



CITIZEN SCIENCE:
THEORY AND PRACTICE

Obstacles to the Use of Citizen Data in Environmental Litigation before East African Courts

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SONJA KAHL 

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ABSTRACT

Increasingly, citizen data are used as evidence before courts in the context of environmental litigation. This trend is especially strong in Europe and in the United States, but is still poorly researched in Africa. This paper may serve as a starting point to identify some general features in East African legal frameworks and judicial practice that could complicate the use of citizen data as evidence in environmental litigation before courts in this region. From the onset, it is important to emphasize the colonial origins of environmental legislation in East Africa, which was not only designed to make the exploitation of natural resources easier for the occupiers (instead of conserving the natural resource base), but was also specifically geared towards excluding the local population from decision-making.

As a first obstacle, environmental statutes still lack clear technical standards concerning air, soil, and water quality. This forces litigants to rely on vague constitutional rights, and leads to a focus on procedural rather than substantive questions in court proceedings. Secondly, there is a lack of standards concerning the collection of environmental information. Thirdly, NGOs often operate in hostile environments. If citizen data are to be used for litigation, it is important to ensure a cooperative relationship with the authorities and to protect the organizers of citizen science projects from retaliation. Fourthly, many environmental procedures in Africa are of a criminal nature, which may influence the requirements concerning the use of citizen data.

CORRESPONDING AUTHOR:

Sonja Kahl

University of Freiburg, DE

sonja.kahl@hotmail.de

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INTRODUCTION

Citizen science refers to scientific research conducted by nonprofessional scientists (Gura 2013, p. 259). It can include, for instance, air and water quality measurements conducted by citizens and civil society groups. Increasingly, citizen data are used as evidence before courts in the context of environmental litigation, with one well-known example being the *Formosa* case before the US District Court of Southern Texas (*San Antonio Bay Estuarine Waterkeeper and others v Formosa Plastics Corporation and others*, 6:17-cv-00047 (2019); Berti Suman and Schade 2021).

This trend is especially strong in Europe and the United States, but is still poorly researched in Africa. Civil society in East African countries has become increasingly active in the gathering of environmental data, and various studies have highlighted the potential of citizen science in the subregion (Tropical Biology Association 2016; Pocock et al. 2018; Weeser et al. 2018; Brees et al. 2021). These findings are not surprising as local communities may not always be able to afford scientific expertise, and access to environmental information is not always granted by the state (or simply not available as the state itself may lack the means to engage in effective measuring and monitoring). The state may even be complicit in environmentally degrading activities. However, there is little to no research on the use of citizen science in environmental litigation before courts. Scott and Barnett (2009), for instance, have published an article on the use of citizen data in environmental policy-making in South Africa. However, it does not concern litigation before courts, and there is, to the best of my knowledge, no publication concerning the matter in East African countries.

This paper may therefore serve as a starting point to analyze some general features in East African legal frameworks and judicial practice that could complicate the use of citizen data before courts in this region. In the first part, this paper will provide some context by setting out the historical background of environmental law and litigation in East African states. In the second part, this paper will explore four important obstacles to the use of citizen data as evidence before courts, which are: a) the lack of clear environmental standards concerning air, soil, and water quality, which forces litigants to rely on vague (constitutional) rights, and results in both legal uncertainty and a focus by judges on procedural matters; b) the lack of standards concerning the collection of environmental information; c) the (at times) hostile environment in which nongovernmental organizations (NGOs) often operate; and d) the strong emphasis on criminal law as an enforcement mechanism in environmental protection.

It goes without saying that this list of obstacles is not meant to be exhaustive and that there are numerous

other obstacles to environmental litigation, which are not unique to Africa, such as the costs of litigation, lengthy procedures, illiteracy and low education in the region, general mismanagement and corruption, lack of judicial independence, travel distances to courts, and the non-implementation of court decisions. The purpose of this paper is to shed light on some features that may be different from other regions, especially from Europe and the United States.

For the purpose of clarification, the focus of this study is on Kenya, Tanzania, and Uganda. The countries form part of the Great Lakes Region, and the economic, social, and legal cooperation between the states can be traced back over a century. They have retained the English Common Law system from their former British colonial occupiers. Common law systems are characterized by their body of law created by judges and the great weight given to judicial precedent, which carries the same force of law as written statutes. This is unlike many of the neighboring states, which derive their legal system from French, Portuguese, Italian, German, or Belgian civil law. Moreover, unlike neighboring Somalia, the three states have enjoyed some degree of political stability in the past decades.

Finally, it is important to note that Kenya, Tanzania, and Uganda feature a legal pluralism that can be found in many African states. This means that the state-run statutory legal system coexists with customary or Islamic laws and that official state courts may operate in parallel with local indigenous or religious courts. This study will focus on official state courts and exclude other types of dispute settlement institutions.

BACKGROUND

This section provides some background on environmental legislation and judicial practice in Kenya, Tanzania, and Uganda.

COLONIAL LEGACIES IN ENVIRONMENTAL LAW IN EAST AFRICA

Environmental legislation in East Africa emerged mainly during the colonial period. It was implemented by so-called command-and-control administrative structures, with an expertise, at least initially, “confined to law and order functions,” and “ill-adapted to natural resource management, often over-politicized, sanctions-oriented, and without public participation in their functions” (Richardson 2000, pp. 25–26).

The best example is the “fences and fines” model, a preservationist approach that established national parks and game reserves. Areas inhabited by protected wildlife, or otherwise of perceived aesthetic value, were set aside, fenced off, and placed under the control of the colonial

administration, with entry licenses granted only for European hunters and tourists. The local population was evicted and criminalized for entering the park to hunt, fish, cut wood, or engage in agricultural activities without a permit (Richardson 2000, pp. 64–65; Situma 2000, pp. 396–398; Slobodian et al. 2016, p. 1). The establishment of national parks remains one of the centerpieces of environmental protection and conservation to this day, with many postcolonial governments applying this model even more stringently than their predecessors (Dzidzornu 2004, pp. 149–150; Ndethiu 2018, pp. 60–61).

Furthermore, Kenya, Tanzania, and Uganda inherited from their former colonial occupiers a highly uncoordinated and fragmented environmental regulatory framework. For example, in Kenya, the legal framework was fragmented into more than 70 sectoral laws governing various environmental matters and was enforced by different institutions (Ndethiu 2018, p. 91, see also Richardson 2000, 17, 21–24; Bosek 2014, p. 492). Most importantly, most of these laws were not designed to set environmental standards, conserve the natural resource base, or enable public participation in decision-making by the local population (Ntambirweki 2009, pp. 81–82). On the contrary, most of them were geared towards making the exploitation of natural resources easier for the occupiers by regulating and controlling access to them, especially through the allocation of exploitation licenses (Richardson 2000, pp. 21–24; Kariuki and Muigwa 2017, 11, 15–16). Pallyango (2007, p. 34) refers to them as “actually resource-exploitation statutes.”

DEVELOPMENTS AFTER INDEPENDENCE

In the first decades after independence, the three East African states retained or only slightly modified these laws, stretching them “to implement [environmental] policies they were never originally intended to address” (Richardson 2000, p. 22).

It was not until the late 1990s and early 2000s that governments introduced framework environmental legislation to harmonize the existing sectoral patchwork of laws and improve the coordination between different administrative agencies. These laws include the Ugandan National Environment Statute (NES) (1995), which was replaced by the National Environment Act (NEA) (2019); the Kenyan Environmental Management and Coordination Act (EMCA) (1999), which was amended in 2015; and the Tanzanian Environmental Management Act (EMA) (2004). These provide for basic rules concerning environmental planning, pollution control, and the environmental impact assessment of projects (Richardson 2000, pp. 21–24; Kameri-Mbote and Odote 2009, pp. 32–33; Bosek 2014, p. 492). Moreover, they enable citizens to assert a violation of their “right to a clean and healthy environment” before a

court. Uganda and Kenya have further enshrined this right in their respective constitutions.¹

Moreover, the framework laws create national environmental agencies and vest them with the power to establish specific regulatory environmental standards.² For example, in Kenya, the National Environment Management Authority has cooperated with the Ministry of Environment in the adoption of the Environmental Management and Coordination (Water Quality) Regulations (2006), the Noise and Excessive Vibration Pollution Regulations (2009), and the Air Quality Regulations (2014). They also contain schedules with specific standards and thresholds concerning the maximum emission levels of certain substances.

Nonetheless, the development has been slow. Many sectoral laws still need to be integrated (Ndethiu 2018, p. 92), and many sectors still lack specific standards. For example, to date, no Ugandan air quality regulations or guidelines exist.

THE AWAKENING OF CIVIL SOCIETY

Civil society has become increasingly active in environmental management and policy-making, especially in the form of NGOs and local self-help groups and networks (Richardson 2000, pp. 28–29). The participation of local citizens in decision-making can secure the use of traditional knowledge and local conservation practices (Ribot 2002; Kimani 2010, p. 204). Citizens have also established sophisticated methods of environmental data collection. For example, AirQo, a project founded in 2015 by the Makerere University in Uganda, works with diverse communities of stakeholders including civil society actors to install locally developed low-cost air quality measuring and monitoring devices across the country to gather information on the scale of air pollution in Uganda.³

In addition, civil society actors increasingly resort to judicial proceedings to seek redress against environmental pollution. Until very recently, environmental matters were considered private issues and classified as acts of trespass, nuisance, or negligence preventing a landowner the enjoyment of his or her property, rather than matters of public interest (Bosek 2014, p. 490; Amugo Angote 2019, p. 55; Muriithi 2020, p. 72). Moreover, courts often operated as an extended arm of the executive and dismissed cases against government agents due to procedural technicalities (“era of technicalities”) (Oloka-Onyango 2015, pp. 775–781; Ndethiu 2018, p. 93).

However, the above-mentioned constitutional and legislative amendments were flanked by important judicial reforms to allow for environmental public interest litigation (Oloka-Onyango 2015, pp. 791–792; Kyomuhendo 2019, pp. 11–12). As the name implies, public interest litigation is defined as “court action seeking remedies aimed at a broader public good, as opposed to the specific interests

of the individual litigant(s)” (Oloka-Onyango 2015, p. 766). Therefore, the legal standing of individuals and groups (i.e., the right to litigate a case before a court) was expanded in a manner that litigants no longer needed to prove any personal injury resulting from an alleged violation of the right to a satisfactory environment. Accordingly, the attitude of judges became increasingly favorable regarding public interest litigation throughout the 2000s. After decades of apathy, there has been a notable rise in public interest (environmental) litigation in Kenya, Tanzania, and Uganda (Oloka-Onyango 2015; see also Yk 2013, p. 39; Bosek 2014, p. 501; Amugo Angote 2019, pp. 57–59; Kyomuhendo 2019, p. 19; Soyapi 2019b; Muriithi 2020, pp. 72–73; Shivji 2020).

Nevertheless, these developments must by no means be taken for granted. Some courts at times regress into an “era of technicalities.” For example, in June 2020, the Tanzanian legislature passed a law severely limiting public interest litigation by requiring that cases before courts be filed only by those who have suffered personal injury. According to Shivji (2020), this amendment “puts back the clock of constitutional jurisprudence in the country by two decades,” and constitutes a serious obstacle to environmental litigation.

FEATURES AND OBSTACLES FOR CITIZEN SCIENCE

East African states have introduced important legislative, judicial, and institutional reforms in the recent decades, and there has been a considerable increase in public interest litigation and citizen engagement. Nonetheless, several features of East African legal systems could still pose an obstacle to the use of citizen data before courts. The purpose of this section is to identify some of these key features.

FIRST OBSTACLE: LACK OF ENVIRONMENTAL QUALITY STANDARDS

In Western countries, court decisions on environmental matters are often highly scientific and technical (see *RSPB v. The Scottish Ministers* (P28/15 CSOH 103) (2016) as an example). By contrast, for most of recent history, East African courts have been focusing on procedural questions, especially such establishing their competence to rule over a case and concerning legal standing, with much less focus on the actual substance of a case (see Yk 2013; Bosek 2014, pp. 501–502; Kyomuhendo 2019, pp. 12–15, with examples). It is likely that Tanzanian courts will revert to this practice after the enactment of the 2020 law severely limiting public interest litigation. Nonetheless, Kenya and Uganda appear to have moved beyond that stage, and legal standing is mostly a given in recent environmental cases.

However, one important problem in all three states lies in the fact that substantive environmental standards have not yet been fully developed. Although the environmental framework laws entrust the respective environmental agency with this task,⁴ scholars such as Kituku et al. (2019, pp. 208–209) still point out the “need to ensure [the] continuous and progressive development of normative standards and obligations for the realization of the right to a clean environment.” This lack of science-based legal standards makes it complicated for judges to examine a breach of the right to a “clean and healthy environment,” especially taking into account the scientific complexity of environmental issues.

In *Ken Kasing’a v. Daniel Kiplagat Kiriu and others* (Petition 50 of 2013) (2015), a Kenyan court noted (albeit *obiter dictum*) the lack of environmental regulation concerning telecommunication transmitter stations and the duty of the environment agency to fill the legal gap (paras. 74–77). In *Martin Osano Rabera and another v. Municipal Council of Nakuru and others* (Petition 53 of 2012) (2019), another Kenyan court urged the national environmental management authority to get involved in policy-making concerning waste disposal and management, asking it to regulate questions such as “[c]an incinerators be used for particular types of urban waste? If so, what type of incinerators? What about recycling? (para. 73)” In *Greenwatch v. Attorney General and another* (Miscellaneous Cause 140 of 2002) (2012), a Ugandan court directed the Attorney General to initiate a law to regulate the importation, manufacture, and use of plastics.

Courts faced with a lack of standards have also come to conflicting decisions. In the Ugandan case of *Byabazaire Grace Thaddeus v. Mukwano Industries* (Miscellaneous Application 909 of 2000) (2001), concerning obnoxious smoke being emitted from a factory, the judge refused to engage with the case, declaring that

“[o]ne needs to know what is meant by a ‘healthy environment’. ... [The environmental agency] is the body entrusted with the duty of establishing these standards. In my considered view, it is only after the standards have been established that one can gauge the totality of the right to a healthy environment.”

In *Asiimwe and 2 others v. Leaf Tobacco & Commodities (U) Ltd and another* (Miscellaneous Cause 43 of 2013) (2014), which concerned air pollution by a Ugandan tobacco factory, when the respondents argued that there were no standards on air quality in Uganda to determine whether the smoke constituted a harm to the environment and human health, the court chose to not apply the *Byabazaire* precedent and held that

“[t]o urge that ... air quality standards, occupational air standards, emission standards, e.t.c. must first be established by [the environment agency] before the Applicants can sue as far as the violation of their right to a clean and healthy environment is concerned is preposterous [sic] and too academic.”

In some instances, the lack of national environmental standards has forced courts to discuss whether external standards should be imported. For example, in *Nakumatt Holdings Ltd v. National Environment Management Authority and another* (Appeal 01/02/2005) (2015), which was filed before the Kenyan air quality regulations were adopted, a Kenyan court accepted the argument that “in the absence of statutorily prescribed limits [on air pollution], Kenya relies on World Health Organization standards.” By contrast, in *Moffat Kamau*, which concerned the construction of a wind park in Kenya, the applicants tried to invoke minimum distance standards between wind turbines and residential areas from United States law, as they did not exist in Kenyan law (para. 14). Perhaps understandably, the judge found that “USA law does not apply in Kenya. One cannot import foreign legislation and argue that it applies to Kenya (para. 98).”

It is true that having standards does not completely eliminate uncertainty. It is also true that most of these courts have issued a decision despite the lack of environmental standards. However, the fact that judges often felt the need to indicate this—even *obiter*—implies that there is indeed an issue. Vague norms and the lack of scientific expertise among judges have long been identified as obstacles in environmental litigation, not only in the African context (Kanhanga 2019, on international litigation).

Indeed, standards may greatly improve the connection between law and science. Governments often rely on science to inform the formulation of environmental standards, which is why they are likely to help jurists and (citizen) scientists speak a common language and come to a mutual understanding as to whether the right to a healthy environment has been violated. Hence, precise environmental standards and clear legal thresholds are likely to assist the judge in taking a science-based and more predictable decision. Moreover, litigants will be faced with less uncertainty as to how much evidence is enough to convince the judges of a violation of their right to a healthy environment. For instance, AirQo, the Ugandan citizen science project engaging in air quality measurement, relies on WHO standards (in the absence of Ugandan air quality standards) to assess whether pollution in Ugandan urban centers is excessive.⁵

In addition, albeit not an exclusively African problem, some authors continue to note a focus of some East African courts on procedural instead of substantive environmental obligations (Soyapi 2019a, pp. 156–157; Gilder and Rumble 2021, pp. 3–4). It is possible that this, too, is a consequence

of the above-mentioned legal gaps. For example, in *Moffat Kamau and 9 others v. Aelous Kenya Ltd and 9 others* (Constitutional Petition 13 of 2015) (2016), a Kenyan court declared that the failure to conduct an environmental impact assessment (EIA) before the construction of a wind farm violated the petitioners’ right to a clean and healthy environment (paras. 90–92). In *ACRAG and 3 others v. Municipal Council of Naivasha* (Petition 50 of 2012) (2017), another Kenyan court examined whether an EIA had been carried out properly before the operation of a waste disposal site, but omitted any evaluation of what minimum emission standards existed and whether they had been complied with (Kituku et al. 2019, pp. 208–209). Similarly, climate change cases, of which there have only been a handful in Kenya, have primarily involved administrative requirements in the approving of coal fired power plants (Gilder and Rumble 2021, p. 3). In this context, too, clearer environmental standards could provide science with a greater role in the judicial disputes.

SECOND OBSTACLE: LACK OF STANDARDS CONCERNING THE COLLECTION OF ENVIRONMENTAL DATA

However, even where standards determining what exactly constitutes environmental pollution in a substantive sense of the law do exist, only very few of them include guidelines concerning the process of data collection itself. This includes requirements for measuring equipment and expertise, as well as testing methods for the determination of environmental quality.⁶ In many cases, regulations place a duty on the national environmental authorities to prescribe criteria and procedures for the measurement of air quality, obnoxious smells, noise vibrations, radiation, and soil quality.⁷ It appears that the environmental agencies have made little to no use of such provisions. Not only does the lack of guidelines lead to considerable uncertainty, but even where they are established, they may limit or place additional burdens on the collection of data by citizens.

This is illustrated by the dispute in *Elizabeth Kurer and Detlef Heir v. County Government of Kilifi and 4 others* (Petition 23 of 2016) (2018), where the applicants were suing on behalf of a group of Kenyan residents aggrieved by loud music emitted by a restaurant. The applicants had used self-made instruments to prove that the noise vibration levels from the restaurant were excessive.

At the center of the dispute were the Kenyan Noise and Excessive Vibration Pollution Regulations (2009). Pursuant to Section 6, “[m]easurements shall be taken by the relevant lead agency”. However, “[i]n any cases where there is not relevant lead agency to take the measurements, or where the lead agency has failed to take action ..., the measurements shall be taken by a person duly authorized by the Authority, who is knowledgeable in the proper use of the measuring

equipment.” Moreover, “[t]he Authority in consultation with the relevant lead agency may issue guidelines for the measurement of noise and excessive vibration.”

The judge noted that the National Environment Management Authority (NEMA) had neither made its own measurements of noise and vibrations nor issued any guidelines for the measurement (para. 23). According to the court,

“[24] Even if there were guidelines to measure noise and vibration levels prepared by NEMA, I am neither persuaded that the Petitioners were authorized by NEMA to carry out the measurements nor that they had knowledge in the proper use of the equipment as provided under the Regulations.

[25] The upshot is that while I admire the spirited nature in which the Petitioners have followed up on their rights to a clean and healthy environment, this Petition must fail.”

This case shows that the admissibility of citizen data as evidence largely depends on whether regulatory legislation authorizes citizens to make measurements. The judge was ready to consider citizen data as evidence in the proceedings, but only because Section 6(3) of the regulations specifically provided for an entity or person other than the environmental agency to make measurements—implying that citizen data is inadmissible where such a provision does not exist. The regulation also contained the additional requirements that there must be an authorization by the national environmental agency to carry out the measurements and that the applicants must demonstrate that they had “knowledge in the proper use of the equipment.”

THIRD OBSTACLE: HOSTILE ENVIRONMENT FOR NGOS

NGOs are the drivers behind most environmental litigation in Africa (Gilder and Rumble 2021, p. 6). However, environmental NGOs and activists often operate in hostile environments and their actions can provoke backlash from the government and private corporations.

Human rights and environmental NGOs are frequently alleged to oppose economic development and destabilize the government in order to advance “foreign imperialist interests” (Kamau 2014). East African governments, among others, have therefore either adopted or tried to adopt restrictive laws and policies to constrain the activities of NGOs by placing limitations on their registration, financing, and operation (Onyango 2015; Mulindwa 2019; Musila 2019), or have taken measures to limit the activities of the press (Rambaud 2018; Oduor 2021). In addition, environmental defenders who oppose large-scale construction and resource exploitation projects are increasingly subjected

to stigmatization and criminalization by the government. Criminalization can take various forms, including harassment and intimidation by the police and prosecution, unfounded criminal accusations, arbitrary detentions and searches, and the misuse of defamation, libel, or counter-terrorism laws to obstruct their actions (Okuda 2021).

There are numerous examples from all three states. Since 2013, several Tanzanians have been involved in litigation against a mining company and asserted grave abuses by security and police forces against protesters, including some killings (Rights and Accountability in Development 2020; Business & Human Rights Resource Centre 2020). In 2018, the Kenyan state authorities harassed at least 35 environmental activists, *inter alia* for engaging in public interest litigation (Human Rights Watch 2018). In summer and autumn 2021, Uganda suspended the operations of 54 NGOs, including those representing people affected by the construction of an oil pipeline (Biryabarema 2021), and police arrested several environmental activists (Gyuse 2021). Further examples are provided in a study conducted by the Rights and Resources Initiative on the criminalization of land and environmental rights defenders in East Africa (Okuda 2021).

As a consequence, as put by Oloka-Onyango (2015, p. 813), the “[f]ear of clashing with the executive is an underlying and ever-present concern in many [public interest litigation] cases.” Two spokespersons of Ugandan environmental NGOs, whom I interviewed during my research, confirmed that “it is not popular to take on the government” (Anonymous A 2020) and “if it’s your face all over [a case], they will mark you” (Anonymous B 2020).

Citizen science projects such as AirQo have preferred to maintain a cooperative relationship with the authorities. As Okure (2021), air quality scientist at AirQo, told the author in an interview, the reaction of the authorities to their citizen science project was “mainly positive.” But he also added that, to date, AirQo had used the air quality data to work together with policymakers by providing expertise, making policy suggestions and recommendations, and empowering municipal decision-making. It has not been used to take a political line or to initiate litigation—although the latter “might be where we are going.”

This means that if citizen data are to be used for environmental litigation, it is important to ensure that the organizers of citizen science projects are not subjected to retaliation from states or private actors.

FOURTH OBSTACLE: EVIDENTIARY STANDARDS IN CRIMINAL PROCEEDINGS

One consequence of the command-and-control structures introduced by the colonial administrators is the use of criminal sanctions as the primary mechanism for compliance and enforcement of environmental law.

Environmental framework laws frequently provide for criminal liability under various sections or contain entire parts listing environmental offences, which may include fines or imprisonment.⁸ Kidd (2002) and Davids (2020, pp. 9–11) have confirmed that criminal sanctions are almost always used as the primary enforcement mechanism in South African environmental legislation. Similarly, but in less detail, Akech (2006, p. 19) and Pallyango (2007, p. 37) have pointed out the predominance of a sanctions-based approach in East African states.

Especially in the context of wildlife conservation, there are numerous criminal cases concerning poachers or wildlife traffickers. In 2016, the IUCN published a study examining 269 wildlife criminal cases in Tanzania alone (Slobodian et al. 2016, p. 4). Criminal or criminal-like sanctions have also been applied in sectors beyond wildlife.⁹ In *Peter Waweru v. Republic* (Miscellaneous Civil Application 118 of 2004) (2004), a Kenyan court pointed out that “environmental crimes under the Water Act, Public Health Act and EMCA cover the entire range of liability ... and ought to be severely punished because the challenge of the restoration of the environment has to be tackled from all sides and by every man and woman (para. 49)”. In *Amooti Godfrey Nyakaana v. and National Environment Management Authority and 6 others* (Constitutional Appeal 05 of 2011) (2015), the Supreme Court of Uganda emphasized the police-like powers of the inspectors of the Environmental Agency and compared an environmental restoration order with the prosecution of a person charged with a criminal offence.

Scientific evidence plays a crucial role in criminal proceedings as well. The police in East Africa often do not prioritize environmental crimes in their activities or do not possess the necessary scientific understanding (Njuguna Mwanika 2010, 3–5, 7). For example, in *Yamungu Kaburu Moshi v. Republic* (Criminal Appeal 56 of 2017) (2018), the accused had to be released by a Tanzanian court because prosecution could not prove that the meat that he had been found with was actually giraffe meat. The court held that identification by color by the game officer and the police was not sufficient evidence, adding that “there is a need of prosecution being equipped with knowledge [sic]”.

Citizen participation could provide local and contextualized knowledge needed to understand the circumstances of a case and assist the police in the collection of evidence. Indeed, some African NGOs have shifted their focus to criminal law and decided to support law enforcement, especially in the fields of poaching and wildlife trafficking. For example, the African Wildlife Foundation has helped the Kenyan authorities in the Tsavo national park to collect meat samples from local butcheries and meat dealers in order to prove that protected wildlife such as impala and giraffe was being sold to unsuspecting customers, and bring the case to court (Sehmi 2019). On a more professional

level, the Natural Resource Conservation Network counts on members trained in animal forensics and behavior, and has helped the Ugandan wildlife authorities and police to arrest more than 8,000 people, and investigate and prosecute more than 5,000 criminals since 2013 (Marshall 2018).¹⁰

There are several advantages in assisting the authorities in criminal proceedings. Firstly, since court proceedings are carried out by prosecution, the NGO does not risk carrying court costs when a case is lost. Secondly, it avoids retaliation from the state because the NGO works with the government rather than against it.

Nonetheless, adjusting the use of citizen science to the special characteristics of criminal proceedings can entail complications. It is important to make sure that the rights of the accused are not circumvented by “private investigations” carried out by NGOs. Therefore, criminal proceedings typically rely on forensic expert evidence and are not designed to accommodate means of public participation. Moreover, criminal law often necessitates a higher evidentiary threshold. The standard of evidence in criminal matters typically requires a case to be proven beyond reasonable doubt, whereas administrative or civil proceedings leave more room for a balance of probabilities. According to Mhini (2017, p. 94), in Tanzania

“often prosecutions are dismissed because of inadequacies in evidence rather than the innocence of the environmental offender. ... Most of the time evidence required to prove environmental offences is hearsay evidence and the nature of most environmental offences is that unless the offender is caught in the act it is difficult to prove beyond all reasonable doubt that it was the accused who committed the offence.”

CONCLUSION

After decades of judicial restraint and a focus on procedural technicalities, courts in East Africa have finally started to seriously consider environmental cases (perhaps with the deplorable exception of Tanzania, which appears to be regressing after recent legislative amendments). Moreover, the African public is becoming increasingly interested and engaged in environmental matters. Because expert evidence is not always available or affordable to local communities, citizen science is likely to have great potential in the region.

Therefore, the question whether citizen data can be used as evidence in environmental litigation before courts in Kenya, Tanzania, and Uganda is more than justified, and this paper has identified four important obstacles. These obstacles, at the same time, shed light on the next steps to be taken.

Firstly, despite significant progress in recent years, environmental standards and thresholds necessary for ascertaining a violation of the right to a clean environment remain underdeveloped in the region. As a result, litigants are often faced with uncertainty as to the evidence they must provide, and judges struggle with providing a solid scientific basis to their decisions. Therefore, it is important to ease the dialogue between lawyers and scientists by establishing specific environmental standards that reflect scientific insights in the language of the law.

Secondly, the lack of legal regulations and guidelines concerning the process and methods of environmental data collection makes it difficult for judges to assess whether and under which conditions measurements made by citizens are admissible as evidence. This means that there is a task for East African states to formalize the admissibility of citizen data by establishing clear guidelines for citizens, judges, and attorneys.

Thirdly, East African governments have a history of harassing and criminalizing environmental NGOs and activists, or aiding private companies to do so. Accordingly, it is crucial to establish mechanisms to protect from retaliation citizens and organizations collecting environmental information and using it for litigation.

Fourthly, criminal sanctions constitute a primary mechanism for the enforcement of environmental law, and environmental court proceedings are often of a criminal nature. Although there are reasons to believe that citizens and NGOs can successfully assist state organs in the gathering of evidence and prosecution of environmental offenders, the use of citizen data as evidence may need to be adjusted to the higher evidentiary standards of criminal proceedings. This may require a higher degree of cooperation between civil society, police and prosecution, and clearly established conditions as to when citizen data is admissible as criminal evidence.

NOTES

- 1 See Art. 39 Constitution of Uganda 1995 and Art. 42 Constitution of Kenya 2010.
- 2 See e.g., Part VI of the Ugandan NES or Part X of the Tanzanian EMA.
- 3 <https://airqo.africa/about>.
- 4 See, for example, Part VIII of the Kenyan EMCA; Part VI of the Ugandan ENS; Part X of the Tanzanian EMA.
- 5 <https://blog.airqo.net/over-80-of-lives-could-be-saved-if-the-new-who-air-quality-guidelines-targets-are-met-4438fb4f54fc>.
- 6 Examples include the Fourth Schedule of the Ugandan Waste Management Regulations (1999), the Third Schedule of the Ugandan Soil Quality Regulations (2001), the First Schedule of the Tanzanian Water Quality Standards (2007), and the First Schedule of the Tanzanian Soil Quality Standards (2007).
- 7 Examples include Sections 145(a), 146(a), 147(a), 148(a), 149(a), and 150(a) of the Ugandan EMA, Section 4(1) of the Tanzanian Air Quality Standards (2007). Similarly, the Kenyan Water Quality Regulations (2006) make mention of “the measurement methods established by the Authority” under its Third Schedule.

- 8 See, for example, Part XIII of the Kenyan EMCA; Part XVI of the Ugandan ENA; Part XVI of the Tanzanian EMA; Muigua (2019, pp. 12–13).
- 9 See, for example, *Peter Igiria Nyambura v. Director of Public Prosecutions* (Criminal Revision 17 of 2018) (2018) (concerning illegal logging in Kenya); *Johnson Kamau Njuguna and another v. Director of Public Prosecutions* (Judicial Review 9 of 2018) (2018) (concerning responsibility for the collapse of a dam in Kenya); *Mugisa Aziz Mateeba v. National Forestry Authority* (Civil Suit 32 of 2013) (2017) (concerning wrongful prosecution for illegal logging in Uganda); *Joseph Kessy and others v. City Council of Dar Es Salaam* (Civil Case 229 of 1988) (1991) (on the “criminal aspect” of garbage dumping and burning in Tanzania).
- 10 <https://www.nrcn.org/>; <https://www.nrcn.org/what-we-do/>.

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AUTHOR AFFILIATION

Sonja Kahl  orcid.org/0000-0001-6326-9996
University of Freiburg, DE

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