZS 200–500,000 and/or imprisonment for 3–5 years.¹¹

Local powerbrokers, who are often both politicians and land- and livestock owners, are thus pitted against conservation law enforcement personnel and prosecutors who try to enforce the Wildlife Act. The conflict is replicated all the way to the departmental level in Government, where livestock ministers are in conflict with wildlife ministers. The political conflict in turn reverberates down the judicial system, where vested interests put pressure on courts, and on the prosecuting authority in particular. For example, cattle owners are often protected by officials. Regional officials and rich businessmen are often those who own the big herds, and in most cases they will not even be identified as the real owners, as they most often operate with middle men. Thus the only ones prosecuted would be the poor young men or boys who are actually herding the animals.

In addition to the rich businessmen and officials, people from neighbouring countries such as Rwanda have been sending their livestock into protected areas in Western Tanzania. In Rwanda, as one individual or family is not allowed to own more than 100 cattle, some rich cattle owners bring their animals over the border and often into the protected areas in Tanzania.

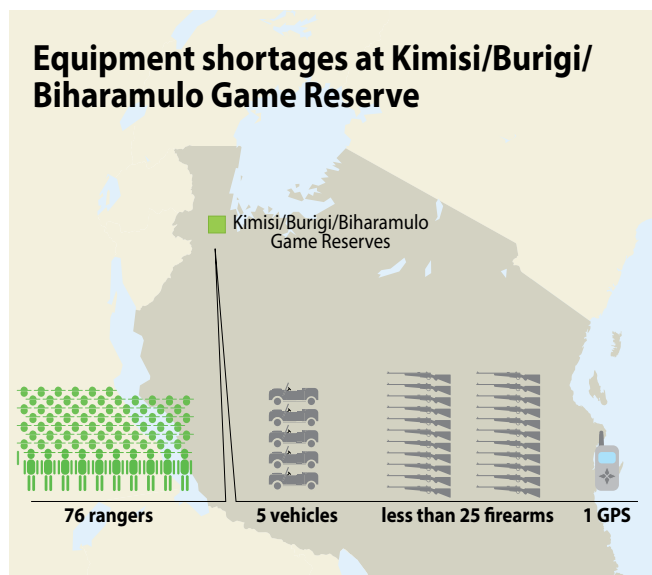


Figure 4. Example of equipment shortages in game reserves within the Lake Zone District

These owners are often inter-married with local Tanzanians over the border, which makes the logistical planning of illegal grazing easier.

When this report was finalized in April 2016, wildlife officers normally engaged with anti-poaching work had to commit all their capacity to the cattle issue in Lake Zone. This resulted in other normally higher-prioritized activities such as stopping wildlife poachers and illegal loggers being ignored. Confiscating cattle, prosecuting the case in court, and managing several hundred head of cattle draws attention away from scheduled training and operations, thereby having a structural impact on conservation efforts. In addition, cattle grazing has a tactical impact in protected areas, because poachers can use the cover of being cattle herders to avoid being tracked and apprehended. With a large number of cattle herders in the bush, the poachers have less chance of being apprehended.

Tanzania is not as heavily affected by armed groups as many of its neighbouring countries, such as Kenya with Somalia-based Al-Shabaab, the jihadist terrorist group which in 2012 pledged allegiance to Al-Qaida. However, neighbours Burundi, Rwanda and Uganda have a long history of violence and numerous non-state armed groups are operating throughout these countries. The Democratic Republic of Congo is also so close that Tanzania is affected by its devastating armed rebellions. Refugees fleeing from the armed unrest in Burundi are currently entering Tanzania in large numbers, and many of the refugees are former fighters with skills and equipment that take the battle on poaching to even more violent levels. The refugees are poor and need income, and with experience in long-term guerrilla fighting in the bush, they are highly able and likely to enter the poaching business. Various armed groups are engaging in ivory poaching to finance their weapons and the continuation of their battle, and some individuals entering Tanzania as refugees will naturally possess such experience. As trained guerrilla fighters, these individuals are deadly opponents to the wildlife- and forest rangers and game wardens. The major cities close to the Burundian border all have a huge market for automatic rifles (such as the AK-47) originating from Burundi, and anyone with money will be able to obtain one with plenty of ammunition.

A new Tanzanian task force on serious crimes known as the ‘Tanzanian National and Transnational Serious Crimes Investigation Unit’ has lately apprehended a series of personnel connected to poaching, and there is hope that this unit might be able to disrupt also organizers higher up in the criminal chain as well.

SITUATION OF THE LAKE ZONE ANTI-POACHING UNIT

According to representatives from the Lake Zone APU who have completed the training in tracking and crime-scene management, the impression is that the basic tracker course is very useful, and that the rangers benefit greatly from the training in their daily work fighting wildlife crime and illegal logging.

The Lake Zone APU consists of 40 personnel in total, including management, secretary and rangers. The organization includes an intelligence unit, but it is not operational due to lack of resources. Intelligence-gathering and management is therefore based on individual initiatives, and there is little or no coordination. Each member of the APU handles his/her

own informants, and in spite of excellent dedicated efforts by the staff and management to stretch their resources as much as possible, there is no formalized system to coordinate the information gathered, which could be a formidable resource to the unit.

The representatives from the Lake Zone APU have observed armed non-state individuals in Nyungwe Forest National Park in Rwanda and in Kibira National Park in Burundi and there have been unconfirmed observations of possible Congolese rebels. The Lake Zone APU says that it has good cooperation with border patrols in Uganda and Kenya, but not those in Burundi and Rwanda.



Rangers from the Lake Zone APU checking charcoal transport, November 2015

In terms of equipment, the rangers in the Lake Zone APU have a shortage of GPS units, push-to-talk radios, compasses, maps, night vision goggles (NVGs), cameras, uniforms, boots and tents.

The APU needs are different from those of PWTI in terms of training and equipment, as PWTI's objective is to train/educate students, whereas APU personnel often operate in environments that demand better tactical and intelligence skills. "The rangers need tactical patrol training and live-fire exercises; some have not practised shooting on a range since they received basic training several years ago."¹² The APU's Deputy Commander says that they are all wildlife officers and that they received medical training during their basic training, but that they now require follow-up training and practice.

Throughout East Africa, wildlife rangers lack the training and equipment to give them confidence to confront well-armed and well-trained poachers. A major risk is that encounters end in deadly firefights, often with one side using an ambush, rather than arrests. Proper and further training such as that provided helps improve the tactical skills, ethical understandings and the safety of both officers and suspects, as well as the rights of suspects, and helps ensure higher standards of prisoner handling and care. This is vital not only on ethical grounds, but also for prosecution and maintaining the rule of law and justice.

Trophies and bushmeat are usually transported by foot or with bicycles/motorcycles in areas in Western Tanzania, due to the lack of roads. Horses and donkeys are not typically used.

Businessmen in Mwanza are running both poaching and illegal logging, contracting managers to run the business in the field. They typically give axes, saws and equipment needed for logging or charcoal production to refugees from Burundi, return to claim the products, and pay the refugees the current rates for the products, subtracting the costs for equipment provided in advance. Then the production goes on.

Both individual police commanders/officers and officials in region/province/city management and from the judicial system have been reported to allegedly cooperate with the

people running the illegal business, providing them with false certificates and overlooking their illegal activities.

Ethnic Arabs from Shinyanga allegedly organize meat poaching in Ugalla Game Reserve (this activity has shifted from the Serengeti), and arrange for the meat to be shipped to the United Arab Emirates (UAE). The meat comes from birds (Sandgrouse and Kori Bustard), and different species of antelopes and wildebeest.

Chinese companies build roads all over Tanzania, and the Chinese working here allegedly often organize poaching. Normally it is claimed that they hire well-connected people in the cities/villages as intermediaries who in turn hire locals to do the actual poaching, whether it is trophy, meat or wood poaching. The Chinese store illegal articles until they have a large quantity, and then ship it out in containers among machinery and supplies for their road construction activities. Tanzanian officials are easily bribed, and give permission to export the containers.

FIELD EVALUATION OF LAKE ZONE ANTI-POACHING UNIT, NOVEMBER 2015

Intention

The intention behind GRID-Arendal personnel's field visit in November 2015 was to evaluate the Lake Zone Anti-Poaching Unit's concept of operations and execution of patrols. This includes planning of patrols, methods used, and results achieved over several patrols. Particular emphasis was placed on evaluating the use of tracking and crime-scene management, since this has been taught through collaboration with Mweka Wildlife College and Pasiansi Wildlife Training Institute directly and indirectly (training of trainers) by personnel from the Rapid Response Unit, formerly based at GRID-Arendal, Norway. This training has been ongoing since 2010 and adheres to INTERPOL guidelines.

A secondary intention was to contribute guidance to enhance patrol effectiveness and security where this was sought and accepted by the patrol leaders. We did not have a mandate or an invitation to initiate comprehensive change in patrolling methods.

The Lake Zone Anti-Poaching Unit's area of responsibility is greater than the area visited during the evaluation. The latter comprised from west to east:

- Kimisi Game Reserve, about 1,000 km²
- Burigi Game Reserve, about 2,200 km²
- Biharamulo Game Reserve, about 1,300 km²



Apprehended bushmeat poacher, Kimisi Game Reserve, November 2015

The commander's perspective

Our field trip started with a visit to the two commanding officers pertaining to the game reserves, Commanding Officer of Lake Zone Anti-Poaching Unit Benjamin Kijika, and Area Commander of the three joint game reserves, Bigilamungu Kagoma, who is based in Biharamulo Town. Kagoma was freshly arrived within the week from his previous post at Selous Game Reserve and was in the process of getting to know his area of operations. Kagoma's rangers totalled 76, including him. They had between them only five vehicles, one GPS and fewer than 25 firearms. The commanders of these units have worked hard in stretching limited resources to most effectively deploy rangers and could complement their skills even further through additional training. In addition, the rangers were also responsible for escorting hunting trips in the reserve during the hunting season from June to November, throughout the duration of the 2–3 week long hunts, to validate that hunting takes place within regulations.

Both commanders explained that the recent election had caused upheaval in the game reserves. Local powerbrokers

had interpreted presidential election campaign promises to mean that they were allowed to use the game reserves as grazing areas. Keeping cattle in the game reserves is illegal, and the two commanders emphasized that this issue was a pressing short-term priority, alongside the more typical anti-poaching work. According to the two commanders, the region's protected areas probably featured around 1.4 million cattle. Our subsequent patrolling lent credence to their claim; there were indeed a large number of cattle and cattle tracks in all the reserves.

A primary threat to rangers' security is professional poachers coming from Rwanda, who could be armed with AK47s or light machine guns. These poachers typically target the roughly 400 elephants in the three reserves. In spite of the lack of resources, rangers and their commanders have put down impressive efforts, sometimes at high risk, to attempt to reduce poaching, but their efforts could become more even more effective with further support of training and additional basic resources.

During the visit, the Lake Zone Anti-Poaching Unit sent out patrols of between 8 and 12 rangers, excluding detachment for securing vehicles while the main section was on patrol. Four days were spent on patrol, with day one in Biharamulo, two days in Kimisi, and day four spent between Kimisi and Burigi.

Concept of operations: intention, priorities and planning

Planning of the patrols appeared to follow a sequence whereby the general area of operation was identified the evening before the patrol, with more specific plans being made in the morning prior to patrolling. Senior members of the patrol made the plans. Priorities were set out by the Commanding Officer of the Lake Zone Anti-Poaching Unit Patrol, but plans did not make reference to an overall body of planning, other than a general understanding of what was the issue of the day – in this case the grazing issue. Additional training support to further and make better use of the existing wealth of experience in the command element could help further improve patrolling efficiency. Cattle were typically locally owned or transported from Rwanda in the border area. At least a third of apprehensions made during the subsequent

four patrol days were cattle herders. The rest were charcoal poachers or bushmeat poachers using snares.

Potential for improvement in planning

In addition to the aforementioned additional training support regarding the existing wealth of experience in the command element, stronger emphasis on a clear intention, with primary, secondary and tertiary priorities would have strengthened the planning process at all levels, from commander through to patrols. This would have strengthened the structure of patrol execution very significantly. For example, a primary emphasis on grazing denial would easily lead to identification of patrolling locations, with interception points where cattle were expected to enter the game reserves, and also a clear plan for what to do with apprehended personnel. Clear plans should also be made in advance regarding what to do with identified cattle, including whether the priority should be removal of such cattle, or sending a signal to cattle owners about the illegality of their activity through catching and releasing cattle herders, or both. Such efforts are compounded by a lack of basic materials, and could be further improved through training and access to maps or training in model making.

Such priorities are essential to keeping the patrol tied to its primary objective, because the game reserves are vast and have a wide range of different offenders. Offenders are typically cattle herders, charcoal poachers, meat poachers using weapons or traps, and in some cases armed and capable poachers killing signature species such as elephants. In the absence of clearly stated priorities, it is easy for the patrol to become distracted by any kind of encounter with trespassers in the field.

In areas where there is large-scale poaching of signature species, parallel to other types of trespassing and poaching, considered prioritizations are critical. Without planning, there is a risk that patrols gravitate towards where ‘low-hanging fruit’ apprehensions can be made, i.e. the most accessible but relatively benign violators. If rangers expend their capability to catch these less significant violators, then the more skilled, dangerous and effective poachers (ideally identified through a planning process whereby intentions generate priorities, which in turn lead to concrete patrolling plans) are likely to escape capture. Professional poacher opponents are likely to be skilled in rudimentary intelligence collection about ranger movements and typical patrolling habits, as well as counter-tracking techniques. These poachers are the ones that need to be prioritized if elephant poaching is to be successfully reduced, and they require rangers to fully utilize their techniques.

Situational awareness

A more active use of planning would, however, require a shared sense of situational awareness among all levels of law enforcement. Such an understanding must be shared in writing in order to go beyond the accumulated personal – individual – knowledge of senior rangers. If not, it can be tempting for key personnel to withhold key information, or personnel rotation, sick leave or other issues will severely impact on the knowledge level of the unit. Writing knowledge down secures its transparency and facilitates its sharing.

Situational awareness in writing can take the form of:

- Maps that are annotated with writing, overlays, arrows or notes. Maps are the cornerstone of any operation, and they can also take the form of sand/mud recreations of the landscape, which help patrol members understand and remember the area of operation.
- Collected patrol logs, incident reports and so forth, ideally represented on a map to easily visualize past incidents, whether successful law enforcement intercepts or locations of carcasses. Patrol logs become the rangers’ common knowledge base, and form an excellent basis for training cases as well.

- Intelligence, both in the form of terrain analysis and source work – anonymized to protect sources’ identity.
- Overview of law enforcement capability and recent activity. This is necessary in order to identify one’s own resources, to best deploy them, and to avoid conducting patrols that are predictable and repetitive.

When the situational awareness is established in written form, it is easier for newcomers (in this case the recently arrived Zone Commander) to quickly acquire an update on the situation. It also gives the various command levels a shared understanding of the situation. This makes the key issues transparent, which in itself helps everyone in the unit to pull together towards a common goal, achieving unity of effort. Knowing the commander’s intention is critical for the unit’s members to take the initiative both in training and in the field, when they come across unexpected circumstances. Another advantage with having shared situational awareness in writing is that it helps separate planning from execution, which reduces the risk of spontaneous shifts in priorities while on patrol.

For example, in order to effectively intercept poachers crossing from the refugee camp on the Rwanda side of the border and into Kimisi Game Reserve, priority should be given to either bushmeat poachers, elephant poachers, snare poachers or cattle herders. These different types of poachers operate using different methods and patterns. They are likely to present different threats, and while some of them operate locally and have short range, others may be crossing tens of kilometres per day for days, and sleep in the bush. Rangers have a lot of knowledge about such patterns of behaviour by poachers both in specific reserves and more generally, but this knowledge must be made available to all in advance, including younger inexperienced patrol members.

An ideal scenario would entail a map outlining the situation in each game reserve, showing where previous patrols have taken place, and indicating what kind of activity has been encountered. This information, together with the commander’s intentions and priorities, would then inform long-term plans for law enforcement in the area. From this in turn, individual patrols would be planned to effectively, step-by-step, fulfil the long-term plans. Such patrols would provide measurable progress, because they would either meet the stated goals or not. If they did not meet the goals sought, the patrols could be reconfigured to take place in other areas (choke points, obvious infiltration or exfiltration routes), at other times (day/night/early morning), and/or by other methods (tracking,



A ranger cuts down snares in Burigi Game Reserve, November 2015

ambush, foot patrol, mobile patrol, intelligence collection, reconnaissance). Furthermore, if the patrols did not reach the objectives set, this would inform needs for further training (use of maps or GPS, patrolling or ambushing at night, long-term stays in the bush, weapons handling, patrol technique, intelligence collection, tracking, crime-scene investigation). When objectives are met, rangers would simply continue to the next objective, which can even happen during a single patrol.

Patrol execution

The patrols we took part in typically started with a drive from the overnight camp out into a designated area of interest. One camp was out in the field, whereas the two subsequent nights took place in a permanent ranger camp. Patrols would typically start around mid-morning, and continue until early or mid-afternoon. From the second camp location, the patrol infiltration consistently used a main road into the game reserve. Once the cars were parked, we were consulted for advice in our capacity as evaluators. At this point the timing, infiltration route and objective of the patrols had already been decided. Patrol formation and use of terrain were open to discussion and we were able to share experiences to enhance patrol security and tactical use of the terrain.

The patrol on the first day, in Biharamulo Game Reserve, entailed encounters with charcoal poachers and illegal cattle herders. The area showed evidence of heavy illegal logging for charcoal burning. One charcoal camp had an output of about 20–30 sacks, but bigger ones producing about 100 sacks are typical according to the rangers. The production area would typically be deserted, with charcoal poachers inspecting the four-day burning procedure a couple of times per day.

The rangers conducted several arrests, and the patrol leader decided that the charcoal poachers should be brought to the police for prosecution. Evidence collected included preliminary interrogation and photographs, and identity details of the detainees. We did not witness comprehensive use of crime-scene management techniques. The cattle herders were released at the end of the day with orders to inform cattle owners that their illegal grazing was now subject to law enforcement. The cattle were clearly marked, and the owners well known. Thus the rangers and the cattle herders found themselves playing out a political conflict on the ground that would have to be resolved between local politicians representing cattle owners, and the senior ranger commanders.



Poacher shelter burned by rangers, Kimisi Game Reserve, November 2015

The second and third day of patrolling took place in Kimisi Game Reserve, close to the Rwandan border. The rangers successfully used high ground to assume an overwatch position, from where they quickly spotted an illegal cattle herder. A patrol element was sent out and the patrol leader skilfully covertly approached and successfully apprehended the herder, taking him by surprise. A quick interrogation revealed that there were snares in the area. As this lead was pursued, additional trespassers were observed. The overwatch patrol element was called in as reinforcement in order to potentially stage an opportunistic ambush. The patrol instead came across a large number of snares, which were cut down and confiscated. During this activity, two snare poachers were apprehended. Pictures were taken, and the poachers' shelter was burned down. The patrol activity was then interrupted because rain threatened sensitive equipment. On the exfiltration the patrol used the Y-formation successfully, which for patrol members led to a greater sense of security against ambush, and another apprehension of an illegal cattle herder. This revealed excellent standards of tactics and excellent use and application of skills taught.

The third day followed a similar approach as day two, with the same infiltration axis used into the same area. The original

plan was to set up an early morning ambush at the most heavily used crossing point along the border river towards Rwanda. However, this had to be modified into a sweep instead, as the patrol did not arrive in the field early enough to catch the dawn infiltrations into the reserve. The sweep did not result in significant captures, as the activity along the riverbank, although illegal, was local people washing clothes and the like, which was not worthwhile pursuing. The patrol leaders subsequently decided to relocate north in the reserve to a lake where illegal fishing takes place. The main infiltration to the lake entered along a road from the south, and at the lake the rangers could witness illegal fishing, but at the far end. There were no plans on how to pursue waterborne poachers or how to access the other part of the lake. Instead, the rangers decided to fire into the air to demonstrate their presence. Unfortunately, this may have had the effect of demonstrating the rangers' inability to conduct a determined pursuit. The poachers simply rowed away to the other side of the lake. Again, access to boats or better transport would have provided the rangers with more tools and options.

Day four involved a mobile patrol, driving along the north-south road separating Kimisi and Burigi Game Reserves. The

plan was to cut for tracks along known paths crossing east to west. A few stops were made, and activity was found in the form of tracks, recently departed campsites and, in one case, a captured cattle herder. Although a concerted tracking follow-up to identify and capture quarry deep in the reserve was not carried out, some tracks were identified. The last patrol finished early afternoon, and redeployment from the field took place the next morning.

Potential for improvement in patrol execution

The patrol members showed individual skill, initiative and ability to operate swiftly and with good tactical situational awareness, spotting intruders often from afar. The tactical elements were improved through a more consistent application of the Y-formation. Furthermore, the way the patrols were conducted suggested that further training could improve the rangers' skills and improve their ability to patrol even with limited resources.

A major challenge to patrol execution was the way in which the patrolling became reactive rather than proactive, in terms of initiative. The limited planning beforehand led to an approach whereby intruders were dealt with as-and-when they appeared. As was seen in the one incident, experienced rangers could apply effective tactical skills, but further training could emphasize and improve this much further. An alternative approach would be to actively target a particular type of illegal activity, based on situational awareness and the commander's priorities. Since no overall prioritization was made among the many offenders active in the vast game reserves, rangers needed a degree of luck to run into poachers. For determined poachers it would be relatively easy to avoid the rangers. The following changes can be made to avoid this:

1. Closer identification of key bottleneck areas for infiltration into the reserves and strict adherence to planning in terms of time of day would enable an element of surprise and covert arrival at a pre-identified ambush point.
2. Staying the night in the bush itself reduces risks of poachers using local villagers to warn them that law enforcement officers have arrived in the area. In addition, rangers would be less reliant on the few roads into the reserves, which make their arrival observable and predictable.
3. A planned prioritization of which type of offenders to pursue would help against spontaneous reconfiguration of patrol following encounters in the field, and instead lead to seamless transition to priority number two.

4. Prioritizing a type of offender helps rangers to mentally prepare for using time-consuming but effective techniques such as systematic tracking until capture, and crime-scene investigation. If no priority is made between offenders, such techniques may appear to be unnecessarily time-consuming; after all, there are many offenders in the area, and they are often accessible quite nearby.
5. Active use of intelligence collection in the local community helps identify the worst offenders, who may be well known among locals. Intelligence collection does not necessarily require a lot of resources – such as incentives – but it does require time to be spent getting to know locals and building trust.
6. Patrols should be conducted in all weather conditions. Attention to waterproofing sensitive kit using plastic bags, for example, will strengthen patrol resilience.
7. Proper planning prevents poor performance (the 5 Ps). A given patrol always has the potential to be unsuccessful, but the chance of success is greatly increased by planning, using maps and learning from experience. Planning also makes it easier to decide how to handle apprehended personnel and cattle. Such procedures should be standardized as much as possible before patrol, to avoid wasting time on decision-making while on patrol.
8. Tracking is an exceptionally effective tool in pursuit of determined poachers. This technique, applied systematically (relying on pre-identified patrol areas to reduce the size of the search area), is the only way to successfully defeat bush-wise and capable opponents in areas as vast as the three game reserves. Successful tracking follow-up has a considerable deterrent effect.

These suggestions can be immediately implemented. It is nonetheless recommended that local rangers receive further training through more comprehensive guidance in the field conducted by professionals. This should entail the whole operational cycle, from developing a commander's intentions through to situational awareness and into specific patrol plans. And this is followed by documentation in patrol logs and on maps, which leads cyclically into planning for the next patrol.

The British method to hand over an area to a new incoming team is helpful. They use an approach called the left-seat-right-seat approach. Imagine sitting in a car and changing the driver halfway. The existing team is first in the driving seat, with the newcomers watching and learning. Then the two teams switch roles, so the newcomers are in the driving seat, and the old team watches and advises.

UGALLA GAME RESERVE

Staff at Ugalla Game Reserve also reported positive feedback on the training after some 25 experienced rangers and game wardens attended a course 21–23 September 2015. They said that they found both the basic tracking techniques and the crime-scene management training very useful.

Japhary Lyimo, Project Manager Ugalla Game Reserve

Lyimo explained the situation in the game reserves briefly: “Local tribes are allowed to settle in the reserve from July to December at the Ugalla River to conduct fishing, around 150 people. They normally stay there for two months at a time, then go out to procure supplies. They are not allowed to hunt. Conservation of the reserve/ protected areas is for the benefit

of the people. Game park rangers do not inspect the fishermen, but admit that there might be meat poaching taking place. During the dry season there is very little poaching taking place. Poachers come when the reserve is flooded and it is hard for the park rangers to perform patrols. Park rangers perform both foot and vehicle patrols, and when they have aircraft available from the Ministry of Natural Resources and Wildlife, they perform aerial patrols as well.”

Ugalla Game Reserve is about 5,000 km². The reserve is protected by about 40 rangers, which equates to about 125 km² per ranger. This compares to the typical 39 km² per ranger in South Africa’s national parks in 2012, except Kruger National Park, which had 88 km² per ranger.¹³ There are challenges with



Rangers from Ugalla Game Reserve and Friedkin Conservation Fund at a site of illegally cut wood in Ugalla Game Reserve, September 2015

illegal logging in the northern part of the Ugalla Game Reserve. In the southern part different kinds of poachers are active, although illegal charcoal production is not a significant problem anywhere in the reserve because of effective patrolling. A lot of the poaching in the south stems from a series of refugee camps surrounding the reserve, the Katumba camp being the biggest, situated about 40–45 km south of the reserve. The refugees typically use bicycles to enter and depart the reserve, where they hunt all kinds of animals that can provide them with meat.

A concerted effort in prioritizing tracking, navigating and patrolling, crime-scene management and the knowledge of the law and skills in conveying these in statements for the prosecution has led to strong results in Ugalla Game Reserve. As recently as between 2008 and 2013, the reserve typically had up to 40 elephant carcasses per year in the dry season from July to September. For the last three years, in contrast, not a single carcass has been found. Currently, tracking leads to identification of hotspots and a body of knowledge used by management to effectively plan patrols that last up to two weeks. The follow-ups depend on whether it is the dry or wet season, and can be by boat or on foot.

Selous Game Reserve, meeting with Deputy Project Manager 5 April 2016

Selous Game Reserve is about 50,000 km² and is divided into 43 hunting blocks, in addition to Matambwe region, where only photography is allowed and hunting is prohibited. The hunting blocks are operated by individuals and companies, both Tanzanian nationals and foreigners. It is the largest game reserve in Africa, and the area stretches across four regions.

Fifty per cent of the reserve's income from regulated trophy hunting goes to the Government as regular national state income. The rest is spent on operating the reserve, i.e. management salaries and operational costs. This is not nearly enough to run the daily costs, but funding from various foreign donors ensures enough income for sustainable operations. The Tanzanian Government does not contribute money to cover the operational costs of the reserve.

The staff in the reserve totals 712 people, meaning that about half of all Tanzanian game reserve staff belong to Selous Game Reserve. If 75 per cent of these are rangers, this gives a patrol density of 93 km² per ranger, which is comparable to Kruger National Park. The reserve has a total of 38 vehicles for all operative and administrative needs. At least 15 of these are too old and in disrepair, and thus non-operational.

The senior management of the reserve estimates that the reserve needs some 80 vehicles in order to patrol and protect the area satisfactorily.

In terms of rangers' rifles, the reserve is better-off than reports from other game reserves suggest, for instance Biharamulo, Burigi and Kimisi Game Reserves. Frankfurt Zoological Society, which runs various projects around Tanzania, was at the time of writing supplying Selous Game Reserve with new radio communication devices and GPS devices.

Another project is being funded and implemented by the World Wildlife Fund (WWF) south of the reserve. Established in 2015, the project is developing the communities on the outskirts of the reserve in order to stop people trespassing across the reserve borders to illegally exploit the protected area's resources. The WWF is providing EUR 400,000 to this project.

According to the Deputy Project Manager (DPM), the scope of elephant poaching in other reserves may be just as large as it is in Selous, but the people organizing the poaching and illegal trade in ivory are interested in keeping the focus on Selous, in order to facilitate their operations elsewhere. During the last three months, only one carcass of a poached elephant has been found, which the DPM believes to be due to the fact that the reserve is well managed and operated. The DPM estimates that the elephant population today totals around 15,000 individuals.

Germany recently donated a new aircraft for aerial patrolling. This aircraft comes in addition to one that the reserve already operates which, unlike the new aircraft, is not strictly allocated to Selous only.

In 2015, Selous Game Reserve received 270 graduates from Pasiansi Wildlife Training Institute, making the reserve by far the biggest destination duty station for newly trained wildlife officers in Tanzania.

According to the DPM, illegal logging and charcoal production is not a big problem in Selous Game Reserve. This may be due to the fact that the area is quite remote, with few big cities and populations nearby.

On the other hand, during the last three years there has been a large increase in the number of livestock driven into the game reserve. Up until 2012 this was only a minor problem in these areas, but due to the grazing lands outside protected

areas in general having been overexploited, the problems have appeared in Selous as well. By now it is mostly the northern areas of the game reserve that have been troubled by cattle illegally driven into the reserve, but as the human population continues to grow, so does the number of cattle, and the remaining grazing lands are increasingly overexploited. As seen in the north-western parts of the country, the issue increased at the time of the general elections in late 2015, due to politicians trying to please voters and powerful businessmen.

Training requirements for rangers as seen by game reserve managers

Senior game reserve managers emphasize the necessity of practical training for rangers. While newly educated rangers tend to have a strong theoretical understanding, they need more practical training to become operationally effective. The first priority for the rangers is tracking, as it is these skills that make it possible for them to determine what kind of suspects they are facing. Is it an elephant poacher, or a bushmeat hunter, or any other kind of trespasser? What kind of weapons are they using? How many of them are there? How long have

they been there? Tracking is what translates random patrol-to-contact into a more targeted effort where it is possible to both backtrack to a crime scene or forward-track towards poachers on the move, to intercept and arrest them. More importantly, it improves the safety of both the officers and the suspects, by enabling rangers to conduct more arrests and reduce armed contacts/exchange of fire, and avoid ambushes. Tracking is thus the most important practical skill for rangers to enable past crimes to be prosecuted and emerging crimes to be intercepted and disrupted.

The second priority is crime-scene management. Rangers must know how to preserve the crime scene, protect it from contamination and record and collect sufficient evidence to be able to present a strong case in court. The subsequent statement from the rangers helps build this court case, with individual rangers who attended specific crime scenes being expected to present their case in court. There is a direct relationship between the quality of the handling of the crime scene and the likelihood of successful prosecution.

The third priority is rangers' knowledge of the applicable laws that they are to enforce, specifically the Wildlife Conservation Act of 2009. Rangers need to know what kind of animal carcass they are facing, as the relevant charges vary accordingly.

The fourth priority is training in how to write a statement. The experiences from the crime scene, found by tracking, must be conveyed in writing to build the court case. The poachers have their defence case built, and the rangers must help the prosecution build a case saying, beyond reasonable doubt, that the individual(s) in question was at the crime scene, and is in fact guilty of the wildlife crime.

A typical case can involve several counts. It is a crime to enter the game reserve without a permit, which constitutes trespassing. A second count is typically illegal possession of weapons, where everything that is capable of killing an animal counts, including snares. A third count is possession of any product from wild animals, from bushmeat to trophies. Separate laws apply for the destruction of vegetation, encompassing illegal logging and charcoal production for example, as these are not covered by the Wildlife Conservation Act. For game reserve managers, practical skills in these four fields are necessary to performing their day-to-day jobs.

In terms of training that is less well covered by domestic training institutions, patrol technique and firearms training is identified



Rangers from Ugalla Game Reserve and Friedkin Conservation Fund training tracking in Ugalla Game Reserve, September 2015

as key. Rangers say that poachers are often combat veterans from Rwanda and Burundi, equipped with submachine guns and assault rifles. This can lead to a tactically unequal encounter in the field between rangers who are inexperienced and lack confidence in handling their weapons against poachers who are well-equipped combat veterans.

Poachers versus rangers

Anti-poaching professionals consistently report the constantly changing methods applied by poachers. The poachers respond to changing operating procedures by rangers, and there is constant competition in the field to stay ahead of the opposition from both sides. For example, the poachers try to change their mode of travel from bicycle to walking, or they reverse their shoe soles, pretending to walk in the opposite direction. Another example is changing the mode of killing from firearms, that can be heard by either rangers or locals, to snares or poison in waterholes in the dry season, that kill silently. If rangers are strong in their tracking skills and field craft, they will be able to see through these ruses.

Similarly, poachers and rangers compete over intelligence and loyalties. The poaching activity is conducted by a network of independent cells, from the hunters to those who cut parts off the animal, to those who transport wildlife products from crime scene to village, from village to district, from district to town and then to Dar es Salaam. These different levels of the chain are usually conducted by different individuals, who do not know each other. It takes a concerted intelligence effort to connect the parts of the chain, to be able to reach the higher and more organized segments. About 90 per cent of poaching is organized and thus pre-planned.

The problem is that the poachers also collect intelligence, and can have their own network of sources, who they pay for information, which generates a race for source loyalties. In addition, this competition for loyalty also applies to rangers. By some commanders' beliefs and estimates, as many as 5–10 per cent of rangers in some areas may be engaged in corrupt activity, assisting poachers to varying degrees. Evidence typically comes from confiscated telephones that indicate phone calls having taken place or payments by phone or other means.

The competition between rangers and poachers also applies to local communities, where poachers are often based. Anti-poaching activities can have a direct negative effect on their cash incomes and alienate these communities. In other cases rangers, often with outside funding from private institutions,

can initiate infrastructure programmes in nearby communities to improve relations and create an understanding of the public interest in maintaining protected areas.

Equipment

Vehicles and tents are key equipment that enables mobile patrolling, although vehicle patrolling reduces situational awareness in terms of picking up very subtle tracks. Small individual tents make it easier to march further and faster instead of relying on team tents that require cars, which can only go in some areas and make noise.

Cattle herding

Cattle herding is a big problem in some reserves in Tanzania, particularly Kimisi, Burigi, Biharamulo and Kigosi. These reserves are close to Rwanda. In Rwanda cattle herders are only allowed to own 100 head of cattle, and only if they have grazing areas for them. In Tanzania there is no such restriction. This leads Rwandan herders to take their cattle over the border to graze in Tanzania, often in protected areas. The problem is reinforced by Tanzanian local power brokers using the land for grazing. A typical exchange can be either herders paying corrupt rangers in order to be left alone, or at the higher level power brokers can provide politicians with votes in return for being allowed to use the protected areas for grazing, including protection from prosecution. In some areas, prosecutors and rangers become entwined in a power struggle against local power brokers who are supported by political figures at the national level, where the parties owe favours to one another. The cattle crowd out wildlife from the protected areas and their large numbers heavily impact the ecosystem.



Ankole-Watusi cattle in Biharamulo Game Reserve, November 2015



Wood prepared for charcoal production, Biharamulo Game Reserve, November 2015

ILLEGAL LOGGING

Illegal logging degrades forests, causes economic loss, destroys biodiversity and livelihoods, promotes corruption, and funds armed conflict. The economic costs of illegal logging are staggering. Including processing, UNEP and INTERPOL estimate that approximately USD 30–100 billion is lost to the global economy through illegal logging every year, making the trade in illegally harvested timber highly damaging to national and regional economies.¹⁴

Tanzania has 33 million hectares (82 million acres) of forests and woodland, but has been losing hundreds of thousands of hectares of forest each year for two decades according to the United Nations Food and Agriculture Organization's (FAO) most recent Global Forest Resources Assessment.¹⁵ In the assessment, Tanzania is number five on the list of countries reporting the greatest annual forest area lost in the period 2010 to 2015, with 372,000 hectares lost per year in that period, i.e. 0.8 per cent of the country's 2010 total area.

Tanzania's controller and auditor general report in 2012 said that 96 per cent of trees cut in Tanzania are illegally harvested. Illegal cutting is the result of poor planning and the Government's inability to manage its forestry resources, according to the report. The Ministry of Natural Resources and Tourism, for instance, reported that the country had lost an estimated TZS 23 billion (USD 13.5 million) in sales of forest products between 2011 and 2012 to illegal logging.¹⁶

The Government has placed a large portion of the country under protection in order to conserve its globally important ecosystems and wildlife populations. These protected areas and their vegetation and wildlife are crucial to tourism and the economic development of rural areas. However, to date there have been very few economic benefits for people living near the protected areas. Population growth and a rising demand for land for animal husbandry and agriculture are increasingly jeopardizing protected resources and intensifying the threat of conflict between people and fauna and flora.

Since the local population typically has no tangible benefit from the protected areas, their commitment to sustainable forms of management is often low. Incentives are thus lacking for sustainable management practices, while illegal logging for timber and charcoal production grows. This is posing a serious threat to the attractiveness of Tanzania's protected areas and their tourist appeal.

The responsible actors have to date not had sufficiently coherent mechanisms at their disposal to ensure the protection of the fauna and flora, and at the same time offer incentives for the local population to support sustainable resource management. Charcoal illustrates this issue well. An estimated 90 per cent of wood consumed in Africa is fuelwood and charcoal, with the latter totalling over 32 million tons per year worth approximately USD 9.7–26.2 billion annually.¹⁷ Charcoal is the predominant household energy source across Africa, and there is no obvious replacement for it in terms of competitive cost and accessibility. Increasing urbanization and dramatic population growth will increase the use of charcoal, which causes deforestation.¹⁸

CORRUPTION AND WEAK GOVERNANCE

As in many developing states, corruption is relatively pervasive in Tanzania. It is found in society all the way from local police officers and bureaucrats to high government. Tanzania was the third biggest African recipient of overseas development aid in 2013, with USD 3.4 billion according to the Organisation for Economic Co-operation and Development (OECD).¹⁹ Annual growth of gross domestic product (GDP) has averaged

at 6.7 per cent for the last 13 years.²⁰ At the same time, the country is ranked as 119th worst out of 175 in Transparency International's corruption index.²¹

In African countries the state bureaucracies are often weak, and different actors see their chance to abuse the system for personal gain through illegal activities, including drug trafficking, the illicit



Improvised set-up for illegal logging, Ugalla Game Reserve, September 2015

movement of natural resources, different forms of environmental crime, and maritime piracy. The United Nations Office on Drugs and Crime (UNODC) cites Dar es Salaam together with Mombasa in Kenya as the two main ports where shipments of ivory leave East Africa. Indeed, 37 per cent of seizures are made in Tanzania, making it the number one country in Africa in terms of ivory seizure.²² Many of these activities should be referred to as organized crime,



often involving foreign actors. The key alliances with organized crime are made at both the central Government level and at the provincial level. Both cases require some form of corruption on the part of officials. Despite frequent government directives to stop deforestation, illegal logging has been continuing unabated. The Government has stepped up security measures in the forest reserves – for example by increasing the number of forest guards and rangers – but catching loggers proves difficult, as they are normally locals who know the territory well, and they often know where law enforcement officers operate so avoid them. Powerful organizers collude with official administrators, bribing them to allow the loggers to operate freely.

Charcoal is the single most important energy source for urban households in Tanzania, which constitute 32 per cent of the population, and the country has an urbanization rate of 5.3 per cent per year.²³ However, charcoal is politically neglected because it is not categorized within sustainable development, and it contributes to deforestation. For this reason, charcoal remains part of the informal, and often illicit, economy. According to the World Bank, in 2010 this incurred a loss of revenue to the Government of at least USD 100 million per year.²⁴ The World Bank estimated that only about 20 per cent of taxes and fees are actually collected, however visits to the field and interviews with law enforcement professionals indicate that this is likely a very high estimate, and that the revenues are considerably less than 20 per cent. Indeed, law enforcement efforts are plagued by ill-defined charcoal policies following from the lack of a viable alternative, government disinterest in the issue, and as a consequence the power of the networks of transporter and wholesale actors who control the informal trade.

Despite repeated official commitments to combating forest crime, such as the *East Africa Initiative on Illegal Timber Trade and REDD+*²⁵ and the July 2015 *Zanzibar Declaration on Illegal Trade in Timber and Other Forest Products*,²⁶ reports still reveal that illegal loggers are destroying Tanzania's forests.

Tanzanian forest officials recently said that a surge in illegal logging was devastating native forests in coastal Tanzania's Rufiji district, despite efforts by authorities to curb forest losses. According to officials, "Hundreds of tons of trees are being smuggled out of the district each month by timber traders to feed a lucrative construction market and furniture industries within the country and abroad".²⁷

HOW IS ILLEGAL LOGGING DONE?

In Rufiji, loggers enter the forests at night to target indigenous tree species, notably mninga and mpodo, which are now on the verge of local extinction due to high demand. District forest revenue records show that more than 70 per cent of the total volume of wood being harvested in the forest is unaccounted for, resulting in enormous losses of government revenue from levies, taxes and fees.²⁸

Local residents claim that some district forest officials are colluding with illegal loggers by sometimes secretly doling out permits or offering safe passage of illegal consignments of timber. Logs are ferried along unofficial routes assisted by a network of local police officers, who often pretend to be

inspecting vehicles for smuggled timber when they are in fact helping them to traffic the product.

Another problem is that the fines for those caught with illegally cut wood products are very low, and once they have paid the fines, the perpetrators are allowed to keep the products. These fines can simply be factored in as the cost of doing business.

In some regions, charcoal and other wood products cannot be taken out of the region, whether legally or illegally processed, and the products will be confiscated if discovered. The problem is that the authorities will auction the products, and when purchased there, they can then be exported legitimately.

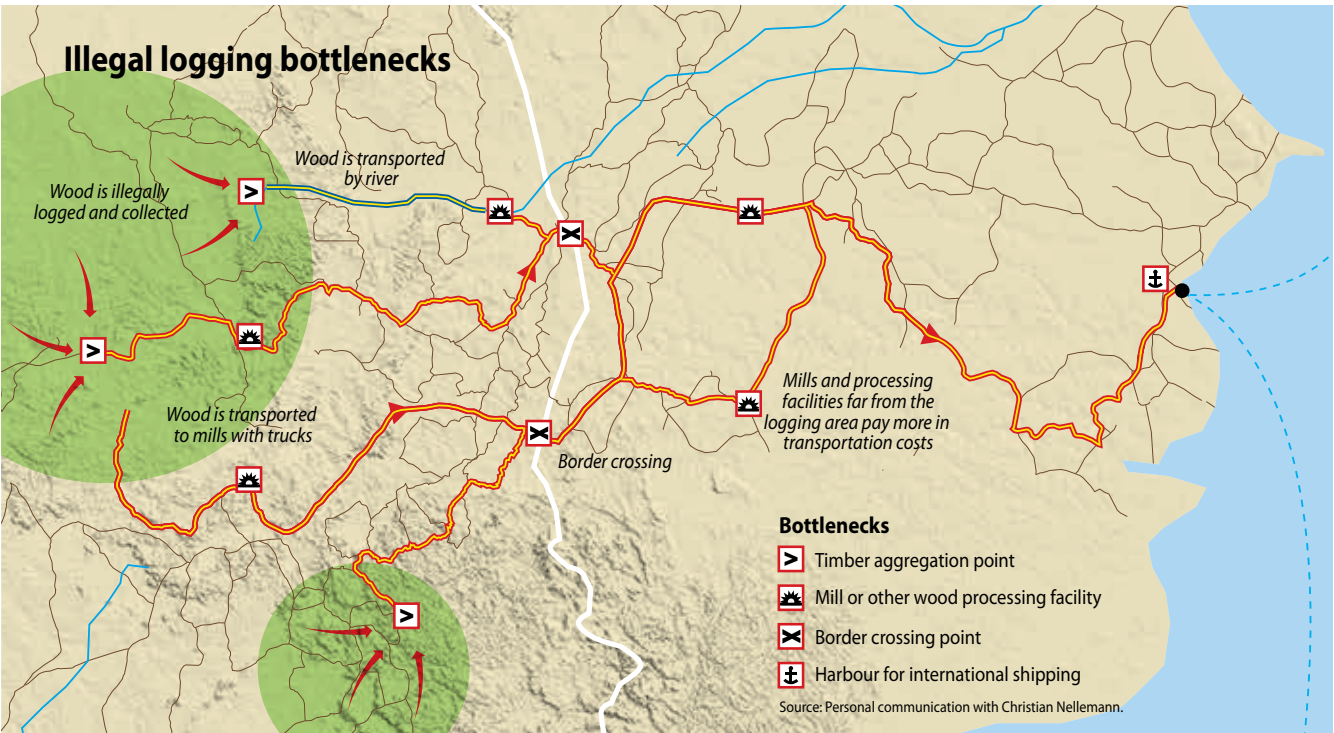


Figure 5. Illegal logging bottlenecks

LAKE ZONE DISTRICT

According to law enforcement officers involved in counter-poaching work in northwest Tanzania, the illegal logging situation is characterized by vast challenges, including corruption and a weak judiciary system. The following quotes and explanations are based on experiences from anonymized Lake Zone law enforcement personnel interviewed about the circumstances surrounding illegal logging in their area of responsibility.

Who is involved, and where does it take place?

“A large number of people are involved in making charcoal or timber get to the market. The mode is the same. Business people in town give money to their subordinates, called managers,

who are the ones going to the rural areas where they meet with locals. These local people, most of them in the Lake Zone come from Burundi, are contacted and tasked with producing a certain number of charcoal bags or pieces of timber. For the first time they are provided with food and equipment, mainly axes, bush knives, hoes and saws. After completing a task, they then negotiate a price for each bag of charcoal or piece of timber, and the amount given as an advance for food and equipment is subtracted from the total. The Burundians enter the country illegally, and many come from areas where there were refugee camps.”

“Areas of forest reserves are highly degraded due to timber and charcoal production. Biharamulo Forest Reserve, Nyantakara



Confiscated wood products, charcoal and bicycles, Lake Zone Tanzania, November 2015

Forest Reserve, Maisome Island Forest Reserve, Geita Forest Reserve, Mkweni Forest Reserve, Usindakwe Forest Reserve, Nyamagwangala Forest Reserve, Kasindaga Forest Reserve, Ruiga Forest Reserve and Kome Forest Reserve. The abovementioned forest reserves are highly affected by the production of charcoal and timber. In game reserves, there is destruction due to charcoal making, but most of it occurs in peripheral areas. Due to patrols going on consecutively, it is difficult for illegal loggers to process charcoal and

succeed without being disrupted or apprehended. In the case of timber, destruction goes far in game reserves. Most forest reserves nowadays do not have good and large amount of timber. Poachers tend to steal from game reserves trees such as *Pterocarpus angolensis* (hardwood), *Azizelia* species, *Brachystegia spiciformis*, *Pterocarpus tinctorius* and many more indigenous trees. In many forest reserves, tree populations for timber are scarce and have too low a quality to suit the market.”



Tree cut illegally by loggers for harvesting honey in Ugalla Game Reserve, September 2015

Transportation

After the trees have been cut and processed as charcoal or sawn into planks, personnel responsible for transportation mainly use roads to transfer the products to the markets. Vehicles, especially lorries, are typically used. Drivers sometimes obtain permits from forest officers, who do not even question where the charcoal or timber was harvested. It is normal to discover a vehicle carrying an amount of charcoal or timber products that differs from the amount written in the permit. The permits should show:

1. The actual amount of cargo
2. Where and when the cargo was obtained
3. The cargo's destination
4. In the case of timber, it should show species of trees involved and quantity in cubic metres
5. Lorries should be checked at every checkpoint according to the route stated in the permit. The owner of the cargo is obliged to have a valid business licence.

In most cases these rules are not followed. It is normal to catch vehicles where the owner of the cargo has none of the required documents. In a few cases, other business people transport timber and charcoal via Lake Victoria to Mwanza city, which has a lot of places on the lakeshore where boats can land vehicles with cargo. As transporting products via water helps business people avoid road inspection, charcoal and timber loads from Maisome Island Forest Reserve are often transported in this way. Drivers make sure that the trans-shipment to land vehicles is done at night, to avoid being seen.

Who is in charge?

“There are business people involved in the illegal trade of charcoal, timber and even ivory residing in Mwanza. There is a connection between them and some officials in doing this business. Some business people are backed by government officials or political figures.”

Destination

“Charcoal and timber from Lake Zone is not only shipped to Mwanza but even to Dar es Salaam. Timber sometimes crosses the border to Kenya. Charcoal transported to Dar es Salaam is transported in heavy goods vehicles with closed and sealed containers. The problem with sealed containers for law enforcement is that if a sealed container is opened and nothing illegal is found, the Government has to pay compensation for the disruption. This puts a high threshold

on inspections, making law enforcement officers unwilling to inspect containers unless they have absolute proof of the contents in advance.

In western parts of Tanzania on the border with Uganda there are business people who transport charcoal and timber to Uganda from Tanzania. They are business people from Uganda. There were cases at Mutukula via locally established routes along the border.”

TANZANIA FOREST SERVICES AGENCY (TFS) – WESTERN ZONE

Meeting with Emmanuel T. Minja, Zonal Manager

“Vehicles are a problem; the road conditions are very demanding, and the cars we have are exhausted. When deploying for patrols in the forest reserves, our rangers need to join game wardens or game reserve rangers that are armed due to the high risk of encounters with armed poachers. The main problem is that people in the surrounding villages and communities do not have jobs and income. The only solution for many is poaching in order to be able to take care of their families.

Another problem is that there is a huge lack of schools. The youngsters are not given the chance to receive an education, and will face big challenges when it comes to future employment and sustaining themselves.

Livestock is also a huge problem. There is an abundance of farmland, but most of it is too dry and irrigation projects are highly needed. The livestock farmers thus drive their herds into the protected areas, and the animals displace the natural wildlife and overexploit the vegetation.

There is a lot of illegal charcoal production taking place in the reserves. The perpetrators are mostly local people from the surrounding communities, but it seems to be a growing number of refugees from Burundi coming in from the west as well. These people are also engaged in meat, wood and honey poaching. It is forbidden to bring charcoal out of the region, but there is of course a lot of illegal smuggling taking place. Confiscated charcoal is auctioned, and then it is allowed to transport it out of the region. Currently, our focus is on consolidating forest boundaries and evicting encroachers.

In terms of refugees, a notable problem is when criminals hide themselves within the group. It is not easy for me to say precisely who organizes the illegal logging, or identify the end markets. We simply do not have the information. Tree species, which are in danger of extinction in this region, include *Pterocarpus angolensis* and *Azelia quanzensis*.

With respect to equipment shortages, the most urgently needed kit is camping equipment, communications like push-to-talk radio, and forest inventory/assessment equipment.”



Rangers from Ugalla Game Reserve and Friedkin Conservation Fund interpret bicycle tracks from poachers, September 2015

UGALLA GAME RESERVE



Ugalla Game Reserve is found in the Tabora and Katavi regions within the Ugalla Ecosystem. It lies between longitudes 31° 26' and 32° 23' East and between latitudes 5° 31' and 6° 03' South, covering an area of approximately 5,000 km². The area has been under some form of preservation since 1938, and became a game reserve in 1965. At that time, hunting was not permitted in game reserves, therefore this activity was stopped. In 1990/1991 the Ugalla Game Reserve was elevated to the status of a “National Project”, to be administered by the Wildlife Division rather than at the district level.

The drainage system comprised of the famous Ugalla and Walla Rivers, which confluence at Senga 1 and flow from east to west through the reserve to the Malagarasi River. Away from the river, the reserve is characterized by open Miombo woodland, which is in places interspersed with some grassland areas (mbuga). During the rains, much of the reserve is inaccessible due to extensive flooding, while in the dry season Ugalla forms a haven for much of the game from surrounding areas. The river stops flowing during the dry season, forming large pools which remain throughout the year. These are home to hippos and crocodiles, and provide year-round water for other game (for example elephant, buffalo, sable, impala and topi) that reside around and beyond the Ugalla Ecosystem.

The forest reserves of western and southern Tanzania were established to ensure that the valuable timber species *Pterocarpus angolensis* ('muninga'), and other species of commercial value such as *Pericopsis (Afrormosia) angolensis* ('mbanga') and *Dalbergia melanoxylon* ('mgembe'), could be exploited in a controlled and sustainable manner. However, many of the larger specimens of muninga have been extracted from Ugalla North Forest Reserve, and the profusion of tracks into Ugalla Game Reserve from the north, with evidence of pit-sawing, indicate that this species is being rapidly removed from the northern part of the game reserve. Muninga is also favoured by beekeepers to make log hives which last for many years.



Trees in Ugalla Game Reserve branded by illegal loggers for later cutting. Removing the bark also kills the trees, preparing them for sawing.

Challenges in managing Ugalla Game Reserve

The major problem is illegal logging, especially during the wet season, when flooding makes it hard for the rangers to access the area. Loggers normally de-bark trees to dry them, then cut logs and make big pieces of timber, which in the wet season they normally transport using the water flow of the Ugalla River.

During the dry season, the illegal loggers enter the reserve on bicycles. They normally come from the neighbouring villages, and are well aware of the tactics and whereabouts of the reserve rangers, who often reside in the same villages. This fact most certainly makes it possible that some rangers cooperate with the perpetrators, either due to family affiliations or for personal financial gain.

The illegal loggers enter deep into the reserve, de-bark trees to dry them, and then return later to cut them down, normally using sawpits to cut the logs into planks. They also cut down trees to retrieve honey from the beehives inside the trunks. In order to transport and protect the honey they normally cut big pieces of bark from nearby trees.



WHAT IS THE FUTURE ROLE OF CHARCOAL IN TANZANIA?

Ninety per cent of Tanzania's energy comes from fuelwood, with charcoal the single largest source of household energy in urban areas.²⁹ Indeed fuelwood and charcoal also represent 90 per cent of Africa's wood consumption. Charcoal, popularly known as 'makala' in Swahili, is used overwhelmingly as household energy, particularly for cooking.

Charcoal has many advantages: it is relatively inexpensive and readily available; being convenient and light, it is inexpensive to transport; it burns much hotter than firewood but requires less safety attention inside the house; and it contains double the energy of firewood but produces less smoke. This is not to say that it is healthy to burn charcoal inside a kitchen without good ventilation, but it is preferable to firewood. Charcoal can be stored for a long time without the problems associated with storing firewood, such as moisture and fungi.



Typical transport of charcoal from the bush/reserves to the villages/markets

The research on fuelwood and charcoal consumption has gone through stages. In the 1970s and 1980s there were warnings of an impending fuelwood crisis. The Government of Tanzania was inspired to initiate programmes to either improve cooking stoves and charcoal kilns to increase charcoal efficiency, or to transition to alternative fuels such as liquid petroleum gas. Alternative energy sources such as gas, kerosene and electricity remain unaffordable to most citizens, and ambitious programmes to transition to these have been unrealistic and unsuccessful in Tanzania.

By the 1990s, some studies blamed agriculture and grazing rather than fuelwood for deforestation, and the initiated

programmes proved unsuccessful. Only relatively wealthy African countries such as South Africa, Namibia and Botswana had succeeded in reducing charcoal consumption. In terms of research, there has been a failure to distinguish between charcoal and firewood and the different types of threats they pose to forests. The former is a product of human labour, while the latter is harvested in usable form directly from nature. The failure to make this distinction in research has led to the role of charcoal in deforestation being underestimated. In one estimate, a 1 per cent increase in urbanization equals a 14 per cent increase in charcoal consumption.³⁰

Official charcoal production for all of Africa in 2014 stood at 32.4 million tons.³¹ This is likely to be a very large underestimate. At a price of between approximately USD 200³² and USD 800³³ per ton, the value of this trade is USD 6.5–26.2 billion across Africa, based on the official production figures. Tanzania officially produced 1.76 million tons in 2014, at a value of USD 352 million – 1.23 billion. This corresponds well with the estimated total contribution of charcoal to neighbouring Kenya's economy, which is about USD 1.33 billion.³⁴

The official quantities reported to FAO for import and export of charcoal are certainly flawed. In 2014 Tanzania officially exported only 4 tons, or half a truckload of charcoal, and imported only 12 tons.³⁵ By comparison, one study found that 12 per cent of Kenyan charcoal feedstock came from abroad, with 4 per cent (equal to 384,000 m³ of wood) from Tanzania.³⁶ It is realistic to assume similar import-export activity takes place with the finished product. Indeed, field studies show clearly that truckloads full of charcoal pass border points regularly. In addition, Kajiado, which is opposite Arusha in Tanzania, and Kwale, which is opposite Tanga on the coast of Tanzania, have been referred to anecdotally by informants as places where charcoal is exported from Tanzania to Kenya. Systematic information is lacking on this important part of the chain, because of the illegal nature of the trade.³⁷



POPULATION GROWTH AND URBANIZATION

In order to evaluate the impact of the illegal charcoal trade on deforestation and potential threat to finance, it is necessary to assess the demographic development as an indicator of the demand for charcoal in the near and medium term. Tanzania's population in 2015 was 53.5 million citizens, with urbanization at 31.6 per cent and rising by 5.36 per cent per year.³⁸ Half of the charcoal produced is consumed in Dar es Salaam, with 500,000 tons in 2009, according to the World Bank.³⁹ With a population of 5.1 million, the city currently only consumes about a third of the urban-consumed charcoal in the country. In Malawi the urban population consumes 90 per cent of the charcoal, whereas in Kenya this stood at

82 per cent back in 2002, and it has likely increased since then.⁴⁰ Tanzania's urban population of 16.9 million is likely to consume at least three quarters (1.32 million tons) of the charcoal produced in the country, while the rural population consumes the rest (440,000 tons). The rural population is able to rely more extensively on firewood than the urban population can, having it within walking distance. The average consumption of charcoal per rural capita is 36 kg, or 84 kg per urban capita on average, given that the urban population consume three quarters of the charcoal for 2014. However, as suggested below, there are indications that total unofficial consumption is two and a half times as large.

Tanzania	2010	2015	2030	2050
Total population	44,973,000	52,291,000	79,54,000	129,417,000
Urban population	12,644,000	16,528,000	33,257,000	68,569,000
Percentage urban	28	31,6	41,9	53
Charcoal consumption (250 per cent of official production)	4,020,000	4,655,000	6,982,500	12,132,500
Charcoal consumption per citizen (kg)	36	36	35	37
Charcoal production tons (FAO) -> projections	1,608,000	1,862,000	2,793,000	4,853,000
Fuelwood production m ³ (FAO, excludes charcoal)	22,836,000	23,570,000	25,772,000	38,984,000
Charcoal official production as percentage of fuelwood	30	32	39	43
Tree volume required for official charcoal production level (x6) m ³	9,648,000	11,172,000	16,758,000	29,118,000
Tree volume required for estimated charcoal consumption level (x6) m ³	24,120,000	27,930,000	41,895,000	72,795,000
Deforestation hectares (300 hectares/day = 109,500 ha per year = 0,11 hectare/ton charcoal) based on official production	176,880	204,820	307,230	533,830
Deforestation hectares (300 hectares/day = 109,500 ha per year = 0,11 hectare/ton charcoal) based on unofficial consumption	442,200	512,050	768,075	1,334,575
Charcoal import tons (FAO)	22	49 (2013)		
Charcoal export tons (FAO)	990	45 (2013)		

Table 1. Tanzania projected charcoal consumption in 2030 and 2050

In 2004 ESDA conducted a comprehensive investigation into charcoal consumption in Kenya, concluding that it was 1.6 million tons.⁴¹ Although FAO does not produce estimates of consumption, their official production figure for that year was 747,000 tons.⁴² Another estimate for 2007 was a consumption of 2.4 million tons,⁴³ with a corresponding official FAO production size of 837,000 tons.⁴⁴ If these estimates are accurate, consumption is at approximately two and a half times official production, which gives an indication of the illicit size of the charcoal economy in East Africa.

Nonetheless, charcoal consumption has not been constant, and there are reasons to believe that it has increased in recent years, and that this increase continues. In 2009, the World Bank noted a rise in absolute and relative consumption of charcoal due to population growth, urbanization and rising fossil fuel prices. Despite the latter having fallen during the last 12 months, petroleum only constitutes 8 per cent of all energy supply used in the country. Biomass constitutes 90 per cent of energy supply, and both population growth and urbanization are steadily increasing.⁴⁵ The United Nations Population Division projects that Tanzania will reach 53 per cent urbanization in 2050. The country's population growth was 2.8 per cent per year in 2015.⁴⁶ Meanwhile Dar es Salaam is expected to emerge as a megacity, passing 10 million inhabitants by 2030.⁴⁷ Nationwide, the United Nations estimates Tanzania to have 33 million urban citizens in 2030, and 68.6 million in 2050.⁴⁸ The total population is estimated at 79 million in 2030 and 129 million in 2050.⁴⁹ These fast-growing figures have a dramatic impact on the consumption and production of charcoal, as shown in table 1.

These estimates of future production and consumption correspond well with the projections made by UNEP and INTERPOL for Africa in 2050, namely 79–90 million tons of charcoal produced at a cost of 474–540 million m³ in tree production.⁵⁰ The tree volume required for Tanzanian charcoal production and consumption, in the range of 29–73 million m³ in 2050, is dramatic. Even the lower estimate of 29 million m³ in 2050 is 3 million more than the 2014 official total roundwood production, which includes all wood removed, and fuelwood, in Tanzania. In turn, this means that either all wood produced must go to charcoal production – which is an unlikely prospect – or deforestation will increase dramatically. A conservative

estimate of deforestation is put at 533,830 ha in 2050 alone, but may be two and a half times higher. Deforestation has a negative impact on water catchments and watersheds, and consequently on both energy and water supply.⁵¹

In 2007, Mwampamba found mean charcoal consumption to be approximately 140 kg per urban citizen per year. The amount of forest needed to meet the 2002 demand of charcoal was 62,000–421,000 ha, depending on whether an average person consumed 3.12 (low mean) or 4.62 (median mean) 30 kg sacks per year. This corresponds well with the deforestation projected in the table above. At this rate of consumption, Mwampamba developed several scenarios. Under the most pessimistic scenario, Tanzania would have completely lost all public forests by 2028. Even with regeneration of deforested land set at 30 per cent or 80 per cent, this would only postpone this date to 2030 or 2035 respectively. Just over another decade later, the forests in reserves would also be depleted. The most optimistic scenario, which somewhat unrealistically presupposed that the 2002 consumption pattern remains, saw public forests survive until 2100, albeit severely reduced.⁵²

Parallel to the increased charcoal demand, there is increased demand for wood products such as timber and poles used in construction and electricity locally, and in neighbouring countries and the Middle East.⁵³ Tanzania has a capacity for producing 345,000 poles per year in the Iringa area.⁵⁴ In addition, the country exported about 77,000 m³ of sawnwood in 2014.⁵⁵ Some research indicates that the official production figures may underestimate actual unofficial and unreported production by a factor of between 5 and 50.⁵⁶

WHERE DOES CHARCOAL COME FROM?

Charcoal can be made from any species of wood, but it is the *Acacia* and *Combretum* species that produce the highest quality charcoal. Availability varies according to region, so for example in coastal areas mango trees are typically used for production.⁵⁷ The largest areas of intact forest that are still suitable for charcoal production of some scale are found in the southeast, in the Mtwara area, which is an area plagued by high volumes of illegal logging.

Charcoal is generally unsustainably harvested from dry (or Miombo) woodlands within a catchment area that extends up to 200 km from urban energy markets.⁵⁸ At least 50 per cent of forests are in protected reserves, although their protection is in reality for the most part theoretical, as illegal harvesting is rampant.⁵⁹ The majority of charcoal comes from natural forests, often on village land, and significant amounts come from protected areas. Plantations and trees harvested under licence outside forests contribute only marginally in quantitative terms.⁶⁰ The Kenyan charcoal survey cited above found that

13 per cent of charcoal production came from protected government forests,⁶¹ and an earlier investigation found 40 per cent of charcoal from rangeland, 40 per cent from farmlands and 20 per cent from government forests.⁶² In Malawi, 60 per cent of charcoal is produced in protected areas.⁶³

In 2010 Tanzania had a forest cover of 33.4 million ha, and an annual forest loss of approximately 1.1–1.5 per cent (300–500,000 ha).⁶⁴ Between 30 and 60 per cent of this forest loss can plausibly be attributed to charcoal consumption.⁶⁵ If the projections in table 1 are correct, however, annual forest loss will grow to at least 2.5 per cent of the 2050 projected tree cover. In other words, the growth in charcoal consumption based on population growth and urbanization will dramatically increase deforestation. However, whereas it is possible to calculate consumption with at least some degree of precision, forest recovery is more complicated. Biomass can return in as little as 15 years in ideal conditions, but this requires systematic and large-scale reforestation.



Illegal charcoal production site in Biharamulo Game Reserve, November 2015

ILLEGAL TRADE IN CHARCOAL

UNEP and INTERPOL have estimated the value of forest crime globally at 30–100 billion annually. The unregulated fuelwood and charcoal trade both inside and outside protected areas, with concomitant tax evasion and fraud, is one of four major areas of forest crime.⁶⁶ The unregulated charcoal trade is estimated to involve a direct loss of revenue of USD 1.9 billion to African countries every year.⁶⁷ In Uganda, Rwanda and Malawi, as in Kenya and Tanzania, the charcoal industry provides employment for a large number of people along the chain,⁶⁸ and represents about 0.5 per cent of GDP in Malawi and between 1.1 and 5 per cent in Rwanda.⁶⁹

Charcoal contributed some USD 650 million to Tanzania's economy in 2009. However, it does not generate tax revenues due to widespread avoidance of licensing fees. The Government is estimated to lose approximately USD 100 million per year from the absence of effective regulation and enforcement.⁷⁰ Kenya, by comparison, was in 2005 estimated to lose USD 50.2 million per year, based on a 16 per cent value-added-tax rate.⁷¹

The charcoal trade is largely unregulated and is characterized by rampant and systemic corruption. In Kenya, a comprehensive investigation in 2005 found that an average charcoal producer makes 30 bags per month. There were about 253,800 producers, but only one in eight was licensed. With an average bag weight of 35 kg, this comes to 3.2 million tons per year, whereas the official production was only 400,000 tons.⁷² Even if only half of the producers made 30 bags per month, the unofficial estimate is still four times the official one.

In response to high charcoal consumption in both Tanzania and Kenya, outright bans on production have often been used as a policy alternative. However, such bans have had to be reversed due to the lack of realistic energy alternatives for families, which made the bans ineffective and instead drove production underground.

During periods when bans were in place, corruption significantly increased in some places, further complicating successful regulation. For example, in Kitui Zone, Kenya, the Kenya Wildlife Service imposed a total ban on charcoal production in 2012. This led to an increase in illegal production, including in protected areas, likely because the blanket ban made distinguishing where production took place irrelevant for the producers. In

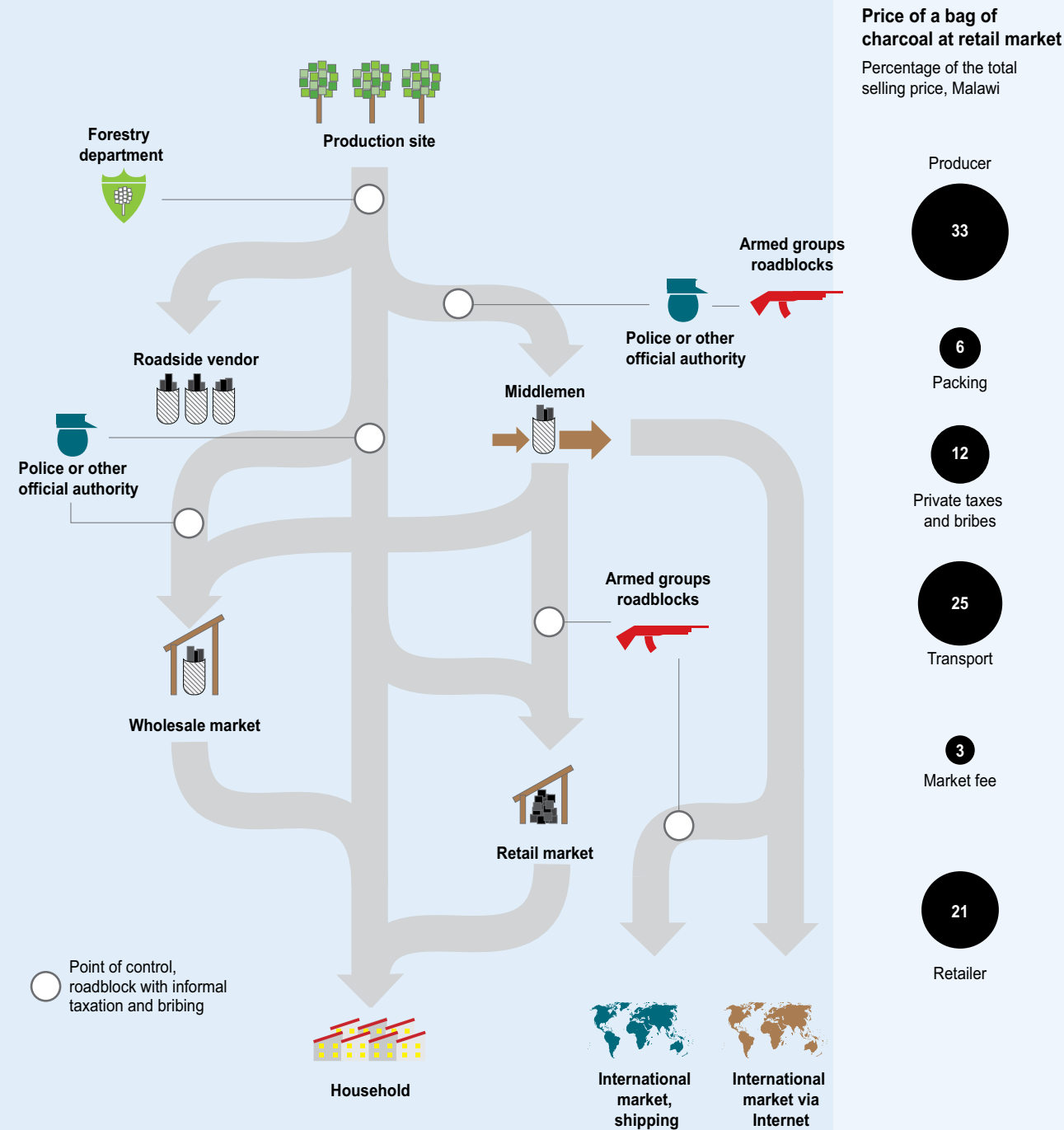
other words, if it is illegal anyway, why not produce in the most convenient locations, such as forest reserves? In addition, charcoal producers needed to bribe police and officials to be able to deliver charcoal to the market, which further diminished these officials' legitimacy.⁷³

The lack of a long-term policy on charcoal legality compounds other issues with its production. For example, the most typical mud kilns used in forest reserves are very inefficient, only yielding 10–15 per cent charcoal from the wood used. However, more efficient kilns require systematic investment in the trade, and for this to happen the trade must be successfully regulated. Without regulation, the expansion of demand further increases deforestation and thus deepens the clandestine character of the trade.⁷⁴

As a further consequence of lacking transparent long-term regulation, charcoal is sold at an artificially low price, which in turn makes it difficult to introduce stronger regulation, as described by the World Bank: "The charcoal trade is dominated by a small number of powerful and politically connected entrepreneurs who are able to use their influence to further avoid and evade payments of fees and obtaining of licences."⁷⁵ Such a degree of control held by what effectively constitutes a cartel makes it difficult to reform the sector and incentivize regeneration of forests to sustainably meet the expected large future demand for charcoal.

Two parallel commercialization chains exist, one official and one unofficial. The former involves paying for government-issued licences to harvest the wood, and the transportation and trade is licensed as well, with taxes and duties paid. The latter and much larger chain involves an informal economy where transportation and trade happens illegally and clandestinely. Taxes are paid here as well, albeit illegally. In one documented case, a consultant in June 2013 accompanied a fully licensed lorry taking a 150 km long journey transporting charcoal from Bisil, in the Namanga area at the Tanzania-Kenya border, to Ngara in Nairobi. The shipment was stopped 16 times and illegally taxed by corrupt Kenyan police officers. The officers ranged from traffic police to plainclothes police, and bridge checkpoint police officers. The total cost in illegal taxes for the journey was USD 230, with on average a stop every 10 km and a payment of USD 14.⁷⁶

The charcoal supply chain



Sources: Kambewa, P., *et al.*, Charcoal: the reality, 2007

Figure 6. The charcoal supply chain

About 80 per cent of the charcoal entering Dar es Salaam is unofficial, meaning that about USD 500 million of the USD 650 million trade in 2009 was unregulated. With the tax rate at 20 per cent, this represents USD 100 million in lost government revenues.⁷⁷ In contrast, a study by Bailis (2006) reported that illegal taxes accounted for between 20 per cent and 30 per cent of the final value of charcoal. In Kenya this was successfully reduced by 15–17 per cent due to legalization of charcoal following the enactment of a set of laws referred to as the Charcoal Rules in 2009. Nonetheless, wood harvesting, charcoal burning, transport and trade are still 90 per cent unregulated.⁷⁸

The illegality of the majority of the charcoal trade in Tanzania is layered. Conservation law enforcement personnel are seeing a trend towards increasing use of protected areas for production, as public forests become deforested and less easily exploited. In some forest reserves, permits are issued for charcoal production for a given period; in all the other forest reserves, production is illegal.⁷⁹ Some areas are allocated for charcoal production, and the producer must apply for a license and permits.

The World Bank has assessed that about 33 per cent of charcoal revenues in Tanzania go to producers, 50 per cent go to transport and wholesale, and 17 per cent to retailing.⁸⁰ In Kenya the sellers control 41 per cent of the market share, transporters 37 per cent and producers only 22 per cent. In Malawi producers make 20–33 per cent of the value, transporters 20–25 per cent, and retailers the most, with 25–33 per cent.⁸¹ In other words, the middlemen make the largest gains, often operating like cartels, doing the work that requires the least time and manpower.

Charcoal as threat finance

Non-state armed groups and charcoal is a dangerous combination, as was seen in Somalia, where Al-Shabaab's primary means of funding was charcoal. At the height of its charcoal business in late 2012, Al-Shabaab was making USD 38–56m per year. Similarly, militias in the Democratic Republic of the Congo have been making USD 14–50 million per year.⁸² When areas of a country are controlled by a non-state armed group, which has no legitimacy, an informal economy is established and gradually becomes entrenched in the social fabric. This economy is based on informal taxation and protection money, including for producers, transporters and retailers of charcoal. As with any industry, stakeholders in the charcoal industry rely on a reasonably predictable and secure environment in which to conduct business. The armed groups

benefit by levying taxes and protection money at realistic levels so that everybody benefits.

This system works for most of the participants most of the time. However, it causes corruption which eventually becomes so entrenched that it later becomes very difficult to reverse. Deforestation and, ultimately, depletion of wood results, because no branch of the informal chain has responsibility for regulation or tree regeneration. This can only be delivered by long-term planning by a legitimate Government that has the public interest at heart.

Tanzania does not have a significant insurgency threat at this time, although there has been a range of security incidents, including explosives and acid attacks since late 2011. A few of these have been located in Zanzibar and Arusha and some have been related to Al-Shabaab.⁸³ However, the larger structural threat is corruption's undermining of law enforcement and governance, which creates a vacuum that easily can be exploited by transnational organized crime.

The charcoal industry is increasing in size and it is a virtually risk-free business due to its lack of regulation and its low punishments for illegal production, transportation and sale. The risk is that the Tanzanian charcoal industry moves from being controlled by what is effectively a cartel of middlemen to become a more ambitious criminal enterprise. It is easy for organized crime to shift between different product types, so the movement from controlling charcoal over to trafficking of weapons, drugs or humans is an easy one to make.

The degree to which charcoal is exported across borders in the area is severely understudied, and control over porous borders is a major feature of transnational organized criminal actors. Tanzanian security forces are too weak, under-resourced and poorly coordinated to control the very large border areas.⁸⁴ Even if the security forces could control the borders – and they cannot – proceeds from the charcoal trade could very easily be trafficked across borders and used in threat finance far from the areas where the charcoal trade takes place. This makes the fragility of the unregulated charcoal trade a regional security issue.

MEASURES TO IMPROVE PROTECTION OF WILDLIFE RESOURCES

REPORT FROM A TANZANIAN NATURAL RESOURCES LAW ENFORCEMENT INSTRUCTOR

The following measures have proven effective in Grumeti and Ikorongo Game Reserves.

Proactive measures

- Establishments of sustainable communities' projects – adjacent community involvement in wildlife protection will be effective only when they have a source of income to sustain their basic needs, in order to minimize use of wildlife resources and their engagement in poaching.
- Improvement of conservation education and involvement of adjacent community in conservation of wildlife resources through increase in – and proper management of – knowledge and skills in Wildlife Management Areas, Game Controlled Areas and Open Areas.
- Intelligence-gathering outside Protected Areas, especially in villages surrounding Game Reserves, National Parks, Game Controlled Areas, Wildlife Management Areas and Forest Reserves, in order to stop organized poaching.
- Planning patrol strategies by using maps to narrow the focus to zones where animals and relevant trees are located, in conjunction with tourist attractions and other managerial planning and activities. Increased use of GPS coordinates in patrolling reports.
- Use of Elite Rangers who are familiar with the areas and the techniques used by poachers and their language. They can move very stealthily with a hidden satphone to report poaching activities to fellow rangers, who respond and make arrests.
- Creation of observation posts and use of binoculars to observe long-distance and night vision goggles.
- Motivation of rangers through incentives, job promotion and short-course training to improve their workforce performance.

Reactive measures

- Adopting an effective patrol system, especially mobile foot patrols, to most-affected poaching areas.
- Switching rangers to different ranger posts from time to time to increase performance, experience, knowledge, skills and exposure as they meet different people and new challenges. This also decreases corruption and ineffectiveness.
- Setting up an ambush on most used trails of poachers to apprehend them where they enter and exit protected areas.

Trained rangers, village game scouts, and students

Over the course of 2015, 437 students were taught tracking skills and crime-scene management. This took place in the second term, from January to June. Among these participants were 41 serving rangers/game scouts from Tabora Anti-Poaching Unit, Friedkin Conservation Fund and Ugalla Game Reserve. All followed courses on tracking and crime-scene management, first aid, wildlife law and the Evidence Act, survival skills and combating counter-poaching patrol techniques. In addition, a one-week refresher course was given to 155 of 450 newly employed rangers who had not received tracking and crime-scene management training during their degree courses.



Rangers from Ugalla Game Reserve and Friedkin Conservation Fund training improvised first aid, Ugalla, September 2015



Students from Mweka and Tarangire National Park rangers on joint patrol in Tarangire, November 2014

TANZANIA ELEPHANT STATUS

According to a presentation given by the Ministry of Natural Resources and Tourism in Mwanza in June 2015, the elephant population in Selous-Mikumi ecosystem decreased from 38,975 in 2009 to 13,084 in 2015 due to the global network in illegal wildlife trade as the major factor in elephant poaching.

The following data comes from this presentation. Tanzania has lost two thirds of its elephant population in just four years, according to Aislinn Laing, Seronera, Serengeti National Park.⁸⁵

Year	Number of incidents	Confiscated pieces	Total weight of tusks caught outside country in kg	Place of confiscation	Number of suspects
2012	2	1,541	3,275.30	Hong Kong, China	6
2013	1	347	2,640	Malaysia, China	1
2014	1	59	40	Hong Kong	–

Table 2. Seizures outside Tanzania

Year	Number of incidents	Number of suspects	Number of whole tusks	Weight of fresh tusks in kg	Number of tusk pieces	Weight of tusk pieces in kg
2012	98	98	1,177	2,798.59	7	2.8
2013	102	102	3789	12,193.86	695	52.28
2014	30	30	542	1,763.10	312	0.51
2015*	19	21	90	273	157	0.56

Table 3. Seizures inside Tanzania

*Jan–June

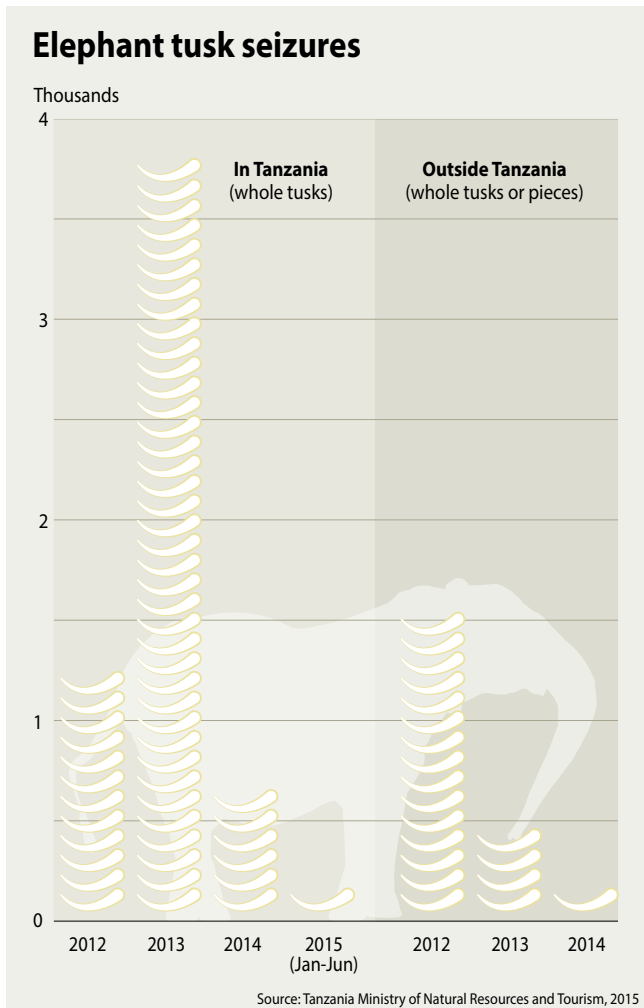


Figure 7. Elephant tusk seizures

According to the African Wildlife Foundation (AWF) Tanzania Survey's 2015 findings, Tanzania lost 10,000 elephants in 2013 alone, estimated at more than 30 each day. In 2014, an aerial survey of Mara-Serengeti ecosystem discovered 192 elephant carcasses missing tusks, of which 75 were on the Tanzanian side. The population fell from an estimated 109,051 in 2009 to just 43,330 in 2014. The Tanzania rhino population fell from 10,000 in 1970 to 123 in 2014 and is now believed to number 80 rhinos.⁸⁶ The findings in the above report were also supported by Environmental Investigation Agency's November 2014 report on the Tanzanian poaching crisis.⁸⁷

FIELD TRIPS

Date	Place	Trained personnel
November 2013	Kwakuchinja, Mdori village, and Tarangire National Park	Ca 55 Mweka students from all over the country, some experienced rangers
June 2014	Pasiansi Wildlife Institute, including field camp and Grumeti Game Reserve	Meeting with management, all locations
November 2014	Kwakuchinja, Mdori village	Ca 60 Mweka students
November 2014	Tarangire National Park (TNP)	12 park rangers from TNP
September 2015	Pasiansi Wildlife Training Institute (PWTI)	Meeting with principal + staff
September 2015	Lake Zone Anti-Poaching Unit (LZ APU)	Meeting with deputy + staff
September 2015	Ugalla Game Reserve	25 Game Reserve rangers / rangers from Friedkin Conservation Fund
September 2015	Tanzania Forest Services Agency (TFS) – Western Zone, Tabora	Meeting with manager
November 2015	Lake Zone Anti-Poaching Unit (LZ APU)	Meeting with commander + staff
November 2015	Biharamulo/Burigi/Kimisi Game Reserves	Meeting with commander + staff
November 2015	Biharamulo/Burigi/Kimisi Game Reserves	Patrolling with LZ APU
March/April 2016	Pasiansi Wildlife Training Institute (PWTI)	Meeting with principal + staff
March/April 2016	Lake Zone Anti-Poaching Unit (LZ APU)	Meeting with commander + staff
March/April 2016	Mwanza	Meeting with CO Ugalla Game Reserve
March/April 2016	Dar es Salaam	Meeting with DCO Selous Game Reserve

Table 4. Field trips

RECOMMENDATIONS

WILDLIFE CRIME

1 The overall finding of the training programme and evaluation period is that the effective means to defeat poaching at the supply side have been identified. There is no shortage of new and creative ideas; rather what is lacking is depth of commitment in terms of training and resources. Both national governments in the region and the international community must move beyond conference agreements and into demonstrating commitment at the front line. This will require much more significant dedicated support from the development community to these national plans and to their enforcement, prosecutions and the judiciary. Most of the funds do not reach the front line in combating poaching or illegal logging – leaving the parks and lands severely underprotected.

2 Initiate a programme focusing on training APUs and park rangers on operational planning and information management. Experience from Tanzania shows that in spite of often skilful and highly dedicated rangers and commanders, there is vast room for further training and subsequent support to improve tactical skills and further strengthen capacities, even with limited resources. Further training support to coordination and management of information, in addition to tactical training of patrol planning and patrol skills, could help improve the creation of long-term plans for operations based on intelligence collected from the current situation and environment. Patrol reports and plans should be produced in writing. Please see the field evaluation below for details.



Rangers on patrol in Tarangire National Park, November 2014

3 Initiate follow-up training programmes for the rangers already trained in tracking and crime-scene management. They need refresher training and more skills in patrol drills and long-range tracking.

4 Ensure that the institutes training the rangers focus on first aid and survival skills in the training programmes, as skills in these highly important matters could be significantly improved.

5 The same applies to map reading and navigation. Few of the rangers have sufficient skills and overall maps are lacking, despite being absolutely essential for planning and patrols. These are vital for intelligence, coordination, planning and the execution of law enforcement.

6 Equip the rangers/game wardens/APU officers lack and need:

- maps
- compasses
- radios
- belt-rigs with water bottles and pouches
- good knives

In addition, there is a general lack of GPS devices and cameras. The rangers often split up during patrols and pursue poachers in smaller sections, but normally there is only one set of this equipment in the teams.

As for means of communication, there is urgent demand for secure push-to-talk radio units in the park ranger and Anti-Poaching Units. The patrolling and enforcement areas are vast, and the rangers face huge challenges in doing their job because they are unable to communicate between sections in the bush or back to headquarters administering the operations. Professional and/or pre-funded poachers are typically better equipped than rangers, and sometimes even able to listen in to the rangers' unencrypted radio communication.

In June 2015, Kenyan wildlife officers launched a secure radio system in their battle to protect elephants and rhinos, aiming to outwit poachers who listen in on wardens' communications. The purchase was partly funded by the French Ministry of Foreign Trade and Tourism, and is expected to function as a vital tool in the battle against poachers.

7 Former poachers should be used in an information campaign to demonstrate the impact of poaching on local communities. This should emphasize the relative accessibility of income from illegal activities compared with legal alternative livelihoods.

8 Although the emphasis in this report has been on the supply side, the other stages in the illegal wildlife trade chain remain critical, whether training at airports and ports, such as that conducted by the UNODC-WCO Container Control Programme, or demand-reduction efforts in consumer countries.

ILLEGAL LOGGING

1 Invest in alternative livelihoods around protected areas. The main reason why local people conduct illegal logging in protected areas is lack of alternatives. A great many rural Tanzanians are very poor and have few alternative cash crops. In 2013, 68 per cent of the population lived on less than USD 1.25 per day, and 94 per cent of the rural population work in the informal economy, on a part-time and part-year basis.⁸⁸

2 Strengthen programmes dealing with irrigation and livestock. As the soil is often very dry and infertile, livestock farmers are forced to drive their animals into protected areas in order to keep the animals alive in the dry season. The animals destroy the vegetation and this activity makes it easier for illegal loggers to enter the protected areas unseen.

3 Assess illegal logging in relation to the current refugee flow from Burundi. Due to political unrest in Burundi, an estimated 130,000 refugees have entered Tanzania since early April 2015 putting pressure on Tanzania's economy, particularly in the border regions, which also has direct spillover effects in the protected areas. The refugees are even worse off than the Tanzania residents, and many of them are forced to conduct illegal activities to survive and feed their families. In addition, many refugees have experience from armed conflicts, and have easier access to weapons than Tanzanian residents. A huge number of illegal weapons (often automatic rifles such as AK-47) in Tanzania are smuggled from Burundi, and often favoured by poachers and illegal loggers.

4 Tanzania should reform its illegal logging legislation and invest in stronger enforcement capability. Offenders of illegal cutting, transporting and selling of protected wood run little risk of being caught and prosecuted. A bag of charcoal typically costs TSH 4,000–6,000 in the production area, and TSH 20,000–40,000 in towns/cities. When stopped by police during transport, the fine is normally only TSH 9,800–TSH 14,600 per sack, and the person transporting the sacks is allowed to keep the goods, which in any case means a significant net profit.

5 Boost programmes on supporting forest reserve administrations. There are a lot of dedicated managers and officers doing their best to fight illegal logging, but support from state authorities is mostly insufficient. Challenges facing the managers of the different units include lack of vehicles, means of communication, forest inventory/assessment equipment, and simple camp facilities such as tents. In addition, rangers often lack knowledge in operational planning, information management and basic bush patrol skills. Such knowledge can be provided relatively inexpensively and training and basic equipment would vastly increase their effectiveness. Such efforts are much more efficient and necessary than fashionable suggestions such as drones and other high-technology/high-expense programmes.



Poachers' campsite, Tarangire National Park, November 2014

CHARCOAL

- 1** Improved regulation leading to improved conditions for investment – which can lead to improved kiln efficiency and investment in reforestation – is urgently needed. Anti-corruption efforts must accompany reforestation to ensure that gains are not quickly reversed. Stocks of the preferred charcoal species *Acacia* spp., *Combretum* spp. and *Terminalia* spp. are being depleted due to over-harvesting.
- 2** Official taxation of the large and growing informal charcoal industry must be enabled by corruption reduction policies across law enforcement. When fully licensed transportation is still illegally taxed by corrupt officials, it becomes difficult to transition to state-based rather than informal taxation.
- 3** Reforestation responsibility easily becomes fragmented as a consequence of an informal charcoal sector. Producers are not landowners, and land ownership is in itself a contentious and complicated issue. Government policy needs to be focused on the long term and provide a clear strategy for reforestation to prepare for the large consumption and attendant deforestation expected in the coming decades. Tree regeneration responsibilities should be decentralized as closely as possible to charcoal producers, for example at the village level. Any fees charged for trees cut could fund tree regeneration expenses.
- 4** Alternative sources of energy in urban areas are urgently needed to counteract the increasing dependence on charcoal. Both electricity and petroleum-based energy are available but only on a very small scale, and they are unlikely to replace charcoal in the near future if population growth and urbanization are accompanied by poverty.
- 5** More data on this fast-growing charcoal consumption is needed, in addition to on the scale and character of unregulated import and export of charcoal. Charcoal will increase in importance as the demand rises and, with it, both prices and opportunities for transnational organized crime to control the sector increase.

NOTES

1. INTERPOL and UNEP. The Environmental Crime Crisis. A Rapid Response Assessment, Christian Nellemann ed. Nairobi and Arendal: GRID-Arendal and UNEP, 2014: 7.
2. *Ibid.*, 11.
3. UNEP, CITES, IUCN and TRAFFIC. Elephants in the Dust: The African Elephant Crisis. A Rapid Response Assessment, Christian Nellemann ed. Norway: GRID-Arendal and UNEP, 2013.
4. INTERPOL and UNEP. The Environmental Crime Crisis. A Rapid Response Assessment, Christian Nellemann ed. Nairobi and Arendal: GRID-Arendal and UNEP, 2014: 7.
5. Christian Nellemann, Jack Kearney and Stig Nørstad. Sign and the Art of Tracking: A Guide to Support Law Enforcement Tracking and Anti-Poaching Operations. Norway: INTERPOL and UNEP/GRID-Arendal, 2011.
6. Scott-Donelan, David. Tactical Tracking Operations: The Essential Guide for Military and Police Trackers. United States of America: Paladin Press, 1998.
7. The World Bank, Population growth (annual %). Data current as of 2014. Available from <http://data.worldbank.org/indicator/SP.POP.GROW/countries/TZ?display=graph>
8. Oliver Milman. Ranger Corruption 'Impeding Global Fight against Poaching'. The Guardian, 27 March 2013.
9. Interviews with Anti-Poaching Unit rangers in the Lake Zone, November 2015.
10. Simon Tomlinson. A Savage End for the Elephants Killed by Men Who Were Supposed to Protect Them: Slaughtered Beasts' Remains Lie Scattered after Rangers Poisoned Them in Pay Dispute. Daily Mail, 29 October 2015.
11. United Republic of Tanzania. Wildlife Conservation Act. 2009. Section 18/2.
12. APU Senior Ranger, Lake Zone, November 2015.
13. Department: Environmental Affairs. Republic of South Africa. Written question number 1441 to the Minister of Water and Environmental Affairs, RSA. 1 June 2012. Available at https://www.environment.gov.za/sites/default/files/question1441_employed_park_rangers_kruger_national_park.pdf
14. INTERPOL and UNEP. The Environmental Crime Crisis. A Rapid Response Assessment, Christian Nellemann ed. Nairobi and Arendal: GRID-Arendal and UNEP, 2014: 19.
15. Food and Agriculture Organization of the United Nations (FAO). Global Forest Resources Assessment 2015. Rome, 2015. Available from <http://www.fao.org/3/a-i4808e.pdf>.
16. Kizito Makoye. Armed Illegal Loggers Devastate Tanzania's Coastal Forest. Reuters, UK, 13 January 2015. <http://uk.reuters.com/article/us-tanzania-logging-idUKKBN0KMo0720150113>.
17. FAO's production figure for Africa in 2014 is 32.4 million tons. Price per ton ranges from USD 300 to USD 800. See INTERPOL and UNEP. The Environmental Crime Crisis. A Rapid Response Assessment, Christian Nellemann ed. Nairobi and Arendal: GRID-Arendal and UNEP, 2014.
18. *Ibid.*, 69-70.
19. Organisation for Economic Co-Operation and Development (OECD). Development Aid at a Glance. Statistics by Region: 2. Africa, 2015 Edition. Available from [http://www.oecd.org/dac/stats/documentupload/2 Africa - Development Aid at a Glance 2015.pdf](http://www.oecd.org/dac/stats/documentupload/2%20Africa%20Development%20Aid%20at%20a%20Glance%202015.pdf).
20. Trading Economics. Tanzania GDP Annual Growth Rate 2002-2015. <http://www.tradingeconomics.com/tanzania/gdp-growth-annual>.
21. Transparency International. Corruption by Country/Territory. <http://www.transparency.org/country - TZA>.
22. "Transnational Organized Crime in Eastern Africa: A Threat Assessment," 4-5.
23. Central Intelligence Agency (CIA). The World Factbook, Urbanization. <https://www.cia.gov/library/publications/the-world-factbook/fields/2212.html>
24. The World Bank. Enabling Reforms: A Stakeholder-Based Analysis of the Political Economy of Tanzania's Charcoal Sector and the Poverty and Social Impacts of Proposed Reforms. Washington, D.C., 2010.
25. United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD Programme). Tanzania, Kenya and Uganda Unite Efforts to Combat Illegal Timber Trade in East Africa with Support from Norway, UN and INTERPOL. July 2014. <http://un-redd.org/Newsletter2014Issue3/EALlegalTimberTrade/tabid/133455/Default.aspx>.
26. TRAFFIC. Zanzibar Declaration on Illegal Trade in Timber and Forest Products. Durban, South Africa, 9 September 2015. Available from <http://static1.1.sqspcdn.com/static/f/157301/26526369/1441873129083/Zanzibar-Declaration.pdf?token=A5U7X2Kyo4wkSwbFbyN5Tmgublw%3D>.
27. Kizito Makoye. Armed Illegal Loggers Devastate Tanzania's Coastal Forest. Reuters, UK, 13 January 2015. <http://uk.reuters.com/article/us-tanzania-logging-idUKKBN0KMo0720150113>.
28. *Ibid.*
29. Ministry of Natural Resources and Tourism: Forestry and Beekeeping Division, and Indufor Forest Intelligence. Timber Market Dynamics in Tanzania and in Key Export Markets: Market Study. Dar es Salaam, 2011: 4.
30. Mwampamba, Heita Tuyeni. Has the Woodfuel Crisis Returned? Urban Charcoal Consumption in Tanzania and its Implications to Present and Future Forest Availability. Energy Policy, vol. 35 (2007): 4221-22, 31-33.
31. UN FAOSTAT: http://faostat3.fao.org/browse/F/*/E
32. Used by UN FAOSTAT: Tanzania exported 45 tons at a value of USD 9,000 in 2012.
33. This is based on the maximum value in the range of 300-800 used in INTERPOL and UNEP. The Environmental Crime Crisis. A Rapid Response Assessment, Christian Nellemann ed. Nairobi and Arendal: GRID-Arendal and UNEP, 2014: 70.
34. Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: xii.
35. UN FAOSTAT: http://faostat3.fao.org/browse/F/*/E FAOSTAT operates with a price of USD 200/ton.
36. Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: 23.
37. *Ibid.*, 65.
38. Central Intelligence Agency (CIA). The World Factbook, Urbanization. <https://www.cia.gov/library/publications/the-world-factbook/fields/2212.html> See also UN Population Division numbers.
39. The World Bank, Environment and Natural Resources Unit. Environmental Crisis or Sustainable Development Opportunity? Transforming the Charcoal Sector in Tanzania. A Policy Note. Christian Peter ed. 2009:vi.
40. Patrick Kambewa, Bennet Mataya, Killy Sickinga and Todd Johnson. Charcoal, the Reality: A Study of Charcoal Consumption, Trade and Production in Malawi. Small and Medium Forestry Enterprise Series No 21. London, UK: International Institute for Environment and Development, 2007: 4 and Ministry of Energy, Kenya. Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries, and Service Establishments: Final Report for

- the Ministry. Kamfor Consultants: Nairobi, Kenya, 2002: 40 cited in Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013.
41. S. Mutimba and M. Barasa. National Charcoal Survey: Summary Report. Exploring the Potential for a Sustainable Charcoal Industry in Kenya. Nairobi: Energy for Sustainable Development Africa (ESDA), 2005. Cited in Analysis of the Charcoal Value Chain in Kenya: Final Report: 3.
 42. UN FAOSTAT: <http://faostat3.fao.org/download/F/FO/E>
 43. F. Mugo, R. Nungo, F. Odongo, N. Chavangi and M. Abaru. An Assessment of the Energy Saving Potential and Heat Loss Pattern in Fireless Cooking for Selected Commonly Foods in Kenya. CARPA Working Paper Series, No. 2, 2007. Cited in Analysis of the Charcoal Value Chain in Kenya: Final Report: 4.
 44. UN FAOSTAT: <http://faostat3.fao.org/download/F/FO/E>
 45. The World Bank, Environment and Natural Resources Unit. Environmental Crisis or Sustainable Development Opportunity? Transforming the Charcoal Sector in Tanzania. A Policy Note. Christian Peter ed. 2009: vi.
 46. Central Intelligence Agency (CIA). The World Factbook, Urbanization. <https://www.cia.gov/library/publications/the-world-factbook/fields/2212.html>
 47. United Nations Department of Economic and Social Affairs: Population Division. World Urbanization Prospects: 2014 Revision. New York, 2014: 18.
 48. Ibid., 205.
 49. Ibid., 241.
 50. INTERPOL and UNEP. The Environmental Crime Crisis. A Rapid Response Assessment, Christian Nellemann ed. Nairobi and Arendal: GRID-Arendal and UNEP, 2014: 70
 51. Ministry of Natural Resources and Tourism: Forestry and Beekeeping Division, and Indufor Forest Intelligence. Timber Market Dynamics in Tanzania and in Key Export Markets: Market Study. Dar es Salaam, 2011: 4.
 52. Heita Tuyeni Mwampamba. Has the Woodfuel Crisis Returned? Urban Charcoal Consumption in Tanzania and its Implications to Present and Future Forest Availability. Energy Policy, vol. 35 (2007): 4226-29.
 53. Ministry of Natural Resources and Tourism: Forestry and Beekeeping Division, and Indufor Forest Intelligence. Timber Market Dynamics in Tanzania and in Key Export Markets: Market Study. Dar es Salaam, 2011: 5.
 54. M.J. Mware, F.M. Mutiso, J.M. Mugo and J. Cheboiwo. Post-Disturbance Tree Species Regeneration and Successional Pathways in Mt Blakett and Kedowa Forest Blocks, Mau Ecosystem, Kenya. Research Journal of Environmental and Earth Sciences, vol. 3, No. 6. Cited in Joshua K. Cheboiwo. The Status of the Poles Sector. Miti, Jan-March 2014: 7.
 55. UN FAOSTAT: <http://faostat3.fao.org/download/F/FO/E>
 56. S.A.H. Milledge and R. Elibariki. Green Gold: Ongoing Efforts Towards Preventing Illegal Harvesting and Exports of Tanzania's Most Valuable Hardwoods. The Arc Journal, No. 17 (December 2004) and S.A.H. Milledge and B.K. Kaale. Bridging the Gap: Linking Timber Trade with Infrastructure Development and Poverty Eradication Efforts in Southern Tanzania. Dar es Salaam: TRAFFIC East/Southern Africa, 2004. Cited in Ministry of Natural Resources and Tourism: Forestry and Beekeeping Division, and Indufor Forest Intelligence. Timber Market Dynamics in Tanzania and in Key Export Markets: Market Study. Dar es Salaam, 2011: 31.
 57. Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: 5.
 58. The World Bank, Environment and Natural Resources Unit. Environmental Crisis or Sustainable Development Opportunity? Transforming the Charcoal Sector in Tanzania. A Policy Note. Christian Peter ed. 2009: vi.
 59. Heita Tuyeni Mwampamba. Has the Woodfuel Crisis Returned? Urban Charcoal Consumption in Tanzania and its Implications to Present and Future Forest Availability. Energy Policy, vol. 35 (2007): 4222.
 60. The World Bank, Environment and Natural Resources Unit. Environmental Crisis or Sustainable Development Opportunity? Transforming the Charcoal Sector in Tanzania. A Policy Note. Christian Peter ed. 2009: 6.
 61. Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: 4.
 62. Ibid., 5.
 63. Patrick Kambewa, Bennet Mataya, Killy Sichinga and Todd Johnson. Charcoal, the Reality: A Study of Charcoal Consumption, Trade and Production in Malawi. Small and Medium Forestry Enterprise Series No 21. London, UK: International Institute for Environment and Development, 2007.
 64. Food and Agriculture Organization of the United Nations (FAO). Forestry Department. Global Forest Resources Assessment 2010: Main report. Tanzania. Rome, 2010: 14. And Heita Tuyeni Mwampamba. Has the Woodfuel Crisis Returned? Urban Charcoal Consumption in Tanzania and its Implications to Present and Future Forest Availability. Energy Policy, vol. 35 (2007): 4230.
 65. Heita Tuyeni Mwampamba. Has the Woodfuel Crisis Returned? Urban Charcoal Consumption in Tanzania and its Implications to Present and Future Forest Availability. Energy Policy, vol. 35 (2007): 4230.
 66. INTERPOL and UNEP. The Environmental Crime Crisis. A Rapid Response Assessment, Christian Nellemann ed. Nairobi and Arendal: GRID-Arendal and UNEP, 2014: 61. The other three are 1) illegal exploitation of high-value endangered wood species; 2) illegal logging of timber; 3) illegal logging and laundering of wood for pulp and paper industry
 67. Ibid., 70.
 68. Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: 13.
 69. Ibid.
 70. The World Bank, Environment and Natural Resources Unit. Environmental Crisis or Sustainable Development Opportunity? Transforming the Charcoal Sector in Tanzania. A Policy Note. Christian Peter ed. 2009: vi.
 71. S. Mutimba and M. Barasa. National Charcoal Survey: Summary Report. Exploring the Potential for a Sustainable Charcoal Industry in Kenya. Nairobi: Energy for Sustainable Development Africa (ESDA), 2005. Cited in Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: 12.
 72. S. Mutimba and M. Barasa. National Charcoal Survey: Summary Report. Exploring the Potential for a Sustainable Charcoal Industry in Kenya. Nairobi: Energy for Sustainable Development Africa (ESDA), 2005. Cited in Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: 21.
 73. Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: 23, 53.
 74. Ibid., xiii.
 75. The World Bank, Environment and Natural Resources Unit. Environmental Crisis or Sustainable Development Opportunity? Transforming the Charcoal Sector in Tanzania. A Policy Note. Christian Peter ed. 2009: vi.

76. Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: 62-64.
77. The World Bank, Environment and Natural Resources Unit. Environmental Crisis or Sustainable Development Opportunity? Transforming the Charcoal Sector in Tanzania. A Policy Note. Christian Peter ed. 2009: 6.
78. Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: 38, 53.
79. Interview with Anti-Poaching law enforcement professional, 15 March 2016.
80. The World Bank, Environment and Natural Resources Unit. Environmental Crisis or Sustainable Development Opportunity? Transforming the Charcoal Sector in Tanzania. A Policy Note. Christian Peter ed. 2009: 8.
81. Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013: xii, 14.
82. INTERPOL and UNEP. The Environmental Crime Crisis. A Rapid Response Assessment, Christian Nellemann ed. Nairobi and Arendal: GRID-Arendal and UNEP, 2014: 81.
83. "The Rising Threat in Tanzania: Domestic Islamist Militancy and Regional Threats," Strategic Forum - National Defense University.
84. Ibid., 5.
85. Tanzania's elephant catastrophe: 'We recalculated about 1,000 times because we didn't believe what we were seeing'. The Telegraph, 19 July 2015.
86. WildAid Foundation, and African Wildlife. Poaching Steals from Us All: The Elephant Crisis in Tanzania. San Francisco, 2015. Available from http://www.wildaid.org/sites/default/files/resources/Tanzania_Survey_Report_EN.pdf
87. Environmental Intelligence Agency. Vanishing Point: Criminality, Corruption and the Devastation of Tanzania's Elephants. London, 2014: 3.
88. "Quick Overview of the Decent Rural Employment Situation in Tanzania Mainland and Zanzibar," http://www.fao.org/fileadmin/user_upload/fao_ilo/pdf/Other_docs/Quick_Fact_Sheet_TZ_FINAL.pdf.

REFERENCES

- Central Intelligence Agency (CIA). The World Factbook, Urbanization. <https://www.cia.gov/library/publications/the-world-factbook/fields/2212.html>
- Cheboiwo, Joshua K. The Status of the Poles Sector. Miti, Jan-March 2014. Department: Environmental Affairs. Republic of South Africa. Written question number 1441 to the Minister of Water and Environmental Affairs, RSA. 1 June 2012. Available at https://www.environment.gov.za/sites/default/files/question1441_employed_park_rangers_kruger_national_park.pdf
- Environmental Intelligence Agency. Vanishing Point: Criminality, Corruption and the Devastation of Tanzania's Elephants. London, 2014.
- Food and Agriculture Organization of the United Nations (FAO). FAOSTAT database. Available from http://faostat3.fao.org/browse/F*/E
- Forestry Department. Global Forest Resources Assessment 2010: Main report. Tanzania. Rome, 2010.
- Global Forest Resources Assessment 2015. Rome, 2015. Available from <http://www.fao.org/3/a-i48o8e.pdf>.
- Quick Overview of the Decent Rural Employment Situation in Tanzania Mainland and Zanzibar. Available from http://www.fao.org/fileadmin/user_upload/fao_ilo/pdf/Other_docs/Quick_Fact_Sheet_TZ_FINAL.pdf.
- INTERPOL and UNEP. The Environmental Crime Crisis. A Rapid Response Assessment, Christian Nellemann ed. Nairobi and Arendal: GRID-Arendal and UNEP, 2014.
- Kambewa, Patrick, Bennet Mataya, Killy Sichinga and Todd Johnson. Charcoal, the Reality: A Study of Charcoal Consumption, Trade and Production in Malawi. Small and Medium Forestry Enterprise Series No 21. London, UK: International Institute for Environment and Development, 2007.
- Laing, Aislinn. Tanzania's elephant catastrophe: 'We recalculated about 1,000 times because we didn't believe what we were seeing'. The Telegraph, 19 July 2015.
- LeSage, Andre. The Rising Terrorist Threat in Tanzania: Domestic Islamist Militancy and Regional Threats. Strategic Forum No. 288. National Defense University, September 2014.
- Makoye, Kizito. Armed Illegal Loggers Devastate Tanzania's Coastal Forest. Reuters, UK, 13 January 2015. <http://uk.reuters.com/article/us-tanzania-logging-idUKKBN0KM00720150113>.
- Milledge, S.A.H. and B.K. Kaale. Bridging the Gap: Linking Timber Trade with Infrastructure Development and Poverty Eradication Efforts in Southern Tanzania. Dar es Salaam: TRAFFIC East/Southern Africa, 2004.
- Milledge, S.A.H. and R. Elibariki. Green Gold: Ongoing Efforts Towards Preventing Illegal Harvesting and Exports of Tanzania's Most Valuable Hardwoods. The Arc Journal, No. 17 (December 2004).
- Milman, Oliver. Ranger Corruption 'Impeding Global Fight against Poaching'. The Guardian, 27 March 2013.
- Ministry of Energy, Kenya. Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries, and Service Establishments: Final Report for the Ministry. Kamfor Consultants: Nairobi, Kenya, 2002.
- Ministry of Environment, Water and Natural Resources. Analysis of the Charcoal Value Chain in Kenya: Final Report. 2013.
- Ministry of Natural Resources and Tourism: Forestry and Beekeeping Division, and Indufor Forest Intelligence. Timber Market Dynamics in Tanzania and in Key Export Markets: Market Study. Dar es Salaam, 2011.
- Mugo, F., R. Nungo, F. Odongo, N. Chavangi and M. Abaru. An Assessment of the Energy Saving Potential and Heat Loss Pattern in Fireless Cooking for Selected Commonly Foods in Kenya. CARPA Working Paper Series, No. 2, 2007.
- Mutimba, S. and M. Barasa. National Charcoal Survey: Summary Report. Exploring the Potential for a Sustainable Charcoal Industry in Kenya. Nairobi: Energy for Sustainable Development Africa (ESDA), 2005.
- Mwampamba, Heita Tuyeni. Has the Woodfuel Crisis Returned? Urban Charcoal Consumption in Tanzania and its Implications to Present and Future Forest Availability. Energy Policy, vol. 35 (2007): 4221-34.
- Mware, M.J., F.M. Mutiso, J.M. Mugo and J. Cheboiwo. Post-Disturbance Tree Species Regeneration and Successional Pathways in Mt Blakett and Kedowa Forest Blocks, Mau Ecosystem, Kenya. Research Journal of Environmental and Earth Sciences, vol. 3, No. 6 (2011): 745-53.
- Nellemann, Christian, Jack Kearney and Stig Nørstad. Sign and the Art of Tracking: A Guide to Support Law Enforcement Tracking and Anti-Poaching Operations. Norway: INTERPOL and UNEP/GRID-Arendal, 2011.
- Organisation for Economic Co-Operation and Development (OECD). Development Aid at a Glance. Statistics by Region: 2. Africa, 2015 Edition. Available from <http://www.oecd.org/dac/stats/documentupload/2Africa-DevelopmentAidatGlance2015.pdf>.
- Scott-Donelan, David. Tactical Tracking Operations: The Essential Guide for Military and Police Trackers. United States of America: Paladin Press, 1998.
- The World Bank. Enabling Reforms: A Stakeholder-Based Analysis of the Political Economy of Tanzania's Charcoal Sector and the Poverty and Social Impacts of Proposed Reforms. Washington, D.C., 2010.
- The World Bank, Environment and Natural Resources Unit. Environmental Crisis or Sustainable Development Opportunity? Transforming the Charcoal Sector in Tanzania. A Policy Note. Christian Peter ed. 2009.
- The World Bank. Population growth (annual %). Data current as of 2014. Available from <http://data.worldbank.org/indicator/SP.POP.GROW/countries/TZ?display=graph>
- Tomlinson, Simon. A Savage End for the Elephants Killed by Men Who Were Supposed to Protect Them: Slaughtered Beasts' Remains Lie Scattered after Rangers Poisoned Them in Pay Dispute. Daily Mail, 29 October 2015.
- Trading Economics. Tanzania GDP Annual Growth Rate 2002–2015. <http://www.tradingeconomics.com/tanzania/gdp-growth-annual>.
- TRAFFIC. Zanzibar Declaration on Illegal Trade in Timber and Forest Products. Durban, South Africa, 9 September 2015. Available from <http://static1.1.sqspcdn.com/static/f/157301/26526369/1441873129083/Zanzibar-Declaration.pdf?token=A5U7X2Kyo4wkSwbFbyN5Tmgublw%3D>
- Transparency International. Corruption by Country/Territory. <http://www.transparency.org/country-TZA>.
- UNEP, CITES, IUCN and TRAFFIC. Elephants in the Dust: The African Elephant Crisis. A Rapid Response Assessment, Christian Nellemann ed. Norway: GRID-Arendal and UNEP, 2013.
- United Nations Department of Economic and Social Affairs: Population Division. World Urbanization Prospects: 2014 Revision. New York, 2014.
- United Nations Office on Drugs and Crime (UNODC). Transnational Organized Crime in Eastern Africa: A Threat Assessment. Vienna, 2013.
- United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD Programme). Tanzania, Kenya and Uganda Unite Efforts to Combat Illegal Timber Trade in East Africa with Support from Norway, UN and INTERPOL. July 2014. <http://un-redd.org/Newsletter2014Issue3/EALlegalTimberTrade/tabid/133455/Default.aspx>.
- United Republic of Tanzania. Wildlife Conservation Act. 2009.
- WildAid Foundation, and African Wildlife. Poaching Steals from Us All: The Elephant Crisis in Tanzania. San Francisco, 2015. Available from http://www.wildaid.org/sites/default/files/resources/Tanzania_Survey_Report_EN.pdf



ENVIRONMENTAL CRIME SERIES **ENVIRONMENTAL CRIME SERIES** **ENVIRONMENTAL CRIME SERIES**

Poaching of wildlife is a massive problem in Tanzania. Since 2011, the tracking and crime-scene management training programme initiated by GRID-Arendal under INTERPOL guidelines has provided more than 2,000 rangers and game wardens with new tools to help reduce the ongoing crime. This report assesses the impact the training has had on law enforcement and identifies gaps in support and further needs. The training philosophy has been to train local trainers, who in turn have trained more than 2,000 rangers in the field, within a short time frame and with limited resources.

