



RECONCILING CHARCOAL PRODUCTION AND THE PRESERVATION OF BIOLOGICAL DIVERSITY IN KENYA

- Forest resources in the Kenyan arid and semi-arid lands cover approximately 2,010,547 ha (45% of total forest cover in Kenya). Dryland forest exploitation include charcoal production, gums and resins, construction materials (poles, thatch, and timber), herbal medicine as well as fruits which are led by communities, in conjunction with their livestock and crop farming activities.
- Charcoal production as well as gum and resins are the major income generating ventures in the drylands with known known value chains. For example, charcoal production in Kenya is estimated to generate KES 32 billion, 50% of which is known to be from the drylands.
- Charcoal is an essential source of energy for millions of Kenyans in urban and rural areas. In 2013, the economic value of the sector was estimated at KES 135 billion (around USD 1.2 billion in March 2021), making it a key contributor to the economy, providing significant incomes to numerous people and their dependents: wood and charcoal producers, transporters, brokers, wholesalers, retailers, and consumers.
- Studies show that estimated wood for fuel harvesting from ASALs for charcoal production was 56,000 tons/ yr which resulted to a deforestation rate of 1.6 ha/ yr. This has led to a great loss of indigenous biodiversity (such as *Olea*, *Vepris*, *Acacia* and *Eucleaspp*), destruction of vital ecosystems and habitats.
- To address the deforestation challenge, Kenya set the Charcoal Regulations of 2009 (also known as the “Charcoal Rules”). Charcoal producers need to have a license to produce charcoal and have to be members of the Charcoal Producer Associations (CPAs).
- The CPAs responsibilities include identifying sources of wood, ensuring sustainable harvesting and carbonization technologies and selling from centralized points.
- Despite this effort, it is estimated that 60% of Kenya’s charcoal is produced and sold by non-CPA members. The inefficient earth kilns – with a 10-15% rate of carbonization – remains the predominant production process.
- Charcoal is produced by burning wood under limited supply of oxygen, a process known as carbonisation. This carbon rich product is produced in kilns. Most kilns used in Kenya – and Africa in general – are very inefficient. Almost 10 tonnes of wood are used to produce a tonne of charcoal, which is a 10% recovery rate. Improved carbonisation techniques and kilns – of various quality and



Figure 1: Land clear felled for charcoal production and crop production in Loitokitok, Kajiado South. © Halima Nenkari (SDL)

cost – are being developed and promoted with recovery rates of more than 30%. Most of charcoal production takes place in forest rich rural areas.

- The charcoal is transported to urban centres where it is sold to wholesalers, who then sell to retailers and vendors, who in turn sell to consumers in smaller quantities. Pricing of charcoal is very location dependent. But it can cost up to US\$23 per bag in Nairobi and most cities. Vendors sell in much smaller quantities – as small as 2kg packets.
- The ASALs in Kenya are spread across 22 counties with varying degrees of aridity. These extreme climatic conditions have had devastating effects on the environment and livelihoods of communities with spiralling vulnerabilities.
- Total forest area in Kajiado County is estimated at 16,866 Ha comprising of indigenous and exotic forests. A total of 15,626 Ha of the
- forest land is gazetted while 1240 Ha is community land.
- Primary drivers of biodiversity losses in the forestry sector in Kajiado County are unsustainable land use practices such as excessive logging for firewood and charcoal (CGK, 2019). This in turn drives many individuals to move into charcoal production as an alternative income source. Most tree species felled for charcoal production are indigenous especially the Acacia species that thrive well in the ASALs. The loss of indigenous trees species to charcoal production contribute greatly to biodiversity losses in the ASALs.

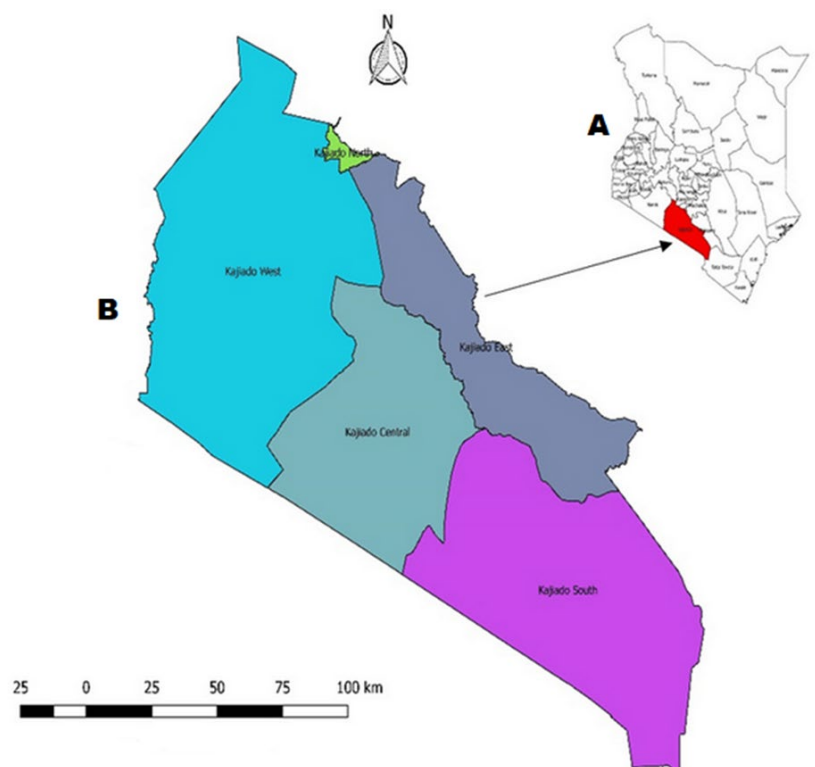


Figure 2: Kenyan map showing the location of Kajiado County shaded in red colour. B) Map of Kajiado County showing different sub-counties shaded in different colors (Source: Onono et al., 2019).

Mapping Of The Charcoal Value Chains In Kajiado County

- The charcoal value chain is composed of six main activity categories (wood production, charcoal production, transportation, wholesaling, retailing, and consuming). In Kajiado County, charcoal production is mainly done under two systems, subsistence, and commercial production. Subsistence production is mostly done on privately owned lands and group ranches using fallen dead trees.
- Wood for charcoal commercial production is mainly found in community lands (very few), private lands and group ranches. Commercial production was mainly found on private leased out lands with the main aim of converting lands from forestry to crop lands. Indigenous species (*Acacia tortillis* and *Acacia melifera*) were the most used for charcoal production in the county. Under the system the trees are clear felled for charcoal production, where the land is later converted to intensive horticultural production. The system causes a major loss to biodiversity and leads to emergence of invasive species in case the land is later left bare.
- After production, the charcoal is transported using motorbikes, public service vehicles, and transporters of back loads depending on the distance to the selling points. The transporters sell the charcoal to roadside sellers or traders within Kajiado County.
- Charcoal wholesalers are mainly located in major urban centers within and outside Kajiado County such as Kajiado, Kitengela, Isinya, Machakos, Nairobi and Ngong. The wholesalers then sell to retailers in the major urban centers and towns. The main consumers of charcoal from Kajiado

County are individual households, restaurants, schools, and colleges within and outside Kajiado County.

- Currently, the country has imposed a ban on charcoal production from public and community lands to improve tree and forest cover in the country. The activity is however ongoing due to the high demand of charcoal production in urban areas of Kenya. It is estimated that approximately 36% of households in urban areas of Kenya use charcoal for cooking (CGK, 2018). This calls for an urgent need to support and promote use of alternative energy sources for both domestic and industrial use.

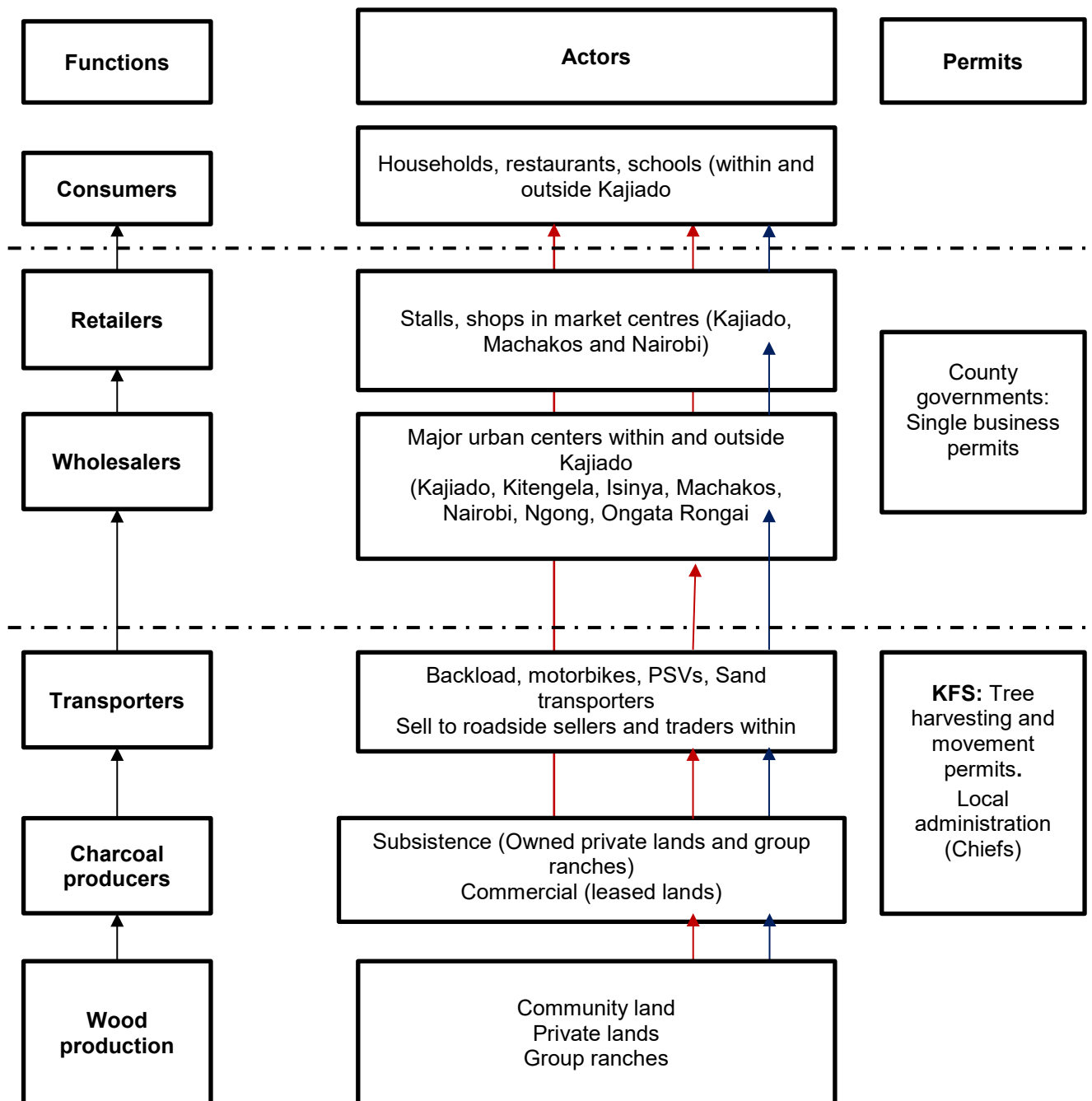


Figure 3: Charcoal Value Chain, Kajiado County

INSTITUTIONAL, POLICY AND LEGISLATIVE FRAMEWORK

- Over the past 20 years, Kenya has developed laws and policies with the hope of bringing the charcoal production sector into the formal economy and reducing its environmental impacts. This was after rampant destruction of forests and a realisation that what is not known cannot be regulated.
- The Ministry of Environment and Forestry is responsible for forests. Ministries responsible for Agriculture, Livestock and Cooperatives also deal with trees on private and community and agricultural land.
- The Constitution of Kenya, 2010 requires the Country to increase and maintain tree cover at a minimum 10% of the total land area. Specifically, Article 69 (1) (b) emphasizes on the need to “work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya”.
- The Kenya Vision 2030 places the environmental sector in the social pillar and emphasizes the need to conserve natural resources to support economic growth. For forests, the goal is to increase area under forest to 10% by 2030 and sustainably manage natural forest resources for environmental protection and enhanced economic growth.
- The Forest management and Conservation Act (FMCA), 2016 is an Act of Parliament to give effect to Article 69 of the Constitution with regard to forest resources; to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for the socio-economic development of the country and for connected purposes. Section 6(3)(a)(iii) highlights the need to develop “programmes for achievement and maintenance of tree cover of at least 10% of the land area of Kenya”.
- Section 37(1) requires every County Government to, establish and maintain arboreta, green zones or recreational parks for use by persons residing within its area of jurisdiction. In this regard, every County shall cause housing estate developers within its jurisdiction to make provision for the establishment of green zones at the rate of at least 5% of the total land area of any housing estate intended to be developed.
- The Act establishes the Kenya Forest Service that is mandated “to conserve, protect and manage all public forests, prepare and implement management plans for all public forests and, where requested, assist in preparation of management plans for community forests or private forests in consultation with the relevant owners, receive and consider applications for licenses or permits in relation to forest resources or management of forests or any other relevant matter in accordance with this Act, establish and implement benefit sharing arrangements in accordance with the provisions of this Act, approve the provision of credit facilities and technical training for community-based forest industries, and the provision of incentives to persons for the sustainable utilization of wood and non-wood forest products, implement and enforce rules and regulations governing importation, exportation and trade in forest produce among others”.
- The Government of Kenya through Forests Act No. 7 of 2005, section 59 provides for formulation of rules for regulating the production, transportation and marketing of charcoal. The Forest (Charcoal) Rules, 2009 give provision for formation of charcoal users’ association. However, both national and county government need to do more to operationalize charcoal rules.
- The Environmental Management and Coordination CAP 387 and (Amendment) Act, 2015 provides for protection of forests and environmental impact assessments of forest related developments. Section 9(2)(r) of the Act requires the National Environment Management Authority (NEMA) to work with other lead agencies to issue guidelines and prescribe measures to achieve and maintain a tree cover of at least 10% of the land area of Kenya.
- The Agriculture and Livestock Act established Agriculture (Farm Forestry) Rules 2009 for the purposes of promoting and maintaining farm forest cover of at least 10% of every agricultural land holding and to preserve and sustain the environment in combating climate change and global warming. Part II Section 6 of the Rules specifically deals with the maintenance of 10% tree cover.

Recommendations: Scenarios of commitments for Charcoal Production

Use of alternative energy

- Illegal logging and illegitimate charcoal burning are among the major drivers of degradation and biodiversity loss in Kajiado County. Charcoal burning is predominantly done in Kajiado West and Central Sub Counties. The main market is located in urban centres within and outside Kajiado such as Kitengela, Rongai, Ngong, Isinya and Nairobi. According to CGK (2018), the main sources of cooking energy in Kajiado County were paraffin, firewood and charcoal. Approximately 94.6% and 74.5% of residents in rural and urban areas respectively used either of the three smoky fuels for cooking.
- Use of alternative cooking energy such as briquettes and biogas may help to reduce charcoal demand in the county. There is however need to promote awareness and capacity building of actors on the alternative energy sources as well as improve on the costing to make them a viable alternative to charcoal.

Sustainable charcoal production (wood lots, efficient kilns)

- There is need to organize the charcoal producers to working charcoal producer groups for ease of monitoring, coordinating, and formalizing the sector. The members of charcoal producer groups can then be trained on efficient and sustainable charcoal production as well as supported to acquire efficient charcoal production kilns. There is also need for awareness among the marketers and consumers of charcoal to only use sustainably produced charcoal. Policy institutions mandated to enforce the charcoal rules such as the Kenya Forest Services should only give movement permits to sustainably produced charcoal. There is need to capacity build charcoal producers on branding, and certification for sustainably produced charcoal. Charcoal producers should also be capacity built on establishment of woodlots specifically for charcoal and firewood supply.

Sustainable charcoal utilization (efficient stoves)

- Wood fuel (firewood and charcoal) are the most common energy sources in Kenya. This is attributed to their availability and affordability as compared to alternative energy sources. Demand for charcoal in Kajiado County is high due to population increase and urbanization of the County as well as proximity to major cities and towns such as Nairobi and Machakos. The charcoal is also on high demand due to its perceived superior quality because it is mostly produced from indigenous hard wood species. Out of the 30 households interviewed in the assignment, 77% (23) stated that they used ordinary charcoal stoves for cooking with only 23% (7) using improved cookstoves. There is thus need to promote the adoption and use of improved charcoal cookstoves for cooking. This will indirectly lead to biodiversity conservation due to the associated reduction in charcoal use

Capacity building and awareness creation

- Capacity building and awareness creation on the relationship between biodiversity conservation and the forestry sector was suggested by FGD discussants. Charcoal producers only considered the direct use values of trees such as charcoal and timber for benefits and not the associated ecosystem services offered such as carbon sequestration, provision of shade, reduced surface runoff, animal feed among others. Charcoal producers also did not account for the value of the tree in determining charcoal prices. They only accounted for their time and labour when determining the value of charcoal. This leads to undervaluation of both the tree and charcoal. There is thus need for improved awareness and capacity building on sustainable charcoal production, marketing, and utilization. Charcoal producers should be sensitized on threatened and endangered tree species and discouraged from using them for charcoal production. Key stakeholders for this initiative will include MoEF, KFS, KEFRI, County department for energy and forestry, CSOs, Consumers and traders.

Adoption of Payment for ecosystem services Models for the forestry sector

- Payment for Ecosystem Services (PES) models was also identified as a potential strategy for mainstreaming biodiversity in the forestry sector. This would act as an incentive for biodiversity

conservation in forestry instead of cutting down trees for charcoal. Some of the reasons why PES is not developed in the country include low awareness and perception on the benefits of biodiversity conservation, inadequate knowledge of PES schemes and lack of PES best practices in the forestry sector. There is thus need to develop, package and disseminate PES best practices in the country to the forestry sector, pilot the best practices. Some of the key targeted actors for this VC recommendation include charcoal producer associations (CPAs), MoEF, County department for forestry, civil society organizations (CSOs) and private businesses

Adoption of Sustainable Practices (apiculture, medicinal plants, ecotourism) as alternative income sources)

- Sustainable practices in the forestry sector such as bee keeping, gums and resins and other non-timber forest product enterprises could be promoted in the communities as a part of economic incentives for biodiversity conservation. Low awareness on the potential value of NBSs as an alternative income source, inadequate knowledge on non-extractive values of the rangelands landscape, poor incentive schemes for conservation and the low awareness of the biodiversity, conservation, livelihood nexus are some of the drivers to low adoption of NBSs.

Forests standards and certification

- Forest standards and certification is another strategy for VC in the forestry sector for improved sustainability and traceability of charcoal. The Forest Stewardship Council (FSC) is the body responsible for forest certification in Kenya. Currently, Kenya has no FSC certified forest area (Forest Stewardship Council, 2021). The standards offers guidance for forest management including compliance with national laws, conserving areas with high conservation values, assessing environmental values and impacts, among others. The standards guide forest owners and managers on compliance with requirements for responsible forest management that confirm that a particular forest block or area is managed in a manner that conserves biological diversity and benefits the lives of local communities and workers while ensuring it sustains economic viability (Forest Stewardship Council, 2021; Star, 2021). There is however need to expand the standards to cover the charcoal sector since it only covers forests established for timber production.

Opportunities and challenges to voluntary commitment in the forestry sector (charcoal production)

Voluntary commitment	Opportunity	Barriers	Mitigation measures
Capacity building and awareness creation	Improved knowledge on the impact of forestry on biodiversity Improved biodiversity conservation	Inadequate funding for extension services and dissemination	Increased funding for extension services and dissemination on the impact of charcoal production to biodiversity
Use of alternative energy	Reduced pressure on charcoal demand Improved biodiversity conservation in forestry	High comparative cost of alternative energy such as LPG and electricity	Promotion of alternative energy sources such as briquettes and bagasse
Sustainable charcoal production (wood lots, efficient kilns.)	Improved efficiency in charcoal production	Lack of awareness and inadequate technical capacity to do sustainable charcoal production	Awareness creation and promotion of sustainable charcoal production practices (wood lots and efficient kilns)
Sustainable charcoal utilization (efficient stoves)	Improved efficiency in charcoal utilization	Lack of awareness on sustainable charcoal utilization technologies High cost of efficient charcoal utilization technologies	Awareness creation and promotion of sustainable charcoal utilization technologies (efficient stoves)
Adoption of Payment for ecosystem services Models for the forestry sector	Incentive for biodiversity conservation in the forestry sector Reduced charcoal production Improved biodiversity conservation	Lack of a national framework to guide PES in the forestry sector Lack of an incentive for PES in the forestry sector	Support the development of a national framework to guide PES in the forestry sector Support piloting of PES models in the forestry sector
Adoption of nature-based solutions (apiculture, medicinal plants ecotourism,) as alternative income sources	Incentive for conservation	Lack of awareness on the potential of nature-based solutions as an alternative income to charcoal production Inadequate technical capacity to properly manage nature-based solutions	Awareness creation and promotion of NBSs as alternative income sources to charcoal
Forests standards and certification	Reduced negative effects of charcoal production on biodiversity Reduced pollution Improved traceability in the forestry (charcoal) sector	Inadequate frameworks to support certification and standardization in charcoal production Lack of incentives to encourage mainstreaming of biodiversity effects in charcoal production	Design and development of certification schemes for biodiversity in charcoal production Enforcement of certification standards across the charcoal value chain

RECOMMENDATIONS

Capacity building and awareness creation on the relationship between biodiversity conservation and the forestry sector was suggested as a cross cutting recommendation. Charcoal producers should be sensitized on threatened and endangered tree species and discouraged from using them for charcoal production.

Business and private companies

- Increased use of alternative energy sources (Briquetter, Biogas, Solar etc) may help to reduce charcoal demand in the county. This includes enhanced awareness and capacity building of actors on the alternative energy sources as well as improve on the costing to make them a viable alternative to charcoal.

National and county governments

- Develop, package and disseminate payment for ecosystems services including piloting and documentation of best practices in the country to the forestry sector.
- Forest standards and certification in the forestry sector for improved sustainability and traceability of charcoal. Improved awareness of the certification and standards.
- Promote the use of sustainable practices such as bee keeping, gums and resins and other non-timber forest product enterprises in the communities as a part of economic incentives for biodiversity conservation

Charcoal Producers

- Organize the charcoal producers to producer groups for ease of monitoring, coordinating, and formalizing the sector.
- Establishment of wood lots for charcoal production and adoption of improved charcoal production kilns
- Use of invasive species for charcoal production (*Prosopis juliflora*)

About BIODEV2030

BIODEV2030 focuses on mainstreaming biodiversity through sector-based commitments emerging from multi-stakeholder dialogue in pilot countries. Funded by the French Development Agency (AFD) the project is being implemented by IUCN, The WorldWide Fund for Nature – France (WWF-France) and Expertise France. IUCN is implementing the project in Benin, Burkina Faso, Ethiopia, Fiji, Guinea Conakry, Kenya, Mozambique and Senegal.

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