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Inclusive Green Economy Policy Review for Kenya

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PREFACE

In order to achieve Agenda 2030, we need to get the economic incentives right and make sure to leave no one behind. In other words, we need a transformation towards an inclusive green economy. Such transformation requires increased knowledge on, and capacities to apply, policy instruments such as bans, taxes, fees, subsidies, permits and refund-systems that generate incentives for an inclusive green economy. The Inclusive Green Economy (IGE) Program aims to strengthen country and regional capacity of green economy transformation in Ethiopia, Kenya, Rwanda, Tanzania and Uganda. The program is financed by the Swedish International Development Cooperation Agency (Sida) and is implemented by the University of Gothenburg and the Environment for Development Initiative (EfD) in collaboration with academic centres in the five East African countries. This *Inclusive Green Economy Policy Review* is a learning material co-created by the academic partners in the program and the program participants at governmental ministries and agencies.

The review aims to facilitate learning on priorities, challenges, and opportunities related to national green economy visions and strategies, and policy instruments in three important policy areas in the country and the region. The policy areas of fossil fuels, plastic pollution and forest loss are chosen as they are important for an inclusive green economy in all five participating countries.

In short, the Inclusive Green Economy Policy Review:

- Gives an overview of the visions, strategies, and programs connected to IGE transformation and the organizational structure for their implementation.
- Describes the current use of policy instruments to reduce plastic pollution, forest loss, and the use of fossil fuels.
- Identifies the acceptance of policy instruments among the general public and different stakeholders, including public and private sector actors, as well as civil society organizations in the three policy areas.

The review provides a basis for critical analysis and dialogue on the current use of policy instruments and gaps in a transition to greener and more inclusive economies. Besides being a key component in the educational material used in the training program, the review also contributes to national and regional dialogues. The national dialogues facilitate in-country peer learning between the academic partners in the program and the program participants as well as with their colleagues.

The review is also used for cross-country learning where one country's group of program participants conduct an analytical review of a neighboring country's National Policy Review to facilitate cross-country peer learning. These cross-country peer learning reviews workshops aim to strengthen networks on IGE in East Africa.

Hence, this report should be read as a learning material, co-created between the academic partners and civil servants enrolled in the program. This means that this should not be referred to as a complete review of all IGE policies for these policy areas in this region and, has not been through a quality review process. This is a document that gives a first overview with the aim to facilitate interesting discussions and learning between countries struggling with similar challenges in their work towards an inclusive green economy.

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UNIVERSITY OF NAIROBI

**GOTHENBURG CENTRE FOR
SUSTAINABLE DEVELOPMENT (GMV)**



CHALMERS
UNIVERSITY OF TECHNOLOGY



UNIVERSITY OF GOTHENBURG



List of Abbreviations

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BRT	Bus Rapid Transport
CFA	Community Forest Association
CO ₂	Carbon Dioxide
COG	Council of Governors
CPAs	Charcoal Producers Associations
EPR	Extended Producer Responsibility
EPRA	Energy Petroleum and Regulatory Authority
FAO	Food and Agriculture Organization
FiTs	Feed in Tariffs
GESIP	Green Economy Strategy (Green Economy Strategy Implementation Plan
GWh	Gigawatt hours
INLUG	Integrated National Land Use Guidelines
IPP	Independent Power Producers
Kt	Kilo Tonnes
KEBs	Kenya Bureaus of Standards
KEFRI	Kenya Forestry Research Institute
KFS	Kenya Forest Service
KeNHA	Kenya National Highway Authority
KeRRA	Kenya Rural Roads Authority
KCSAS	Kenya Climate Smart Agriculture Strategy
Km	Kilometre
KURA	Kenya Urban Roads Authority
KRA	Kenya Revenue Authority
KWS	Kenya Wildlife Service
LULUCF	Agriculture, Land Use, Land Use Change and Forestry
LPG	Liquified Petroleum Gas
LRRT	Light Rail Rapid Transit
MEPS	Minimum Energy Performance Standards
ME&F	Ministry of Environment and Forestry
MoE	Ministry of Energy
Mmt	Million Metric Tonnes
Mt	Megaton
NAMATA	Nairobi Metropolitan Area Transport Authority
NCA	National Construction Authority
NCCA	National Climate Change Action
NAP	National Adaptation Plan
NCCAP	National Climate Change Action Plan
NCCRS	National Climate Change Response Strategy
NDC	National Determined Contributions
NEMA	National Environment Management Authority

NMT	Non-Motorized Transport
NTSA	National Transport and Safety Authority
PELIS	Plantation Establishment and Livelihood Improvement Scheme
PES	Payment for Ecosystem Services
PFM	Participatory Forest Management
PFMPs	Participatory Forest Management Plans
PPA	Power Purchase Agreement
PRO	Producer Responsibility Organizations
SUP	Single Use Plastic
UNEP	United Nations Environmental Programme
UTNWF	Upper Tana Nairobi Water Fund Project
US\$	United States Dollar
SAS	Stand Alone Solar
SGR	Standard Gauge Railway

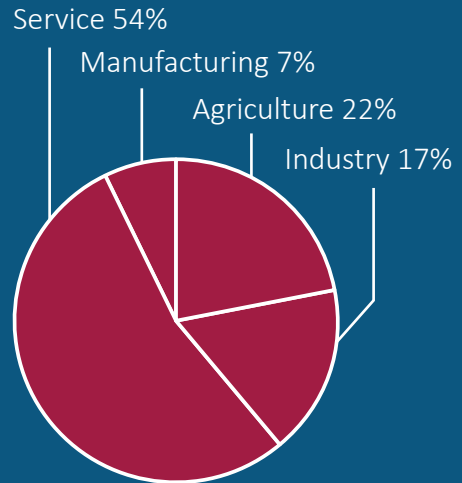
Country Profile: Kenya

Size / Population density



580 367km²
91people/km²

Key sectors in the economy



Population / Growth



53,7M
2.3%

Life expectancy



F 68.5
M 63.8

Poverty rate



15.9%

Populations access to power



71%

GDP per capita



2082 USD

Rainfed / Irrigated agricultural land



R 99.4%
I 0.6%

Land area cover in forest



5%



- SDG achievement
- Challenges remain
- Significant challenges remain
- Major challenges remain
- ↑ On track
- ↗ Moderately increasing
- Stagnating
- ↘ Decreasing
- — Data not available

Chapter 1: OVERVIEW OF IGE VISIONS STRATEGIES AND PROGRAMS

The Kenya's Green Economy Strategy (Green Economy Strategy Implementation Plan-2016-2030) is geared towards enabling Kenya to attain a higher economic growth rate consistent with the vision 2030, which firmly embeds the principles of sustainable development in the overall national growth strategy. The implementation and realization of the vision of the Green Economy Strategy is therefore firmly anchored on Vision 2030 and its medium-term plans. The Green Economy Strategy Implementation Plan (GESIP) vision is to adopt development pathways with higher green growth, cleaner environment, and higher productivity relative to the Business-as-Usual (BAU) growth scenario.

GESIP Macro policy framework identifies enabling conditions necessary for the rapid transition to Green Economy to include; maintaining macroeconomic stability for green growth; human development and capacity building; prioritizing of GE within the devolved government system; governance and sustainable structural transformation; sustainable financing, reduction in cost of doing business, establishing a framework for extractive industries, sustainable trade regimes through exploring market opportunities associated with the transition to a GE and creation of green, decent jobs. Kenya's GESIP focuses on overcoming the main binding socioeconomic constraints. It targets the multiple challenges of infrastructure gaps, food insecurity, environmental degradation, climate change and variability, poverty, inequality, and unemployment. The GESIP strategy is therefore modeled around five thematic areas which are then cascaded to various implementing sectors with specific sector objectives and implementation strategies that also involve private sector, as follows:

1. Sustainable Infrastructure development,
2. Building Resilience,
3. Sustainable natural resource management,
4. Resource efficiency, and
5. Social Inclusion and sustainable livelihood.

According to UNEP's Green Economy Assessment Report (2014): the Kenya T21 model, quantitative analyses indicate that a transition to a green economy has important potential benefits. For instance:

- In the Agriculture sector: The average agricultural yield under the green economy scenario would exceed the same under the Business as Usual (BAU) investment scenario by about 15 percent by 2030.
- In the Energy Sector: Green energy investments would lead to a 2 percent reduction in energy consumption and an expanded supply of electricity from renewable sources relative to BAU. Energy savings are projected to reach 1.8 GWh and the share of geothermal in the total power supply is to reach percent by 2030.
- Green economy-related investments in agriculture and energy sectors would contribute to low energy consumption and carbon emissions. As a result, although Carbon dioxide emissions are projected to increase from 12 million tonnes per year in 2012 to 24.35 million tonnes per year in 2030. Under green economy investments, emissions would be 9 per cent lower than the BAU case (26.7 million tonnes), when the same level of investments are affected.

To reduce potential challenges posed during the implementation of sector-specific strategies and programs, for the case of GESIP, the Green Economy Summit was formed but it is not yet operational.

The summit is a highly technical body that provides policy direction on the implementation of the five thematic areas. The summit also provides a link between the National and County Governments and comprises of; Cabinet Secretaries responsible for devolution and planning, National Treasury, environment, water, energy and petroleum, transport, agriculture, industrialization, Council of Governors (member responsible for the environment), Civil society organizations (members) and Kenya private sector alliance.

Besides GESIP, there are other critical IGE visions, strategies, and programs the country is implementing through the Medium-Term Plans and across different sectors. These include the National Climate Change Response Strategy of 2010; National Adaptation Plan (NAP, 2015-2030); National Climate Change Action Plan II (NCCAP II, 2018-2022); and the Climate Change Act of 2016; Constitution of Kenya, 2010; and Climate Finance Policy and Sector specific Policies and Legislation like the Water Act (2016); Disaster Risk Financial Strategy (2018-2022); Kenya Climate Smart Agriculture Strategy (2017-2026).

Kenya Updated National Determined Contribution (NDC)

Kenya submitted an updated NDC on 28th December 2020. The updated NDC for Kenya commits to reducing emissions by 32 percent by 2030 relative to the BAU scenario of 143 MtCO₂eq; and in line with the Sustainable Development Agenda and National Circumstances. The timeframe for implementation of the NDC is up to 2030 with milestone targets in 2025. An estimate of USD 62 Billion is required as the total cost of implementing mitigation and adaptation actions. Kenya commits to mobilize domestic resources to a tune of 13 percent while the remaining 87 percent will require international support.

The considered priority mitigation activities in Kenya according to the updated NDC include:

- Increasing of renewables in the electricity generation mix of the national grid.
- Enhancement of energy and resource efficiency across the different sectors.
- Make progress towards achieving a tree cover of at least 10% of the land area of Kenya.
- Clean, efficient, and sustainable energy technologies to reduce overreliance on fossil and non-sustainable biomass fuels.
- Low carbon and efficient transportation systems.
- Climate smart agriculture (CSA) in line with the Kenya CSA Strategy and efficient livestock management.
- Sustainable waste management systems

As per the NDC, the prioritized gases include Carbon dioxide (CO₂), Methane (CH₄), and Nitrous Oxide (N₂O). The prioritized gases are targeted from several sectors i.e., Energy, Transportation, Industrial Processes, Agriculture, Land Use, Land Use Change and Forestry (LULUCF) and waste sector.

Need for economic policy instruments

Table 1 in the Appendix presents a review of few selected IGE visions, strategies, and programs. Currently implementation of visions, strategies and program has suffered from weak coordination, however, the government through the Ministry of Environment and Forestry has put in place a coordination framework to improve implementation of GESIP. Besides, coordination, the evaluation

of visions, strategies and programs also hardly ever happens and when it happens, such reports remain unpublished, like the case for GESIP evaluation. However, the National and County governments continue to track progress made in the implementation of the various projects including those under IGE. Such progress is done through the annual progress reports and the quarterly and annual reports. Further, in most cases, organizations undertaking implementation are the same ones that are also undertaking monitoring and evaluations despite preference for independent evaluation. These challenges also affect sector specific strategies and program and the use of policy instruments. Currently the use of policy instruments such as subsidies, taxes, bans, among others is limited. This is due to inadequate knowledge on; what are the implementation challenges, opportunities, as well the application of economic policy instruments.

Chapter 2: POLICY INSTRUMENTS IN SELECTED POLICY AREAS

In this chapter we review policy instruments to address challenges related to three critical policy areas for an inclusive green economy: fossil fuel use, plastic pollution and forest loss. Important lessons can be learned from studying the implementation of different policy instruments to address these challenges in the East African countries. For each policy area, we first identify challenges to an inclusive green economy and then review the key policy instruments used to address these challenges.

2.1 Fossil Fuels

Current use of fossil fuels

The energy sector in Kenya has two key sub-sectors electricity and petroleum. The petroleum sector relies on imports despite Kenya's first commercially viable oil discovery that was made in 2012. The petroleum imports include petroleum fuels (liquefied petroleum gas, motor spirit premium, aviation spirit, jet fuel, illuminating kerosene, light, and heavy diesel oils, and fuel oils); lubricating oils, and greases. Total volume of petroleum products imported into the country dropped by 10.9 percent to 5.7 million tonnes in 2020. The electricity sector relies on domestic generation from renewable energy sources at 88 percent compared to fossil fuel sources (thermal oil generation) at 10 percent. The largest electricity generation is from Geothermal (41%), Hydro (30%), Wind (16%), Solar (1%), Import (2%), and Thermal (10%) according to the Kenya Economic Survey, 2022. Energy is used in all sectors of the economy, though fossil fuel usage finds dominance transport, commercial, industrial, residential, agriculture sectors as well as in energy generation.

Fossil fuels challenges

Despite fossil fuels being associated with high carbon emissions, poor air quality, depletion of foreign currency due to heavy reliance of fossil fuels, Kenya still has plans to explore, develop and produce crude oil and other products. While their efforts to develop the renewable energy sub-sector, the sector still faces some obstacles. This section discusses challenges facing renewable energy technologies, challenges related in energy efficiency and conservation, and finally challenges related to Feed-in-Tariffs (FiTs).

Generally, renewable energy (biofuels, biomass, solar, wind, biogas, etc.) in Kenya suffer from common challenges which include: (i) lack of awareness on the potential, opportunities and economic benefits offered by the different renewable energy technologies; (iii) High upfront capital cost for plant and equipment required for different renewable energy technologies; (iv) Inadequate skilled capacity required for renewable energy development; (v) Inadequate data and documented assessment of resources and potential; and (vi) Weak enforcement of standards and regulations related to: building codes on water heating and lighting, and also on motor vehicle operations and maintenance practices.

Challenges facing specific fuels are discussed as follows. First, biofuels specific challenges include: (i) Insufficient feedstocks to produce biofuels for blending and (ii) competing uses of ethanol; and (iii) Inadequate Research Development and Demonstration on alternative biofuel feed stocks and technologies; and (iv) Insufficient legal and institution framework to support generation, utilization, production, distribution, supply and use of liquid biofuels. Second, biomass specific challenges include:

(i) Unsustainable use of biomass with attendant negative impacts on the environment, (ii) increasing emissions from wood fuel leading to health hazards among users, (iii) inadequate recognition of alternative clean modern energy sources to reduce overreliance on biomass energy source. Third, solar specific challenges include: (i) Proliferation of sub-standard solar energy technologies and equipment. Lastly for wind, the specific challenge is the inadequate wind energy industry standards due to fast changing technologies.

Energy efficiency and conservation challenges are numerous as well, they include: (i) Inadequate awareness and sensitization of the benefits accruing from energy efficiency and conservation; (ii) Lack of tax rebates and fiscal incentives for energy efficiency and conservation equipment and appliances; (iii) Insufficient standards for energy efficiency and conservation equipment and appliances; (iv) Low uptake of energy efficiency and conservation technologies, appliances, and standards. This includes low acquisition and use of fuel-efficient technologies in motor vehicles; low uptake of safe efficient transportation for passengers and cargo; and low use of public transport and non-motorized transport.

Feed-in-Tariffs (FiTs) also faces some hindrances which include: (i) Insufficient data analytical tools to inform the level of tariffs for different technologies, (ii) No clear guidelines on PPA negotiations, (iii) current tariffs are not market reflective and do not cater for hybrid renewable systems.

Goals of the sector

The Ministry of Energy (MoE) is in charge of policies to create an enabling environment for efficient operation and growth of the sector. The Ministry sets the strategic direction for the growth of the sector and provides a long-term vision for all sector players. It thus seeks to focus on the following objectives:

1. National Energy and Policy management.
2. Hydro-power Development.
3. Geothermal Exploration and Development.
4. Rural Electrification Programme.
5. Promotion of Renewable Energy
6. Energy Regulation, Security, and Conservation.

2.1.1 Policy Instruments to reduce the use of fossils

The review of fossil fuel policy instruments based on the challenges highlighted in section 2.1, show that most policy instruments deployed are classified as price-based policies, followed by regulatory policies and information-based policies. Right-based policies are lacking as presented in the table below.

In this chapter we review policy instruments to address challenges related to fossil fuel use/consumption on the demand side and production/generation of renewable energy or alternatives to fossil fuels on the supply side (see section 2.1), For the case of fossil fuels, we first identify challenges to an inclusive green economy and then review the key policy instruments used to address these challenges. The review shows that most policy instruments deployed are classified as price-based policies, followed by regulatory policies and information-based policies. Right based policies are lacking as presented in table 1.

Table 1: Policy Instruments to reduce fossil fuels

Price-based	Regulatory	Information-based
<ul style="list-style-type: none"> • Tax exemption for solar imports. • Feed in Tariff System (FiT) to encourage investment in renewable energy. • LPG subsidy as an avenue to eliminate the use of solid fuels by 2028. • 	<ul style="list-style-type: none"> • Implementation of fuel economy standards and labeling for vehicles. • Transition to zero emissions motor vehicles by 2040. • Implementation of fuel economy standards and labeling for vehicles. 	<ul style="list-style-type: none"> • Increase adoption and uptake of E-Mobility.

Policy instruments focusing on production /generation policies

Specific to energy sector

1. Tax exemption for solar imports. (Source: Finance Act, 2021). This is a price-based policy instrument. Thus, this implies solar imports are not subjected to taxation. The 14 per cent VAT exemption on renewable energy products considers solar and wind generation equipment and clean cooking solutions. The goal of the policy instrument is to accelerate adoption of solar energy as alternative sustainable and affordable energy sources from 2019 onwards. The latest efforts by the government to exempt solar products parts from taxation has two positive impacts. It urges investors to set up shop locally and reduces tariffs for consumers, making solar energy an import energy source to other forms of electricity. According to Africa Clean Energy Technical Assistance Facility (2021), Such tax exceptions are expected to realize about 250,000 more households using their stand-alone solar (SAS) products to support a new business or start a new job. Of the jobs created by the SAS sector, 27% of the positions would be filled by women Responsible stakeholder for implementation is the Kenya Revenue Authority. Responsible stakeholder for monitoring is the Ministry of Energy. Stakeholders affecting the policy instrument: The National Treasury. Stakeholders affected by the policy instrument or alternatively with solar tax-exemption, investors are benefiting for low cost of equipment and that spurs investment, employment and low prices of products among locals.

2. Feed in Tariff System (FiT) to encourage investment in renewable energy. This is a price-based policy instrument. The goal of the policy instrument is to facilitate resource mobilization by providing investment security and market stability for investors in electricity generation from renewable energy sources and reduce transaction and administrative costs and delays associated with the conventional procurement processes since 2012. In 2015, the Public Private Partnership (PPP) Committee acting on section 61 of the PPP Act 2013, approved the FiT Policy as a mechanism for procuring and developing renewable energy projects aligned to the PPP Act. The current Feed-in Tariff (FiT) Policy of 2012 on renewable energy was initially established in 2008. Originally for electricity generated from wind, biomass, and small hydropower sources, following revision in 2010. FiTs now also provide

support to geothermal and biogas sources and solar electricity generation. The standard FiT (US\$/kWh) for small renewable projects (up to 10 MW of installed capacity) connected to the grid is as follows¹: for wind is 0.11, hydro is 0.105 and 0.0825, biogas is 0.10, biomass is 0.10, solar (grid) is 0.12 and solar (of-grid) is 0.20. The standard FiT (US\$/kWh) for renewable projects (above 10 MW of installed capacity) connected to the grid is as follows: for wind is 0.11, hydro is 0.0825, biomass is 0.10, solar (grid) is 0.10 and geothermal is 0.088. Investments done by Independent Power Producers (IPPs) on wind and solar have increased, this is evidenced by the electricity generated from the IPPs. IPPs contribution for year 2021/22 for Solar projects was estimated at 1.6 GWh, and wind at 1647 GWh up from 0.2 GWh and 1124 GWh respectively for year 2018/19 (KPLC, 2022). Responsible stakeholders for implementation include: the Ministry of Energy, EPRA and Kenya Power, while the responsible stakeholders for monitoring include the Ministry of Energy and Energy Petroleum and Regulatory Authority (EPR). Stakeholders affecting the policy instrument: Ministry of Energy, EPRA and Kenya Power. Stakeholders affected by the policy instrument: Investors benefit from competitive tariff, thus low tariffs for consumers, increased investment, and employment among locals.

Specific to transport sector

3. Implementation of fuel economy standards and labelling for vehicles (source: Kenya National Energy Efficiency and Conservation Strategy, 2020). It is a combination of regulatory based and price-based policy instrument. The goal of the policy instrument is to improve fuel economy performance of vehicles in Kenya between 2019 – 2025. The objective is to enhance adoption of the developed fuel economy standards and labelling for vehicles. The labels include average fuel consumption per mile or of light duty vehicles per 100 km travelled where the status at 2019 average fuel economy was estimated at 7.5 L/100km and in 2025 at 6.5 L/100km. Similarly, average reduction for carbon emissions was estimated at 181.9 g/km in 2019 and targeted at 160 g/km in 2025. The policy instrument also entail a policy restricting the age of second-hand vehicles imported into Kenya to a maximum of five years, collecting annual license fees based on the results of annual inspections on fuel economy and carbon dioxide emissions, and implementation of vehicle inspection for emissions. In addition, according to the excise duty Act 2015, there is a graduated system of import duty for vehicles of different cylinder capacity. To date, the Imported vehicles with internal combustion engines of more than 2500cc face up to 35% excise duty. However, the move to review the age of second-hand vehicles imported into Kenya to a maximum of five (5) years from the current eight (8) years was socially rejected and expected gains in terms of improved fuel economy performance and lower emission associated with more newer vehicles are not possible. Responsible stakeholders for

¹ Though currently they are not operational following several government interventions which include: (i) The 2021 feasibility study, that was intended to update the findings of the 2016 feasibility study that was undertaken to: assess the introduction of renewable energy auctions, to explore viability of implementing competitive bidding and propose the necessary instruments and frameworks required. (ii) The three task force, one in March 2021, appointed by His Excellency the President to review the Independent Power Producers (IPP) Power Purchase agreements (PPA) and update the findings of the previous task forces (formed in November 2016) and another one on interagency committee (formed in April 2020) both appointed by the CS Ministry of Energy.

The studies and the reports by the two Task Force and the interagency committee proposed introduction of competitive bidding for medium to large scale renewable energy projects and review of FiT policy for small scale Biomass, Biogas and Small Hydro projects. The review process is in good progress, as the draft policy is awaiting finalization and implementation. This Policy applies to renewable energy power plants not exceeding 20MW in Biomass, Biogas and Small Hydro technologies. On the other hand, all Solar and wind power projects, as well as other RE projects larger than 20MW will be procured under the Renewable Energy Auction Policy.

implementation include the Ministry of Transport, NTSA, Ministry of Energy, Treasury, KRA, County Governments, Kenya Bureau of Standards, EPRA, KURA, KENHA NEMA NAMATA, and others. Responsible stakeholders for monitoring include the Ministry of Transport, NTSA, Ministry of Energy, The National Treasury, KRA, County Governments, Kenya Bureau of Standards, EPRA, NEMA, and others. Stakeholders affecting the policy instrument: Ministry of Transport, NTSA, and Ministry of Energy. Stakeholders affected by the policy instrument are mainly the car importers and users/consumers. The high custom taxes imposed on secondhand vehicles imported by vehicles importers (Car importers Association of Kenya) into Kenya results in high prices for imported vehicles among motorists and also resulted in loss of jobs among the multiple traders.

Policies instrument focusing on use/Consumption policies

Specific to energy sector

1. Use of LPG subsidy as avenue to eliminate the use of solid fuels by 2028 (source: Kenya National Energy Efficiency and Conservation Strategy of 2020). This is a regulation-based policy instrument. The goal of the policy instrument is to achieve universal clean cooking between 2021 – 2028. It is approximated that about 86% (Economic Survey, 2022) of the rural households depend on firewood and charcoal as their primary sources of cooking fuel. Again approximately 70% of households in Kenya and more so in rural areas by 92% still use a type of wood stove as either their primary or secondary cookstove. Reducing reliance on solid fuels is one of the health illnesses associated with household indoor air pollution, which kills 13 people every minute globally according to WHO. At the same time reducing reliance on wood fuel may contribute to environmental conservation and climate change, given that about 34% of wood fuel is unsustainable. Thus, The Ministry of Energy has put in place mechanisms to transition public institutions from use of biomass cooking fuels to higher level cooking solutions by 2025. These public institutions include boarding schools, hospitals, Technical and Vocational Education and Training (TVET) institutes, prisons among others. The government commits to accelerate the adoption of and use of clean cooking technologies and fuels by rural households from the current 30 percent to 100 percent by 2028. The elimination of charcoal use in urban areas will be gradual and complemented with up-scaling of emerging clean cooking fuels and technologies such as the use of bioethanol and electricity for cooking. For instance, according to the bioenergy strategy of 2020 aims to have; (i) a full transition to clean cooking with bioethanol and biogas by at least 50% of all households; (ii) complete switch to improved charcoal kilns; and (iii) at least 50% households are lit with power from bioenergy systems by 2027. Previously LPG was exempted from VAT, it attracted 16% of VAT since June 2021 and since July 2022, the VAT was halved to 8%. This has reduced the price of LPG fuel and enhanced access to universal clean cooking alongside other welfare benefits including women and children productivity and health outcomes. The responsible stakeholders for implementation include Ministry of Energy and the Ministry of Forests and Natural Resources. Responsible stakeholders for monitoring include the Ministry of Energy. Stakeholders affecting the policy instrument are the Ministry of Energy and Ministry of Forests and Natural Resources. Stakeholders affected by the policy instruments or the most vulnerable population groups are the women and children below 5 years who spend time with mothers as they carry out their cooking responsibilities.

2. Transition to zero emissions motor vehicles by 2040 (source: Kenya National Energy Efficiency and Conservation Strategy, 2020). This is a regulatory based policy instrument. The goal of the policy instrument is to reduce reliance on fossil fuels between 2022 -2040. The transport sector makes up

the biggest consumer of petroleum products, accounting for about 67 percent of carbon dioxide (CO₂) emissions and 11.3 percent of the total greenhouse gas (GHG) discharges in 2015. Implementing a low carbon initiative for the transport sector is key for the government. The government plans to transition to zero-emission motor vehicles by 2040 by creating the Bus Rapid Transit (BRT), Light Rail Rapid Transit (LRRT) systems, rooting for Non-Motorized Transport (NMT), and the extension of the Standard Gauge Railway (SGR). Currently fully electric-powered motor vehicles are charged only 10 percent excise duty charge. Currently the 8 year old imported vehicles face the following taxes: import duty (25%), value added taxes (16%), import declaration fees (3.5%), railway development levy (2%) and excise duty vary between 10 to 35 percent. The policy instrument is working. For instance, the BRT system is planned to be launched in June 2022 along the 28km of the Thika Superhighway where only electric and hybrid buses and those that utilize biofuel blends will be given access. Kenya is also among the pioneers in Africa to venture into both research and commercial biodiesel refineries. Responsible stakeholders for implementation include the Ministry of Transport and Kenya Revenue Authority. The responsible stakeholder for monitoring is the Ministry of Transport. Stakeholders affecting the policy instrument: Ministry of transport, and NTSA. Stakeholders affected by the policy instrument or alternatively potential beneficiaries are the early investors in electric vehicles and advanced biodiesel, which does not create competition between fuel and food production. Matatus Operators who are the majority of commuter transporter currently using diesel vehicles will be affected by the policy change.

Specific to the urban development sector

3. Adoption of Minimum Energy Performance Standards and the integration of energy efficiency requirements into the Building Codes. (Source: Energy Act 2019/ Kenya National Energy Efficiency and Conservation Strategy, 2020). This is a regulatory-based policy instrument. The goal of the policy instrument is to promote the efficient use of energy and for reduction of waste of energy in buildings from 2019 onwards. In order to promote the adoption of minimum energy performance standards, Kenya has developed minimum energy performance standards (MEPS) for new buildings. These requirements are also included in the amendments to the Building Codes, which should be updated regularly (e.g., every five years). Building energy performance certification to indicate whether they meet the MEPS is a key requirement in county governments. The national and county governments will develop implementation strategies at the county level and offer training to building professionals to build local capacity for compliance. Adopt the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) building energy conservation standards or equivalent for public and commercial buildings. As of 2019, there was no minimum energy performance standard developed and gazetted but there is a target for one by 2025. Further, another target is to establish one (1) baseline energy use index for buildings in Kenya by 2025. The policy instrument is working. Responsible stakeholders for implementation include Ministry of Energy, State Department for Public Works, CG (County Governments), EPRA, KEBS, NEMA, NCA, Ministry of Health, Council of Governors (CoG). Responsible stakeholders for monitoring include the Ministry of Energy. Stakeholders affecting the policy instrument: Ministry of Energy, State Department for Public Works, CG (County Governments), EPRA, KEBS, NEMA, NCA, Ministry of Health, Council of Governors (CoG). Stakeholders affected by the policy instrument are mainly investors and more so consumers. Investors may be affected by high costs related to compliance and this might be passed down to consumers in terms of high rental prices.

Specific to transport sector

4. Increase adoption and uptake of E- Mobility (source: Kenya National Energy Efficiency and Conservation Strategy, 2020). This is a **combination of** regulatory, price and information-based policy instruments. The goal of the policy instrument is to increase the adoption of E-Mobility from 2019 onwards. The instrument combines regulatory actions and financial mechanism to increase the ownership of electric vehicles with a revision of the Building Code incorporating charging stations in public buildings and new estates (Regulatory based). It also includes financial incentives through lower import duty for electric cars, bicycles, and tuk-tuks and lower vehicle road taxes (price-based) and Awareness-raising on electric engine vehicles and e-mobility (information-based). The policy instrument is working. Though the intended impact is yet to be established, given that the prices of electric vehicles are still high in the market despite the lower import taxes they attract. Responsible stakeholders for implementation include: NTSA, National Treasury, KRA, MoE, MoT, Treasury, County governments, EPRA, private sector investors. Responsible stakeholders for monitoring include: NTSA, Treasury, KRA. Stakeholders affecting the policy instrument: Ministry of Transport, NTSA, National Treasury. Stakeholders affected by the policy instrument are vehicle importers and consumers. Low import levies for electric vehicles are an incentive that encourages vehicle importers to invest more into the sector, this may lead to increased local jobs and lower prices of electric vehicles.

2.2 Plastic Pollution

Current use of plastic

Global plastics production increased from 2 million metric tonnes (Mmt) in 1950 to 381Mmt in 2015 (Geyer et al., 2017). Cumulatively, the world produced 7.8 billion mt of plastics by 2015. In the case of African continent, the daily plastics consumption generally ranges between 0 to 0.2 kg per person. The sectors that produce the most plastic waste are packaging, textiles, and automotive tires (Paruta et al. 2020). Kenya generates an estimated 22,000 tons of waste per day (Paruta et al. 2020). In 2018, the per capita waste generation rate was 11 kilograms per year, compared to the world average per capita waste generation rate of 29 kilograms per year. Urban area accounts for approximately 40 percent of the waste generated. Past inventories indicate a national average estimate of 60 -70 percent of waste is organic waste, 20 percent plastic, 10 percent paper, 2 percent metal, and 1 percent medical waste. The unique feature of plastics which include a combination of lightweight, inert properties and high durability gives them an essential role in most economic sectors such as building and construction, automotive, food and beverages, agriculture, health, and pharmaceuticals. In Kenya, the highest proportion (36 %) of all plastics was manufactured to produce packaging, while building and construction were ranked second with 16 percent, these were followed by Textile (11.5%), consumer and industrial products (10.3%), transportation (6.6%), electrical/ electronic (4.4%), and other sectors (15.2%) (Geyer et al.,2017). Kenya's plastic waste management operates primarily on an Informal Recycling Sector (IRS) (Gall et al. 2020). This process entails the collection of recyclable materials from open dumpsites that are then passed to informal middlemen for sorting and aggregating plastic waste (Gall et al. 2020). Although the IRS is an integral part of Kenya's waste management system, it is inadequate because there is a lack of formal integration between plastic production and solid waste management systems (Gall et al. 2020).

Plastic pollution Challenges

The global production and consumption of plastic has increased over the years and most of this contributes directly to the total annual solid waste produced. The average recycling rate for plastic globally is 15 percent, while another 40 percent is mismanaged. Ultimately, this is leaked into the environment through stormwater washouts and littering. It is further estimated that 50Mmt of plastic waste is burned openly per year, while another 10Mmt enters the aquatic environment of the ocean per year. The production, use, and disposal of plastics also create significant greenhouse gas emissions throughout the different stages of the plastic value chain. According to research by the Center for International Environmental Law, greenhouse gas emissions from plastic could represent 10-13 percent of the entire remaining carbon budget by 2050 (in the context of the 1.5-degree goal of the United Nations Framework Convention on Climate Change Paris Agreement). All these show how much of a challenge plastic waste management is to policymakers

Solid waste management practices in developing countries are highly heterogeneous, with greatly varying levels of treatment, low recycling rates, and a high share of illegal disposals (Alpizar et al.,2020). The management of solid waste is often weak due to lack of appropriate planning, inadequate governance, lack of awareness and knowledge, poor technology, weak enforcement of existing legislation, and the absence of economic and fiscal incentives to promote environmentally sound development (UNEP, 2005). This legislative gap is further exacerbated by inadequate and weak enforcement systems in the country. Further, lack of a coordinated regional approach to plastic waste management within the East African Community Countries is also a serious challenge given the transboundary nature of the plastic value chain. It will not be possible for Kenya to eliminate plastic waste until a regional solution is found.

In addition, other challenges facing waste management systems are the lack of plastic alternatives that are affordable, a lack of avenues supporting the production of plastics through polluter pay mechanism where producers pay higher/premium fees/licenses to engage in plastic production, a lack of policies and strategies that support use of local materials /raw materials as alternatives for plastics, and the fact that the plastic ban did not address completely the issues with plastics (i.e., it took care of 25 percent and the other 75 percent of the issues in plastic still remains).

In Kenya, the plastic material flow indicates that more than 98 percent of the plastic consumed is imported either in the form of a product or in the form of primary virgin plastic. Only 27 percent of the plastic waste generated in Kenya is collected of which 8 percent is recycled, and the remaining 19 percent is disposed of in unsanitary landfills or dumpsites, 73 percent of all plastic waste is uncollected. The packaging sector contributes to more than 50 percent of the total plastic leakage with 20.3 kt of packaging waste leaking into oceans and waterways. The textile sector is the 2nd highest contributor to plastic leakage in absolute value (4.4 kt). Medical, fishing, agriculture, and tourism sectors have a low contribution in absolute leakage but have high leakage rates (respectively 19%, 12%, 10%, and 10%).

Goal and objectives of the Sector

The goal of the waste management sector is to protect public health and the environment, as well as to create wealth and prosperity in the country by providing an enabling environment for integrated

waste management and minimization of waste generation, to contribute to a circular economy. Specifically, this calls for the promotion of sustainable waste management through the implementation of the waste hierarchy and circular economy concepts; enhancing mapping, planning, segregation, collection, transportation, and audit of waste; strengthening the institutional framework that enables and enforces integrated planning, budgeting, decision-making, and implementation, at both the national and county level; setting up transparently managed financial mechanisms at national and county level to invest in waste management infrastructure and finally engaging, strengthening, and building partnerships with all stakeholders, including the private and informal sector, as well as the general public, including education for responsible waste management behavior.

2.2.1 Policy Instruments to reduce plastic waste pollution

The Constitution of Kenya provides the overarching legal and regulatory framework for environmental conservation, including plastic waste management to curb plastic pollution to the environment. As for environmental policies in general, waste management includes a mix of complementary measures such as regulatory, economic/price-based, educational, and informative instruments (OECD, 2007, van Beukering et al., 2009). The instruments are designed to persuade households and waste producers to strive towards diverting waste from landfills, recycle more waste and optimize the use of resources in order to prevent the generation of waste, and, at the same time, contribute to financing waste management activities as presented in table 2.

Table 2: Policy Instruments to reduce plastic pollution

Price-based	Regulatory
Plastic Bag fees	Secondary Plastic Bag ban
Tax incentives in respect of recycling plants	Plastic Bag permit
Landfills fee/levy	Ban of single use plastic in protected areas
Plastic Littering fine	Extended Producer Responsibility

Policies and legislations to address plastic pollution

Kenya has addressed plastic pollution using three major regulatory tools. Following Alpizar et al., (2020), we analyze the current policy instruments for reducing plastic pollution along the pathways of production, consumption, and disposal.

Production Pathway Policies

1. **Secondary plastic Bag Ban** (source: Environmental and Co-ordination Act (Cap 387). Gazette Notice No. 2356 on Plastic Ban for Secondary Packaging (2017). The goal of the policy is to eradicate plastic bag importation, local production, and use. The Ban prohibits the manufacture, importation, distribution, and use of single-use plastic (SUP) bags for retail or household packaging. The ban includes a fine of between Kshs. 2-4 million or 1-4 years imprisonment for the offenders. The proponents of environmental conservation have hailed the ban as a hallmark decision, however, the traders and end users felt enraged claiming that it reduces efficiency of shopping for their products by customers. Studies have shown that there has been a general improvement in the cleanliness of the environment, even though plastic bags were still being used illegally due to the existing porous black market of the product (Wahinya & Mironga, 2020). Challenges that face the implementation of the ban have been a lack of suitable alternatives, weak enforcement, lack of proper sensitization of the public, porous cross-country borders, and inadequate stakeholders' engagement, especially the traders.
2. **Plastic Bag fee/permit** (Source: Plastic Bag Control and Management Regulation (2018))- the goal of this price-based policy is to ensure a clean and healthy environment through the prevention of pollution caused by plastic bags and the promotion of alternative biodegradable packaging materials. The policy prohibits any manufacture, import, export, use, or offer for sale of plastic bags unless someone has a permit or has paid a fee. All plastic bags that are approved for production must include at least 30% total recycled content, and manufacturers must print a legible label on the bag.

The application of a plastic permit has raised considerable divergent views. It is observed that the ban on plastic bags was not a total ban because while it has been outlawed to use plastic bags as specified in the gazette notice, the regulator has opened a window for the use through exemptions (Njuguna, 2018). By making an application to NEMA, one is allowed the use of the

same bags for industrial purposes and for garbage collection. Factories are allowed to wrap bread and sweets among others with plastic bags that small vendors cannot use while serving their customers. In the face of it, therefore, the policy is seen as discriminatory as the effects on the environment do not discriminate against the source of pollution.

Consumption-Based Policies

1. **Ban on Single Use Plastics in protected areas** (Source: The Wildlife Conservation and Management Act. Gazette Notice No. 4858). This is an expansion of the 2017 Plastic Bag Ban on Secondary Packaging. The policy bans the use and littering of single use plastics in all protected areas including national parks, beaches, forests, world heritage sites, biosphere reserves, Ramsar sites, and conservation areas. This ban came into effect on 5th June 2020 in National Parks, beaches, forests, and conservation areas.

Disposal-Based Policies

1. **Landfills fee/levy** (source: National Sustainable Waste Management Bill (2019)). An Act of Parliament to establish an appropriate legal and institutional framework for the efficient and sustainable management of waste in the framework of the green economy, the realization of the zero-waste goal, the Constitutional provision of the right to a clean and healthy environment for all, and for connected purposes. The goal of the instrument is to incentivize waste collectors to take waste to mixed recovery facilities rather than depositing it into landfills.
2. **Environmental levy** (Source: Nairobi City Council Solid Waste Management Act (2015)). The goal of the instrument is to control plastic material littering. Any offenses to the act lead to a fine of 300,000 Kshs (approximately US\$2,783).
3. **Plastic littering fine** (source: Baringo County Polythene Material Control and Management Act 2014). The objective of the instrument is to control plastic material littering. The Act imposes a fine of Kshs.20,000 (1st offender) or kshs.500,000 2nd offender or 2 years imprisonment
4. **Extended Producer Responsibility Regulations - EPR** (source: The Environmental Management and Co-Ordination (Extended Producer Responsibility) Regulations, 2021). The regulations require that all producers (any manufacturers, importers, distributors, converters, or sellers) pay EPR fees to Producer Responsibility Organization (PRO) that will assume responsibility for the post-consumer and end-of-life management in lieu of the producers' products including financial, organizational and physical responsibility for the management, treatment, and disposal of their post-consumer products and end of life treatment for the waste generated by their products. The model is PRO-finance helping to put in place post-consumer product collection, logistics, recycling, recovery, and safe disposal.
5. **Tax incentives in respect of recycling plants** (Source: - Via an amendment to the Value Added Tax Act 2013 ("VAT Act")). It was introduced by section 21 of the Finance Act, No. 23 of 2019, the First Schedule to the Value Added Tax Act, 2013 was amended to exempt from VAT any "Plant, machinery and equipment used in the construction of a plastics recycling plant". Further, the same Finance Act of 2019 amended the Third Schedule to the Income Tax Act so

as to reduce the income tax of a “company operating a plastics recycling plant” from the ordinary corporate tax rate of 30 to 15 percent for the first five years of its operations. These tax incentives became effective on 7th November 2019.

2.1 Forest Loss

Current use forest and challenges

Forest resources are critical in provision of forest ecosystem services and for economic development and livelihoods (Ferraro et al. 2011). In Kenya, forest loss has been found to be dynamic within various localities, especially in the five major water towers²: Mau Forest complex, Aberdare ranges, Mt. Elgon, Mt Kenya and Cherenganyi Hills (Kuto 2020). As of independence forest cover accounted for about 10 percent of the country’s land size. However, by 2009 the forest cover had reduced to 6 percent as a result of the removal of various forests to alternative land use mainly agricultural, unregulated logging, and urbanization as well as charcoal and timber production. In 2021 the country’s forest cover had increased somewhat to 7.3 percent (Economic Survey 2021). However, the rate of forest loss is still alarming and thus may negate the gains made and hinder the provision of ecosystem goods and services as well as a realization of the national targets such as the reduction of GHG emissions by 30 percent by 2030.

Improving forest governance has therefore been an implicit objective in forest sector reforms over the last two decades, including a strategy to help increase the forest cover while at the same time reducing the loss of existing forests. The Kenyan government has made a constitutional commitment to replenish the country’s forest cover back to 10 percent by 2030. The government also committed to restoring 5.1 million hectares of degraded and deforested landscapes by 2030. This is also part of Kenya’s contribution to the African forest and Landscape Restoration Initiative (AFR100), a pan-African, country-led effort to restore 100 million hectares of deforested and degraded land. The National Forest Programme 2016-2030 also seeks to sustainably manage forests and allied natural resources for socio-economic growth and climate resilience. To avert forest loss, the government has continued to implement various policy measures such as eviction of forest encroaches, fencing off some reserve forest, imposition of moratorium on harvesting charcoal, and timber products among others.

2.3.1 Policy Instruments

In this section we present a review of the existing policy instruments to reduce forest loss. The emphasis is on price-based instruments.

Conservation policy instruments

The review focuses specifically on economic policy instruments aimed at reduction in forest loss in Kenya. Table 3 presents a summary of the economic policy instruments reviewed in the study.

² The water towers enable adequate runoff flow to a lower point, have adequate springs, streams and river networks to feed bigger basins, geology, suitable soils and adequate vegetation cover that allows sufficient storage of both underground and surface water and hosts a myriad of biodiversity.

Table 3: Policy Instruments to reduce forest loss

Price-based	Regulatory	Information-based
<ul style="list-style-type: none"> • Plantation establishment and Livelihood improvement scheme. • Payment for ecosystem services. • Forest user fees and charges 	<ul style="list-style-type: none"> • Participatory Forest Management • Plantation establishment and Livelihood improvement scheme 	<ul style="list-style-type: none"> • Charcoal transportation and marketing licences. • Licensing and trade in forest products. • Payment for ecosystem services guidelines. • Charcoal Movement Permit/export and import permit. • Guidelines for sustainable utilization of rural energy sources. • Guidelines on protection of hilltops, hillside, mountains and forests. • Land use zoning. • Ban on logging and timber harvesting. • Forest charcoal rules.

1. Participatory Forest management (PFM):

Participatory Forest management (PFM): PFM is a rights-based policy instruments and is also a price-based instrument in away. It seeks to give forest adjacent communities some access rights as they monitor and conserve forest resources while they enjoy certain services. The Forests Act (2005) introduced participatory forest management (PFM), through the engagement of local communities, and the promotion of the private sector investment in gazetted forest reserves. This was accompanied by concomitant institutional and organization change, notably the establishment of the Kenya Forest Service (KFS), formerly the forest department (FD) and the formation of Community Forest Associations (CFA) (Forest Act 2005; Forest Policy 2014, Forest Act 2016³). PFM⁴ is a model where management authority of a forest land invites local forest adjacent communities to participate in

³ <https://fsk.or.ke/download/forest-conservation-and-management-act-2016/>

⁴ <http://www.kenyaforestservice.org/documents/pfm/PFM%20Guilines%20Final%202016.pdf>

certain forest management activities with various responsibilities outlined in Participatory Forest Management Plans (PFMPs) an arrangement where communities benefit and manage and conserve forests as well. Under PFM forest adjacent communities pay some fees to join CFAs which are registered and are in charge of monitoring and managing adjacent forests. A certain amount is remitted to the KFS, and a given percentage remains with the CFA and the associated forest user group. The amount is used to manage the adjacent forest resources. The main goal of PFM was to conserve biodiversity while advancing local forest adjacent communities' livelihood to ensure sustainable management and conservation of forests. The implementation of PFMPs through management agreement between KFS and community forest associations has however been slow with mixed results hence delay in realization of full potential (ME&F, 2018). PFM is implemented and monitored by KFS and forest adjacent communities through CFAs. Its enforcement is affected by KFS and CFAs while its implementation also affects both CFAs and KFS.

2. Plantation establishment and livelihood improvement Scheme (PELIS):

Plantation establishment and livelihood improvement Scheme (PELIS): This is a rights/price-based policy instrument. This is a system whereby Kenya Forestry Service allows forest adjacent communities through community forest associations the right to cultivate agricultural crops during the early stages of forest plantation establishment in degraded areas for three years until tree canopy forms (Forest Act 2005; National Forest Policy 2014). Forest adjacent communities therefore pay user fees through the CFAs to be allocated half an acre plot in which they plant crops and tend to the trees until tree canopy forms. A certain proportion of the amount is remitted to KFS, and another remains with the CFAs and at times used to pay members who guard the forest from any destruction. The main goal of PELIS was to promote livelihood of locals economically while ensuring sustainable management of forests through provision of raw materials for expanding the timber industry and reduce pressure on natural forests. PELIS was first introduced in Kenya in 1910 by the colonial government as non-residential cultivation to promote livelihood of locals economically while ensuring sustainable management of forests through provision of raw materials for expanding the timber industry and reduce pressure on natural forests (Kagombe et al 2005). However, it was later banned after several attempts in 1986, 1994 and 2003 due to failure and mismanagement. Despite evidence of the scheme improving livelihood of forest adjacent communities as well as forest cover (Okumu et al 2020 and Agevi 2016).

The Taskforce Report on Forest Resources Management and Logging Activities in Kenya in 2018 recommended progressive phasing out of PELIS (MOEF 2018). They recommended PELIS to be replaced with concessioning of forest plantations with provision of a role for CFAs. According to the task force, The PELIS scheme, instead, led to considerable abuse and loss of forestland and that many other illegal practices were camouflaged under its umbrella, including agricultural encroachment into the indigenous forest via plantations. They also found that PELIS mostly leads to the establishment of low standard forest plantations compared to best practices and to illegal conversion of indigenous forests into plantations. The implementation of PELIS is done by KFS and local communities through CFAs and timber industries are the ones most affected by the policy instrument. However, monitoring the implementation of PELIS was the sole task of KFS through CFA officials.

Payment for Ecosystem services (PES)

Payment for Ecosystem services (PES)⁵ is a price-based instrument and is a global tool for sustainable watershed management mainly due to its capacity to engage multiple stakeholders in both public and private sectors. It incorporates voluntary economic incentives and market-based instruments which are superior to the conventional command and control approaches of watershed and natural resource management. The use of PES in watershed management in Kenya is still low and disjointed in implementation. Kenya Forestry Research Institute (KEFRI) developed guidelines in 2017 to provide a framework for linking the science of ecosystem management to the practice of PES implementation with the aim of mainstreaming PES scheme in the management and restoration of degraded watersheds and water towers in Kenya (Langat et al. 2017). In Kenya, a number of PES schemes have been piloted namely: Wildlife Work Kasigau Corridor Redd+ Project in Taita Taveta County, Lake Naivasha Upper Catchment PES in Nakuru County, Upper Tana-Nairobi Water Fund Project (UTNWF), and Mikoko Pamoja Project at Ganzi Bay in Kilifi County (Langat et al. 2017). However, the uptake of PES is still low. The implementation of PES is to be done by downstream and upstream communities while monitoring is to be done by communities and different government agencies depending on the type of ecosystem services. Its implementation affects downstream farmers and is affected by mainly upstream farmers.

Harvesting other forests Products

1. Charcoal transportation and marketing license

This is a regulatory instrument and was first gazetted in 2009 and revised in 2012 under the Forest (Charcoal) Rules of 2012⁶. It actualized the provisions of the Energy Act 2006, specifically regulating the sustainable production, transportation and marketing of charcoal. Charcoal producers and transporters must be licensed by the Kenya Forest Service (KFS); commercial charcoal producers must organize themselves into Charcoal Producers Associations (CPAs); and charcoal wholesalers or retailers should not trade with unlicensed producers. It is not fully working since there is still uncontrolled production of charcoal leading to increased degradation of forest. Moreover, the recent increase of tax for LPG has also led to increased demand for charcoal making it an expensive commodity although it is banned. Its implementation is monitored by KFS while charcoal producers and KFS are responsible for implementation. Charcoal producers, wholesalers and retailers are affected and also responsible for effecting the instrument.

2. Forest User fees

Forest User fees⁷: This is a price-based policy that has been in effect since the enactment of the forest Act (2005) it was aimed at promoting livelihood of local communities through participation in various forest user groups such as; bee keeping, tree nursery, grazing, harvesting medicines and herbs, thinning (silviculture) mainly for fuel wood, cutting grass for thatching, recreation activities, scientific studies, fish farming, eco-tourism and educational activities (National Forest Policy 2014; Okumu et al. 2020) as they monitor and protect forest from any destruction. Forest adjacent communities are

⁵ <https://www.kefri.org/WaterTowers/PDF/PES%20Guideline.pdf>

⁶ <http://extwprlegs1.fao.org/docs/pdf/ken101362.pdf>

⁷ <http://www.kenyaforestservice.org/documents/Legal%20Notice%20No%20%202021%20-%20Forest%20Fees%20and%20Charges.pdf>

therefore obliged to monitor and take care of forest resources and avert any loss of forest through illegal activities. This instrument was also meant to avert forest loss through imposing restriction on harvesting of forest products through various charges. For forest adjacent communities to enjoy this incentive, they self-organize within CFAs inform of Forest User Groups (some small CBOs) for a specific one where each member of forest user group pays a certain amount per month a percentage of which is sent to CFAs and another to KFS. However, in certain forests, forest adjacent communities are the same people who have destroyed forests. The instrument is implemented by KFS, Forest User Groups, CFAs and is monitored by CFAs and KFS as well. KFS and CFAs are also responsible for effecting the instrument. Those affected are mainly forest adjacent communities and timber industries who harvest timber.

3. Charcoal movement Permit/export and Import permit⁸: This is a regulatory instrument that was meant to restrict movement of charcoal or charcoal products from one place to another unless: in possession of a valid charcoal movement permit issued under the regulations and is operating in conformity with the terms and conditions of such permit; and has certificate of origin for the charcoal and has original receipt from the vendor⁹. It was aimed at reducing forest loss through burning and movement of charcoal. It has been in effect since 2009 when the charcoal rules came into effect. The Kenya Forest Service is mandated to issuance of licenses for the production and transportation of charcoal (Forest (Charcoal) rules 2009). The instrument is not fully effective since some charcoal still find their way into the cities. This is because of lack of enforcement of the rules and corruption issues. The instrument is implemented by KFS, Kenya Police and KWS. The most affected by the policy are mainly forest adjacent communities who rely on the business as well as the Kenyan public who depend on charcoal for cooking.

4. Licensing and Trade in forest products¹⁰: This is a regulatory instrument that was aimed at averting forest loss by regulating actions of industrial processors and traders in forest products. Private sector may be invited to participate in sustainable forest management under their jurisdiction. This includes authorization for forestry in the form of issuance of permits, timber license, special use license, contract, concession agreement, joint management agreement. Any body found contravening the act therefore commits an offence and is liable on conviction to a fine or to imprisonment (Forest fees and charges regulations (2016); Forest Act 2016). However, the instrument has not been effective due to lack of felling plans for industrial processors some industries have also in the past collaborated with KFS officials to harvest even indigenous trees which are not to be harvested. It is implemented and monitored by KFS and Kenya Police and it mainly affects timber industries and traders of timber products. The instrument is also affected by KFS and Kenya Police.

⁸ <http://www.kenyaforestservice.org/documents/Legal%20Notice%20No%20%2021%20-%20Forest%20Fees%20and%20Charges.pdf>

⁹ <http://extwprlegs1.fao.org/docs/pdf/ken101362.pdf>

¹⁰ <http://www.kenyaforestservice.org/documents/Legal%20Notice%20No%20%2021%20-%20Forest%20Fees%20and%20Charges.pdf>

Other policy instruments to reduce forest loss

Guidelines to promote sustainable utilization of rural energy sources¹¹

This is a regulatory instrument. The guidelines: provide economic incentives and technological mechanisms for the use of Liquid Petroleum Gas (LPG), biogas, wind and solar energy; promote village hydropower (micro hydro) production.; promote use of energy saving technologies/devices such as energy saving stoves and fireless cookers; promote the use of charcoal kiln as an efficient and comparatively clean mechanism for conservation of wood into charcoal; promote establishment of woodlots using early maturing tree species. The guidelines therefore seek to reduce deforestation by reducing over reliance on wood fuel and charcoal by rural households. Although it has been in effect since 2011, its effect at the local level is still minimal especially following increase in price of LPG that resorted in increased demand for wood fuel and charcoal.

Guidelines on protection of hilltops, hillside, mountains, and forests¹²: These are regulatory instruments aimed at protection of Kenya's land resources centers on hilltops, hillside, mountains and forests. Most of these resources have been threatened by intense human activity and have been protected under the various land ownership regimes in Kenya. This is coupled with challenges such as inadequate management capacity, different ownership regimes, inadequate public awareness, lack of prioritization, inadequate political will and natural disasters.

To address these challenges, the following guidelines are to be followed: Any form of cultivation on areas of slope of between 12-55 percent must incorporate appropriate soil and water conservation measure as the Agriculture Act (2012), Cap 318 of the laws of Kenya; there must be no cultivation at all on slopes beyond 5% instead there should be afforestation and the protection of existing vegetation; prohibit any form of cultivation on hilltops and hillsides beyond 55%, mountains and forest areas; undertake valuation of non-wood forest produce e.g. herbal products; promote agroforestry and encourage woodlots establishment on farm lands; rehabilitate degraded areas through re-afforestation and enclosure for natural regeneration; develop and improve fire breaks and access roads; encourage indigenous forestry on hilltops, hillsides and mountains; encourage ecotourism in hilltops, hillsides, mountain and forests; discourage human settlements on hilltops, hillside, mountains and forests; Regulating exploitation of forest products and Services e.g. charcoal, logging, and non-wood products; Zone and protect water catchments areas in Hilltops, Hill sides, mountains and Forests; Embrace integrated ecosystem management planning; Develop access and benefit sharing mechanisms; Protect hills, mountains and forests through identification, mapping, inventory, easement and gazettement; and Encourage interagency coordination and public-private and community partnerships in planning and management efforts of these resources; Ensure at least 10% of land holdings are under trees as per the gazetted "Farm Forestry Rules" of 2009; Promote Participatory forest management; and Repossess hillsides from private owners as per the Local Authority Act. The guidelines have not been effective since there is still wanton encroachment on the hill tops.

¹¹ <https://www.nema.go.ke/images/Docs/Guidelines/national%20landuse%20guidelines-nema.pdf>

¹² <https://www.nema.go.ke/images/Docs/Guidelines/national%20landuse%20guidelines-nema.pdf>

Land use zoning¹³: This is a regulatory instrument that seeks to define territories into zones with different rules and regulations for land use, management practices and land cover change. It involves a systematic assessment of land and water potential, alternatives for land use and economic and social conditions in order to select and adapt the best land use options (FAO 1993). This is critical in supporting the implementation of land use policies such as definition of protected areas or the limitation of land uses¹⁴. In Kenya this has been enforced in gazette forests especially the five water towers where squatters have been evicted to reclaim the forests and the process is still on going. Further, chapter 5 of the Kenya Constitution deals with land, environment and natural resources with Land categorized into public community and private land Article 69 (1) which emphasizes the development and management of the forestry sector through: achieving and maintaining 10% tree cover, protecting, and enhancing intellectual property and indigenous knowledge; using the environment and natural resources for the benefit of the people of Kenya among others. The Integrated National Land Use Guidelines (INLUG) also outlines land issues which should be considered throughout the country in all land use planning. This includes requirement on the quality of the living environment, economic and ecological development of community structures, the preservation of natural values and the built heritage, utilization of natural resources and communication network. The guidelines particularly aim at implementing, in Kenya, international conventions protecting cultural environments and the biological diversity and combating the climate change and desertification. The policy is partially working but has not been fully implemented due to political interference and occupation of forest lands by some people who also have genuine title deeds. The evictions are also costly since some people have to be compensated. The policy is implemented by the National Land commission, Ministry of lands and physical planning and the Kenya forest Service. The policy has affected mainly forest adjacent communities that have sometimes been evicted out of forest reserves.

Ban on logging and timber harvesting¹⁵: This is a regulatory instrument aimed at averting forest loss through restriction of logging and timber harvesting by industrial processors and other timber millers. The government-imposed a moratorium on logging and timber harvesting and was to end in 2021 after its renewal in 2018 (ME&F 2018). The moratorium was to allow reassessment and rationalization of the forest sector in the country. The moratorium was initially for 90 days and was later extended for six months to November 2018 and further to 2021 although to date there has been no mention of its suspension. It is hard to tell whether the ban has been effective. The ban is implemented by the Kenya Police, KWS and county government enforcement officers. The ban affected timber industries and Kenyan public who had to cope with increased prices of timber products. Although the ban is still in place, there are still cases of illegal logging reported in the country.

Ban on charcoal trade¹⁶: This is a regulatory instrument aimed at addressing environmental concerns mainly reduce forest loss through burning of charcoal. The government-imposed bans charcoal trade in some counties and intercounty transportation of charcoal was also outlawed though production for

¹³ <https://www.nema.go.ke/images/Docs/Guidelines/national%20landuse%20guidelines-nema.pdf>

¹⁴ <http://www.parliament.go.ke/sites/default/files/2017-05/LandAct2012.pdf>

¹⁵ <http://www.environment.go.ke/wp-content/uploads/2018/11/4048264.pdf>

¹⁶ <http://www.environment.go.ke/wp-content/uploads/2018/11/4048264.pdf>

local use remained legal. This was further enhanced through the 2018 Moratorium. However, despite the 2018 moratorium, production and consumption of charcoal has continued calling for increased enforcement capacity and compliance and a rethink of wood fuel governance. Further, charcoal still found their way into cities where demand is high. This is despite the dwindling forest cover. The ban therefore failed to ensure sustainability of charcoal production or protect the environment. It also led to increased smuggling of charcoal hence driving the underground charcoal business. The 2015 charcoal rules and regulation also allow the fuel to be extracted from government land only while most charcoal is produced from privately owned or managed land. The ban was to be implemented by the Kenya Police, KWS and county government enforcement officers. The ban affected forest adjacent communities and Kenyan public.

Comparison of economic policy instruments and other existing instruments

Despite the existing economic policy instruments, there are also rights based and regulatory instruments that have been implemented in the country. Some of the ones that have been somehow successful are the rights based such as Participatory Forest management, energy regulations and hilltop management guidelines etc. However, regulatory instruments have not been effective as such due to their restrictive nature and the fact that the restriction makes forest products such as charcoal and other timber products very lucrative in the market. In addition, the imposition of certain regulations has also clashed with some instruments making it hard for the objective of the economic policy instruments to be met. It therefore implies that despite the importance of economic instruments for implementation of public policies, market mechanism or market like policy instruments cannot operate in a vacuum. Institutions also matter hence the economic policy instruments need to go hand in hand with other instruments such as rights based and regulatory instruments. This is because economic policy instruments are applied within existing rules and institutions. An appropriate institutional and legal framework is thus a precondition for the application of economic instruments.

Chapter 3: PUBLIC ACCEPTANCE OF POLICY INSTRUMENTS

An important component contributing to an effective introduction and implementation of environmental policy instruments is that there is public acceptance. From a normative democratic perspective, it is desirable that policies are in line with people's preferences. But there are also practical reasons for why public acceptance is important.

There are several examples from all over the world, when we have seen protests in connection to the introduction of new reforms or policy instruments. This can be from certain interest groups (e.g., plastic bag producers opposing a ban on plastic bags) or from the general public protesting against increased fuel prices (due to for example reduced subsidies or increased carbon taxes). Some recent examples from East Africa are the introduction of a 16 percent tax on fuel products in Kenya that prompted strikes and protest across the country and stakeholders from the private sector protesting against changing the ban on the import on older vehicles from 8 to 5 years. In July 2022, police in Uganda fired teargas and arrested more than 40 people who participated in a large protest over increased fuel prices and the refusal by government to cut taxes on cooking oil and fuel. These examples illustrate the need to enact policies that have wide public acceptance and support, since politicians will be reluctant to introduce policies and people are less likely to comply if there is low public support.

While carbon pricing is often recommended by economists as a way to reduce the use of fossil fuels, such policies often receive low support from the general public, compared to other policy instruments (Davidovic & Harring, 2020). Higher prices on fossil fuels imply higher costs for most households. People are likely to dislike policies that affect them or their group negatively and perceive such policies to be unfair. However, research has shown that there are also other individual-level factors or qualities that influence people's attitudes to climate and environmental policy instruments (Harring, 2021). For example, factors linked to people's beliefs or values, such as *concern* for environmental degradation is positively linked to policy instrument support. Another factor is *trust* or confidence in public agencies. People are simply less likely to support the introduction of policy instruments if they believe that the responsible public institutions are not competent, motivated or have sufficient resources to do their job. Previous studies have shown that trust in public institutions is particularly important for accepting or supporting economic¹⁷ instruments (e.g., taxes and fees) (Harring 2014; Davidovic & Harring 2020).

There are few studies of public acceptance of climate or environmental policy instruments from the Global South in general and from Africa in particular (Bergquist et al., 2022). In a unique survey we have investigated the general acceptance for several policy instruments. The results are accounted for below.

3.1 Survey on Acceptance of Policy Instruments

In the following sections we will present the results for Kenya from two surveys on acceptance towards the use of price-based and regulatory-based policy instruments within the three thematic areas we have presented earlier. That is: fossil fuels, plastic pollution and forest loss.

¹⁷ Acceptance is a passive evaluative response to a policy, and public support is an active evaluation of a policy, for example linked to behavior (e.g., voting in favor of a policy) (Kyselá et al., 2019).

The first survey was conducted via telephone to the general public in Ethiopia, Kenya, Uganda, Rwanda and Tanzania during March 2022. In total 5 078 adults responded to the survey across the five countries, with approximately 1000 respondents in both urban and rural areas in each country. In the case of Kenya, the total number of respondents were 1 021. This data was a good representation of the population characteristics in Kenya, in terms of gender and age. However, there was relatively large number of respondents with tertiary education and residing in urban areas as compared to population data. This was because during data collection more urban and people with relatively high education were willing to participate in the survey as compared to low educated people living in rural areas¹⁸.

The second survey targeted stakeholders within public sector, civil society, academia, and private sector. The stakeholders were selected for their knowledge within the three thematic areas, and the survey was carried out at workshops in each of the five countries during July and August 2022. The survey was responded to individually at the beginning of the workshop. In total 249 respondents, with a range of between 36-65 respondents in each country. In Kenya the number of respondents were 59, representing the following kinds of stakeholder: 52% public sector, 22% academia, 16% civil society and 10% private sector.

3.1.1 Acceptance of Policy Instrument affecting Fossil Fuels

In the surveys we asked our respondents about their opinion about three proposed or already implemented policy instruments to deal with the negative consequences for the global climate and local air quality caused by the use of fossil fuels (such as petrol, diesel, gas, kerosene and coal). The three policy instruments are the following:

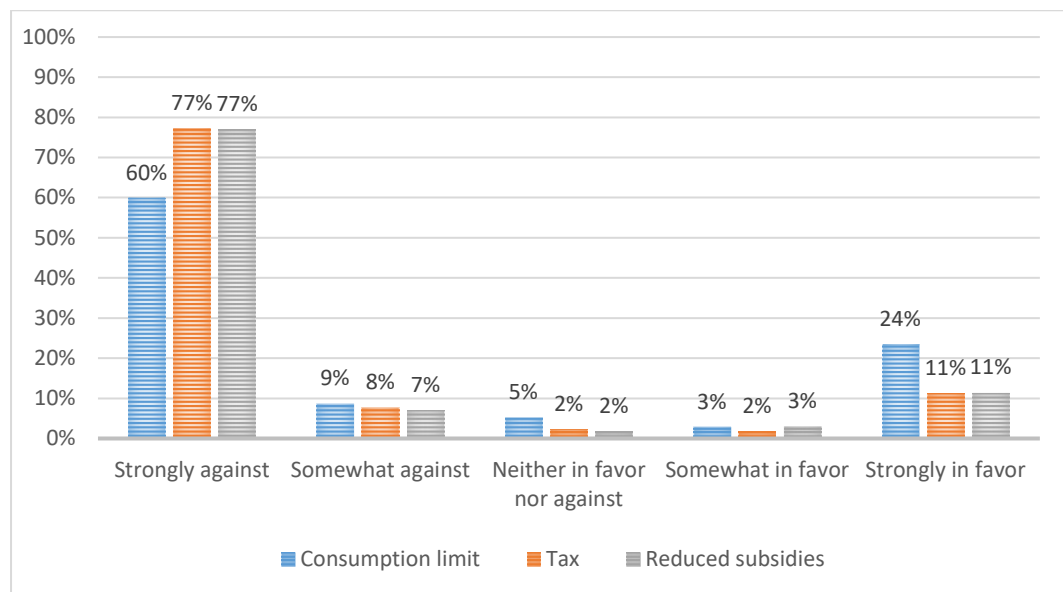
- Decreasing the quantity of fossil fuels by regulating how much households can buy
- Increasing the prices on fossil fuels by introducing a tax
- Increasing the prices on fossil fuels by reducing subsidies

Figure 1 shows the results for the general public in Kenya. It indicates that there in general is a much stronger opinion against these policy instruments, rather than in favor of them. Further, there tend to be a preference of the regulation via a limit (27%) compared to the two price-based options tax and subsidy reduction (13% vs 14 %). The figure in brackets refers to the share of respondents stating that they are either somewhat or strongly in favor of the policy instruments.

However, the picture changes when respondents were informed that the revenue was going to be used for a specific purpose. Such as education, infrastructure, environment programs or social programs targeting the poorest households in society. In Kenya, the acceptance for a tax or reduced subsidy increased from 13-14% (without specified revenue use) to 64-65% when revenue use was specified.

¹⁸ We have conducted statistical test on the population sample (Kruskal-Wallis) to confirm statistically significant differences between the distribution of responses per policy instrument. This has not been done for the stakeholder survey, due to the low sample size.

Figure 1: General public's acceptance of 3 policy instruments affecting fossil fuel use (1 021 respondents)

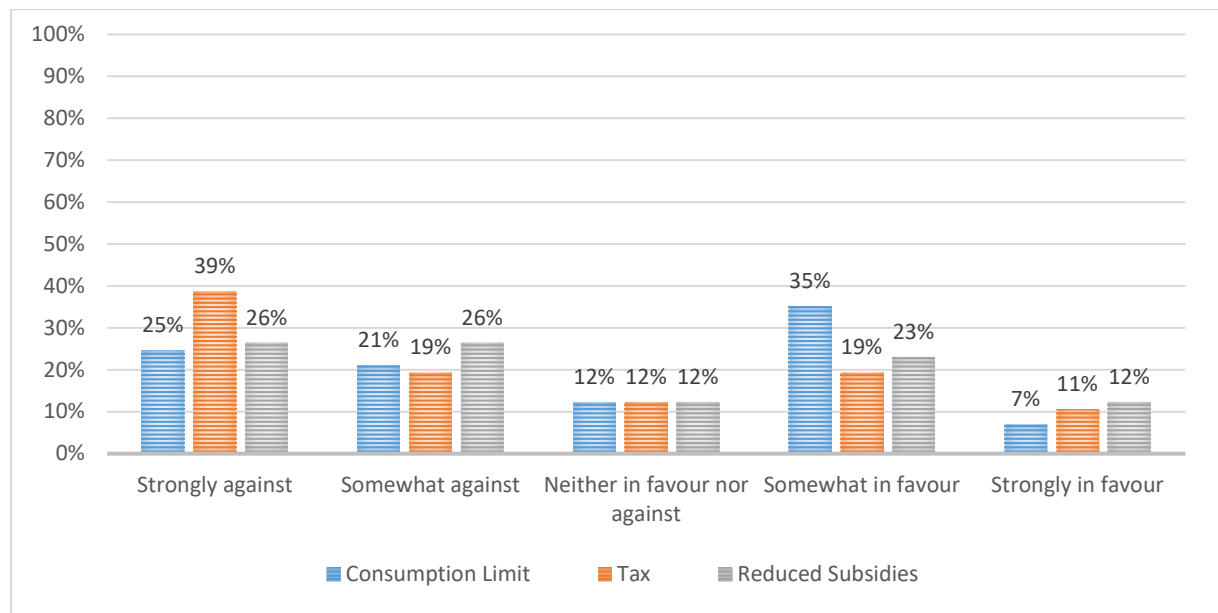


In addition to the question on general fossil fuel use, we also asked about the opinions concerning a decrease in the price on cooking gas (i.e., Liquid Petroleum Gas, LPG) by a subsidy. The acceptance of this subsidy was very strong with 95 % of the respondents stating they were somewhat or strongly in favor, whereof 93% stated strongly in favor. In comparison to the other countries where the survey has conducted the acceptance for this LPG subsidy was among the highest.

Stakeholders' perspective

When asking different stakeholders, the same questions as the general public, the responses turn out rather different as seen in Figure 2 below. Here the results indicate a higher acceptance of the three policy instruments affecting fossil fuel use. There is a preference toward the consumption limit compared to the tax and reduced subsidy. The acceptance increased a lot when the use of collected revenues were specified, a similar pattern as we saw amongst the general public. However, it is important to keep in mind the large difference in the number of respondents between the two surveys, with only 59 respondents in the stakeholder survey compared to 1021 respondents from the general public.

Figure 2: Stakeholders' acceptance of 3 policy instruments affecting fossil fuel use (1 021 respondents)



3.1.2 Acceptance of Policy Instrument affecting Plastic Pollutions

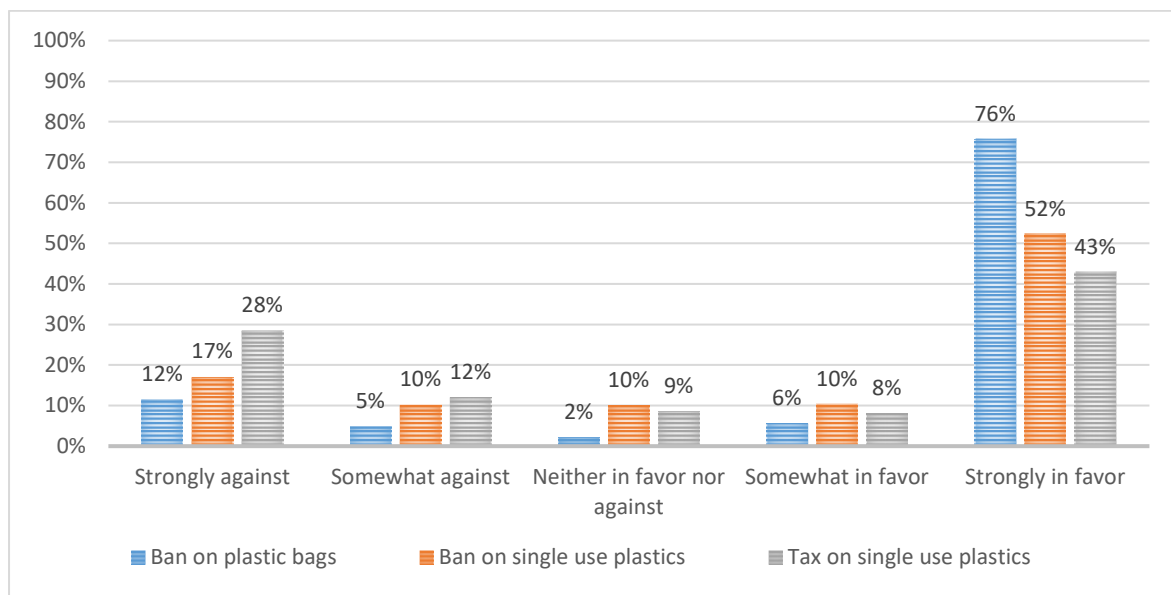
Concerning plastic pollution, we asked in the survey about the opinions on the following three proposed or already implemented policy instruments:

- A ban on the usage of plastic carrier bags
- A ban on the usage of single use plastics
- A tax on the usage of single use plastics.

Compared to the low acceptance of the policy instruments on fossil fuels, apart from the LPG subsidy, it is much higher for the ones concerning plastic carrier bags and single-use plastics (see Figure 3). The respondents are more in favor than against for all the proposed policy instruments to deal with plastic pollution. However, concerning the tax on single-use plastics the difference between the share of respondents against compared to the ones in favor is smaller. For the tax 40% is strongly or somewhat against vs 51% somewhat or strongly in favor, meanwhile for the ban on single use plastics the equivalent percentage are 27 % resp. 62%.

Our results also indicates that there is a preference of a ban (62-82%) on both single-use plastic and carrier bags compared to a tax (51%) on single-use plastics amongst the general population. Hence, a preference towards the regulatory-based instruments compared to the price-based.

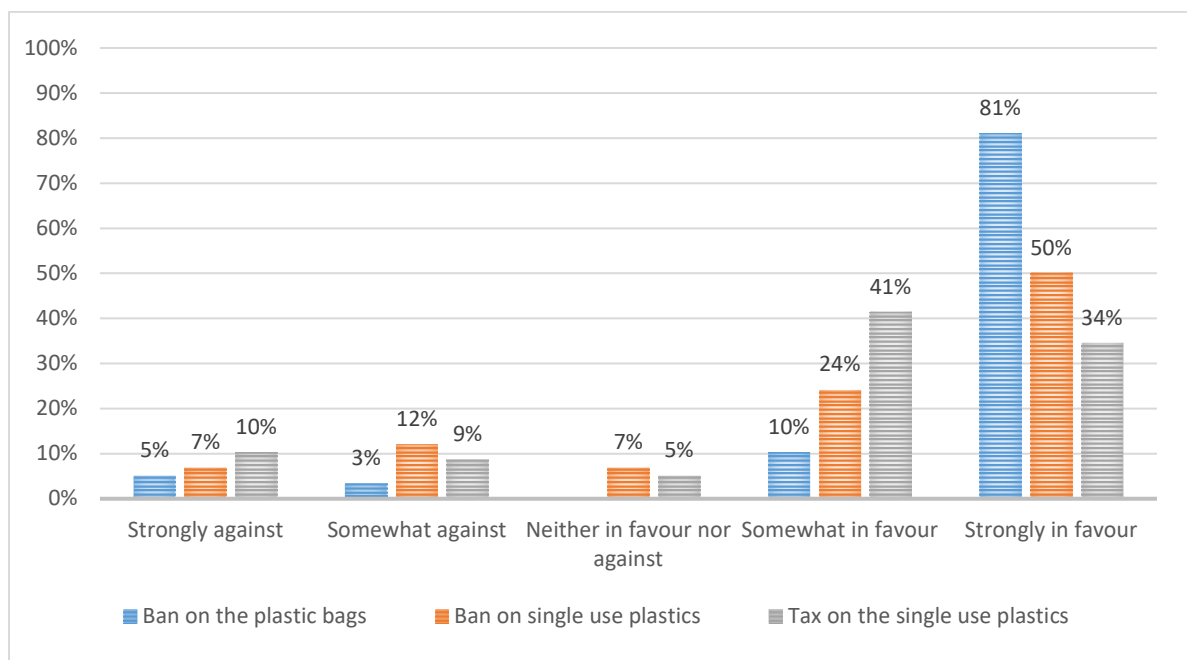
Figure 3: General public's acceptance of 3 different policy instruments affecting plastic pollution (1 021 respondents)



Stakeholders' perspective

For policy instruments affecting plastic pollution, the results from the stakeholder survey turned out to be rather similar to the general public (see Figure 4), compared to the differences seen for fossil fuel. Our results indicate that there is a strong acceptance for the three proposed policy instruments both among the general public and stakeholders in Kenya. The strongest acceptance is found for the ban on plastic carrier bags, which is an already implemented policy instrument in Kenya today.

Figure 4: Stakeholders' acceptance of 3 different policy instruments affecting plastic pollution (59 respondents)



3.1.3 Acceptance of Policy Instrument affecting Forest Loss

To address the issue of forest loss we asked questions on the opinions on a regulatory-based (ban) and a price-based (tax or fee) policy instrument for (1) cutting trees in public and community forests and (2) producing, selling and usage of charcoal. The results are presented in Figure 5 and 6 below. The respondents are in much higher degree somewhat or strongly in favor of regulating tree cutting in community forest via both a ban and tax (63-64%), compared to somewhat or strongly against (30%). For charcoal, we see a similar pattern, although, the difference between the ones against and in favor is much smaller. For a ban 43% are somewhat or strongly against and 48% somewhat or strongly in favor, the equivalent percentage for a tax or fee is 44% resp. 49%. Hence, the share of respondents against these policy instruments are almost the same as the one in favor.

Figure 5: General public's acceptance of 2 different policy instruments affecting forest loss due to cutting trees (1 021 respondents)

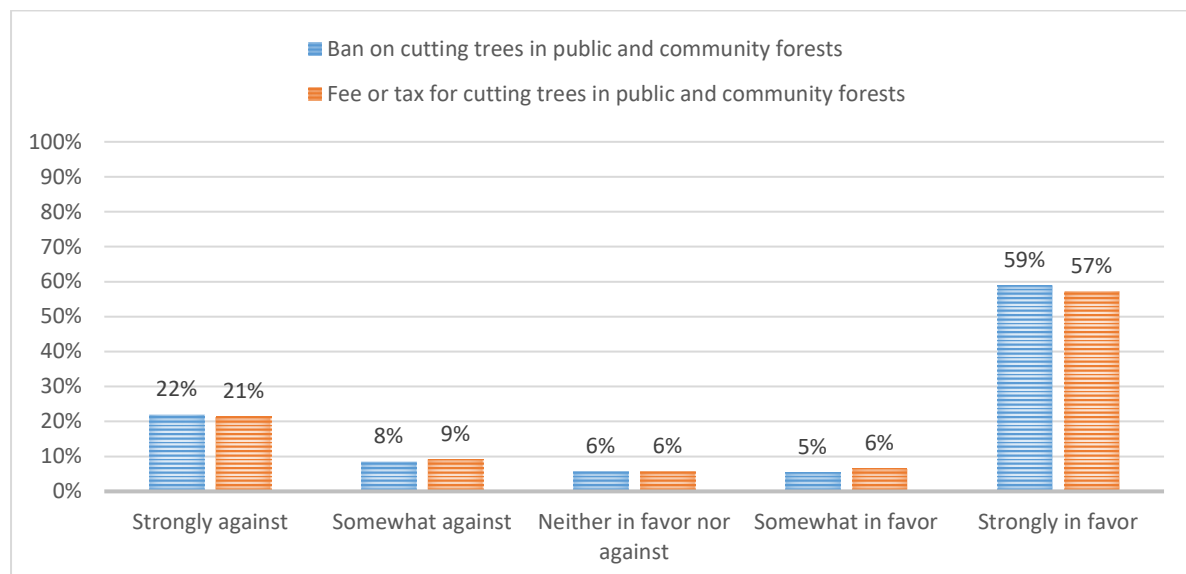
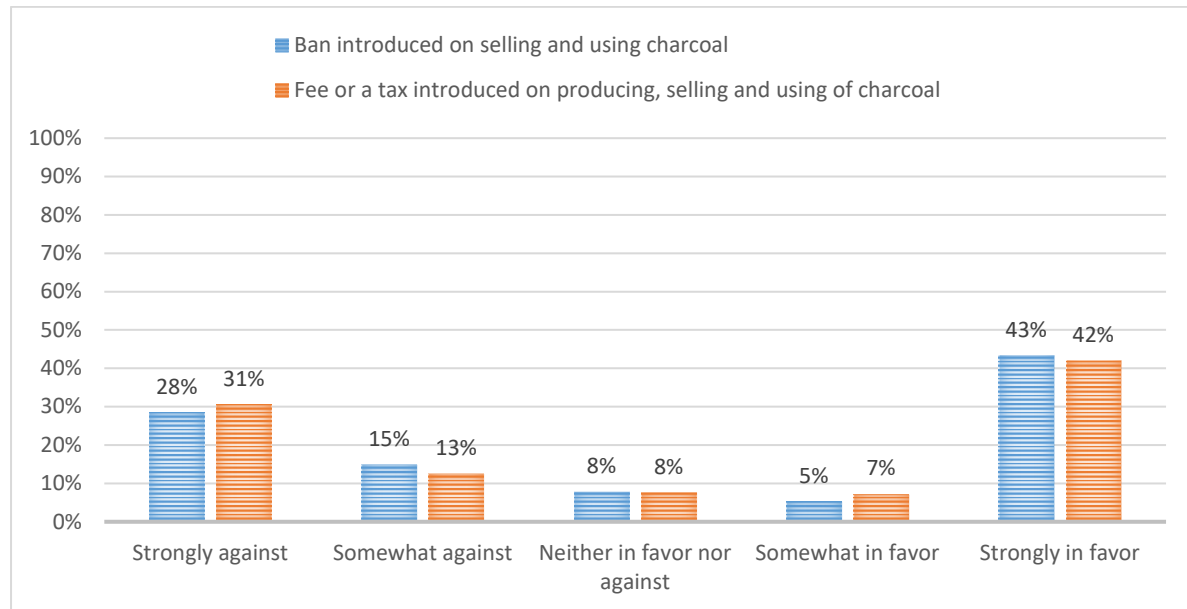


Figure 6: General public’s acceptance of 2 different policy instruments affecting forest loss due to charcoal (1 021 respondents)



Stakeholders’ perspective

The stakeholders’ perspective indicates that most respondents are strongly or somewhat in favor of the proposed policy instruments to tackle forest loss, as can be seen in Figure 7 and 8 below. For a ban on or a fee/tax for cutting trees in public community forests the stakeholders’ perspective is similar to the general public, but with a tendency to be more in favor and less against the policies. However, it is important to keep in mind the large difference in sample size.

Concerning a ban or tax/fee on charcoal production and usage, the stakeholders have stated that they are strongly or somewhat in favor, especially towards the fee or tax. Hence, the results indicate that there is a stronger preference for price-based instruments compared to the regulatory ban when it comes to charcoal.

Figure 7: Stakeholders' acceptance of 2 different policy instruments affecting forest loss due to cutting trees (59 respondents)

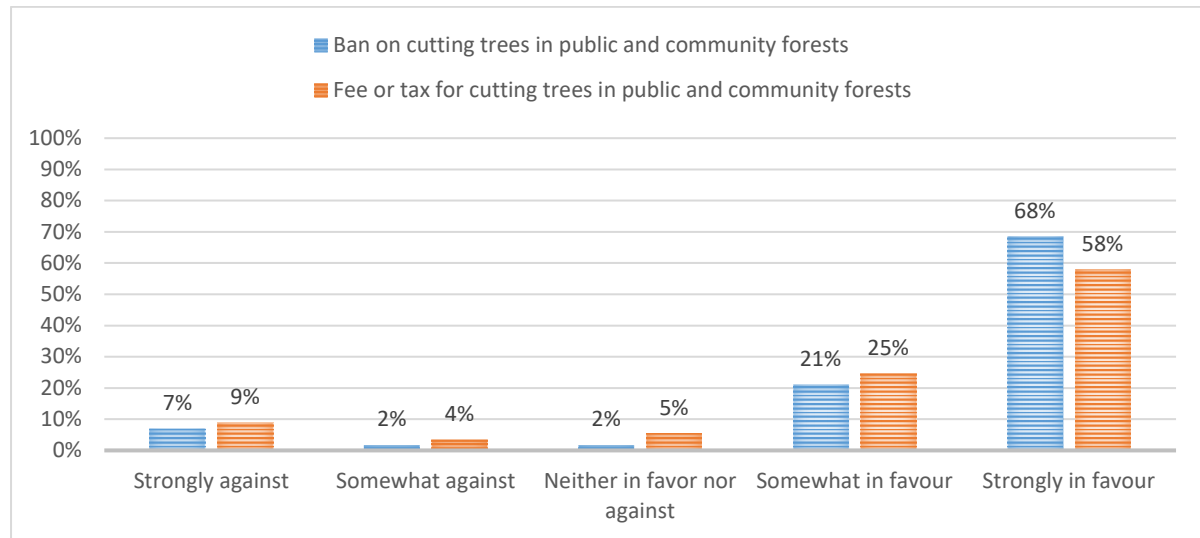
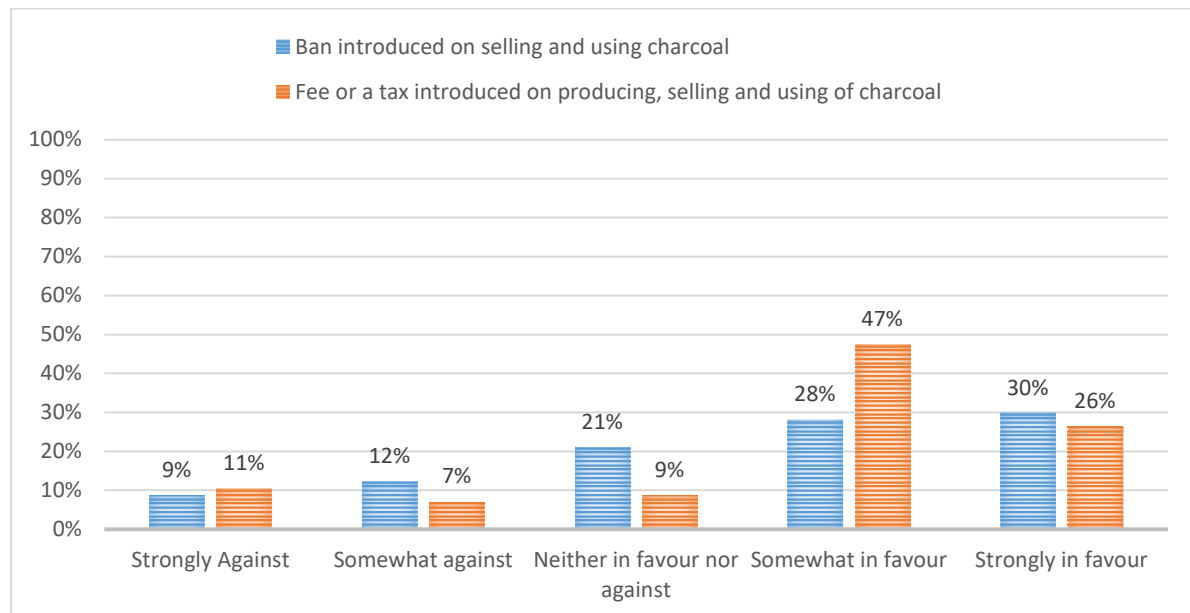


Figure 8: Stakeholders' acceptance of 2 different policy instruments affecting forest loss due to charcoal (59 respondents)



3.1.4 Discussion on Public Acceptance of Policy Instruments

The findings from our surveys presented above, indicates overall that stakeholders seem to be more accepting of the proposed policy instruments compared to the general public. This were discussed during the workshops held with the selected stakeholders, and part of the explanation for the difference could be that the stakeholders were selected based on their knowledge within the thematic areas, and hence might be aware of the reasons for why these regulations are being proposed. The stakeholders stated that the creation of awareness on pollution and climate change issues is important for an increased acceptance of policy instruments. This is also supported in the literature in the sense that people's values and concern for environmental degradation is positively linked to policy instrument support (Harring, 2021).

If we look at the different thematic areas, the highest acceptance found in the surveys was for regulating plastic pollution and forest loss, meanwhile it was much lower for fossil fuels (except for LPG subsidy). For plastic pollution rather similar pattern of acceptance is found between general public and stakeholders, but somewhat stronger amongst the latter when merging somewhat and strongly in favor of. For fossil fuels we see a much stronger acceptance for regulations amongst the stakeholders. For both plastic pollution and fossil fuels, we see a preference towards regulatory-based policy instruments compared to price-based such as a tax or fee. But for forest loss, we don't see the same preference, but rather a more equal share of acceptance amongst the general public. Meanwhile for stakeholders, a stronger preference towards the tax/fee on charcoal is seen.

However, the price-based instrument LPG subsidy gained the highest acceptance of all instruments amongst the general public (not asked of the stakeholders). Price-based policy instruments, such as taxes on fossil fuels as proposed here imply higher costs for many households, are often receive low support from the general public, compared to other policy instruments (Davidovic & Haring, 2020), which our results support.

When it comes to taxes, our results showed that the acceptance increased a lot when respondents were informed that the revenue was going to be used for a specific purpose: such as education, infrastructure, environment programs, or social programs targeting the poorest households in society. Here the question of perceived fairness and trust is important if you trust that others will pay tax and that the revenues the government receives are spent in good governance (Solvinger, 2022; Haring 2014; Davidovic & Haring 2020). In general, trust in others as well as institutions is rather low in Kenya. From our population survey, we found that the majority (75%) of respondents had low trust for other people while nearly half (49%) of the respondents had no to little confidence in the national government. Our finding complements, (Mitullah, 2021) who found that majority (96%) of Kenyans indicated that one must be very careful when dealing with others. Elaborating further on the case of forest loss, we see a higher acceptance to regulate the cutting of trees in public and community forests, compared to regulating charcoal. This could partly be related to the fact that our sample is including a higher share of the urban population and is less dependent on firewood for example cooking. However, to draw general conclusions based on the presented data is precarious and needs to be interpreted with care, since the sample from both the public and stakeholders are not fully representative.

From the stakeholder workshop, it was stated that public acceptability is important as it accommodates the interests of various stakeholders, makes policy implementation easier, helps to eliminate corruption, and therefore is crucial for sustainability. It needs several prerequisites to increase the acceptance and support of policy instruments for these areas in particular, and for a more inclusive green economy in general. The ones raised during the workshop were amongst others the need for alternatives to banned items or goods, availability of financial resources, technology innovation, IGE components in the university curriculum, and gender gap analysis of policy instruments. And not least inclusivity in policy formulation processes, political goodwill and collaboration and partnership between state and non-state actors, and alignment of IGE instruments with existing government Vision 2030 and Medium-Term Plans.

Chapter 4: DISCUSSION AND CONCLUSION

4.1 Discussion on Policy Instruments

Fossils Fuels

According to Africa Clean Energy Technical Assistance Facility Report of 2021 on economic impact assessment on removal of tax exemptions on stand-alone solar (SAS) products in Kenya. In total, reintroducing VAT exemptions for SAS products could result in Treasury incurring a net cost of around USD 13 million per year by 2025, while import duties could represent up to USD 16 million further. When compared to total national revenue of USD 16 billion, the import duties as a result of VAT introduction are insignificant to the National Treasury but disastrous to households. Considering the impact on prices and affordability, the 16% VAT charge could result in as many as 470,000 fewer households accessing SAS products by 2025 (with import duties the number rises to 650,000).

On the transport sector energy use, National Climate Change Action Plan (NCCAP) identified a number of priority mitigation actions (e.g., Bus Rapid Transit (BRT) and Light Rail Transit system implementation in Nairobi, passenger vehicle stock efficiency, improving heavy-duty vehicles stock efficiency, bioethanol, biodiesel and shift of freight from road to rail). The mitigation options for Kenya on greenhouse gas emissions from the transport sector identified the efficiency of freight transportation as one of the options with the highest potential (Notter et al. 2018). For instance, the relevance of freight transport in Kenya is very high (in the baseline scenario, heavy goods vehicles accounted for 41 percent of total road transportation GHG emissions in 2015, 50 percent in 2030, and for 55 percent in 2050. The report by Notter and other also indicate that the potential of a mode shift (road to rail) seems small and depends on when the rail system is electrified and what the carbon intensity of the electricity grid looks like.

As regards the efficient use of energy in buildings, Kenya has formulated and has made few steps towards the adoption of energy-efficient building codes at the time of the evaluation. This is according to the terminal evaluation of the UN Environment project promoting energy efficiency in buildings in East Africa by UN Environment in 2018. The commercial sector has however shown significant interest in efficient building practices, with a vibrant green building society established in the country in partnership with UN-Habitat.

Plastic Pollution

The Cabinet Secretary Ministry of Environment and Forestry reports that there has been 80% success rate in the enforcement of 2017 plastic ban (ME&F,2020). This has been able to eliminate and estimated 6.1billion bags from the waste stream. Though there has been success in banning single use plastics, experts suggest stricter implementation and enforcement is needed to prevent illegal plastic importation and waste trade of other plastics (ME&F, 2020). Though Kenya has many policies and regulations addressing single-use plastics and marine litter, there are still challenges in the implementation of these bans. For example, some polyethylene bags remained in use under license by the NEMA. With the passing of the Extended Producer Responsibility (EPR) and formation of the Producer Responsibility Organizations (PRO) will help the management of all single-use plastic

products exempted in schedule one (Macharia et al. 2021). The PET task force efforts have led to an increase in plastic recycling: as of 2020, Kenya was recycling 2000 tons of PET per year (ME&F, 2020). In 2019, the task force released a Plastics Action Plan to guide their operations, reiterating the need for mandatory extended producer responsibility scheme to raise required to promote PET waste management (ME&F, 2020). As a result, ME&F has developed Extended Producer Responsibility Regulations (published in 2021) that require all producers, converters, importers, and distributors of products to bear the responsibility to ensure proper disposal emanating from the introduction of their products into the market.

Forest loss

Forest policies help determine the use, retention, and protection of forests. In the last decade, sustainable forest management has become a widely accepted paradigm. The paradigm states that we should manage forests for a broad set of economic, ecological, and social values. The evolving nature of sustainable forestry goals requires advances in forest policy instruments for multi-functional forestry. In particular, the new forest policy instruments must improve our ability to provide and protect common pool and collective goods to account for and mitigate market failures and externalities and to include communities and new non-government stakeholders better.

Despite the existence of various policy instruments, most of them have challenges in the implementation hence ineffective. Notable challenges in the implementation of policies namely: mandate overlaps; periodic charcoal bans (for instance it is illegal to commercially produce and transport but perfectly legal to sell and use it). There is also limited capacity at county levels to implement some of the policies. There is also limited coordination and cooperation between the various parties charged with managing the forestry sector. Despite capacity constraints at county levels, county governments have made attempts at the development of specific charcoal production or timber management strategies and implemented them with the support of the KFS and other government agencies.

Most of the policy instruments in Kenya are the conventional command and control approaches which are less superior to for instance the uptake of economic instruments such as PES which has the ability to incorporate voluntary economic incentives and market-based instruments. Global experience has shown that conventional command and control approaches in ecosystem management may be effective in managing natural resources in well-defined hot spots but not at the ecosystem level where resource degradation results from a combination of individual actions spread over large geographical areas. Most of the piloted schemes in Kenya have evolved with higher external expertise and thus need for simplified systematic approaches to support local entities in upscaling beyond donor-supported project duration (Langat et al. 2017). At the moment, although there are guidelines for PES, there is no enabling policy on PES. This implies that environmental benefits that could accrue from PES arrangements have not been fully exploited. However, some legal and regulatory frameworks like the Constitution provide an enabling environment to accommodate PES schemes in Kenya hence the need to develop PES schemes. Further, since the income generated from forestry-based PES schemes is unknown. There is a need to tap into forestry-based PES schemes due to their huge potential in Kenya.

Although there could be incidences of forest destruction in PELIS fields, the nationwide uniform banning of PELIS may be detrimental in the long run since in some water towers the scheme has realized the dual intended objectives. The uniform application of some policy measures may therefore be detrimental to forest management and conservation since communities may not conserve the forest if they do not benefit from it especially those without physical capital such as land. Despite the task force recommendation of using concessions and increasing private engagement through PPPs to increase public plantations, it would be prudent to implement the two at the same time. This may also require testing evaluating and a balanced pragmatic way within a specific time frame. Most small and medium enterprises are operating below capacity due to deficit in wood production (MEWNR, 2013a) attributed to sub-optimal plantation management. Although private companies are interested in bridging this deficit through plantation establishment, commercial plantations and taking concessions in public plantations. However, concession arrangements were agreed and regulations governing the same have never been finalized. Since an enabling environment has been created, there is potential for concessions.

To strengthen PFM through CFAs, there is need for policy and regulatory framework on community forestry to provide for long term equal rights, responsibilities for all actors, fair benefits sharing mechanism, base for good governance, participatory principles and institutional support. The PFMPs prepared by CFAs are also not very detailed and do not have clear management actions for sustainable management of particular forest blocks (M&EF 2018). In addition, investment in community forestry will only succeed if the value of forests is clearly understood. It is therefore critical to capture and document the value of forest products and ecosystem services.

Forest economic policy instruments in relation to other instruments

Although there are a range of policy instruments implemented by the government, most of the policies conflict with one another due to lack of a multi-stakeholder approach in developing the instruments. For instance, the ban on charcoal production coupled with the imposition of tax on LPG gas would be counterproductive since over 60% of households in rural areas rely on wood fuel and charcoal then an increase in tax for LPG gas would result in most households resorting to using wood fuel and charcoal thus increase the price of charcoal which is already banned. This would further make more rural household risk cutting more trees to produce charcoal even though it is banned.

An assessment of the implementation of most instruments have revealed mixed results due to weak stakeholder support, inadequate political goodwill, and weak implementation. In addition, in Kenya most focus has shifted to water towers resulting in limited attention to dryland woodlands including coastal and riparian forests. Corruption has also hindered the rehabilitation of most water towers. For instance, lack of private ownership and unclear tenure and access to forest resources, invasion of some water towers by top officials who have genuine titles have inhibited reforestation through prolonged court battles. Without alternative livelihood measures, there will still be overdependence on agriculture and more pressure on forest lands. The rapid urbanization and infrastructure development have also been a threat to forestry in Kenya. In conclusion, there is need for a balance in policy mix between command and control in order to sustainably manage forest resources.

4.2. Discussion on Acceptance of Policy Instruments

Although there was substantial public acceptance of policy instruments in the three areas that were surveyed; fossil fuels, plastic pollution, and forest loss, the level of public acceptance varied across these areas. There was overwhelming strong public support and acceptance of policy instruments on plastic pollution and forest loss areas when compared to the fossil fuels area in Kenya. For fossil fuels, the level of support varied outright depending on the sectors where the national revenues were spent.

Based on the analysis, social acceptance of policy instruments today and going into the future, largely and will continue to depend on where the revenues are invested for the case of taxation. However, for the case of subsidies, there is a large expectation that such subsidies should be prioritized and invested in climate change sectors.

4.3. Concluding reflections

Fossil fuels

Renewable energy technologies face several challenges including those related to high capital costs requirements, poor targeted incentives that can promote access and usage of cleaner and low carbon technologies, slow implementation of energy efficiency and conservation measures targeted on reduction of fossil fuel consumption and emissions. While there have been significant efforts deployed to address these issues, through deployment of various policy instruments, the anticipated success stories have been limited by various obstacles.

To address these issues the government needs to take into consideration, first the Inconsistent and in most cases retrogressive policies that have hampered acceleration of universal access to clean technologies. Some of these policies include introduction and retraction of the taxes on solar imports, the withdrawal of the 5-year ban on the importation of secondhand vehicles back to an 8-year ban, LPG subsidy introductions and withdrawals ranging from currently at 8% to 16% just to mention a few. In addition, the slow implementation of key policies such as the transition to zero emission motor vehicles by 2040, minimum energy performance standards and the integration of energy efficiency requirements into the Building Codes as well as adoption and uptake of e-mobility are challenges that the government need to address which can be attributed to weak enforcement, funding, and low public engagement.

Plastic pollution

While there has been growing awareness of the negative impacts of plastic pollution, it has not led to consistent action, due to barriers that include misinformation, disempowerment, convenience, and cost. Recycling is perceived as the only action required to clean up the environment, even though only a small proportion of plastic packaging is effectively recycled In Kenya. While efforts to minimize their production are commendable, ultimately, the other major goal should be to find ways of dealing with the ones that have already been produced. Whether it is imposing heavy taxes on their manufacture and/or use, investing on technology to produce viable alternatives or forcing

manufacturers to re-use and recycle, something needs to be done urgently to control their production, use and disposal. This can only be achieved if all stakeholders are involved in the formulation of policy and regulations. A lot of public education and awareness need to be carried out and which should be backed by heavy investment in proper technology and strict laws to deal with errant entities. At the end, there is a need for concerted efforts from all to ensure that the right to a clean and healthy environment is realized.

In the wake of the plastic bags ban, it is worth noting that the plastic bags ban in Kenya has led to an improved aesthetic appeal of the physical environment as evidenced by reduced littering and pollution as reduction of landfills arising from heaps of plastic waste. However, despite the ban on plastic bags, there exist myriads of challenges in the effective implementation of the ban arising mainly from the porous source outside the country. This has promoted a thriving of black-market business of smuggling plastic bags. In addition, the attitudes of consumers has become a major hindrance of effective implementation of the ban and a lot needs to be done in order to positively influence their plastic consumption behavior. Effects of emerging policies related to extended producer responsibility and prohibition of single-use plastics in protected areas are not yet well known.

Forest Loss

Kenya has shown some significant progress in improving forest cover partly attributed to increased awareness and tree planting campaigns especially through various government institutions and also to some regulatory economic instruments. However, the rate of forest degradation is still something to worry about. Although various policy instruments have been effective, implementation of some have failed due to lack of multi stakeholder approach in their development and implementation. Most government institutions work in isolation thus often resulting in policy failure as one organization's instruments negate the gains made by another policy instrument in another organization. The rent seeking behavior of some institution officials has also hampered full realization of objectives of some policy instruments.

In conclusion, in order to reduce forest loss, it is inherent for the government to adopt a policy mix taking into consideration both conventional command and control approaches and the economic instruments. This is because communities will rarely conserve forest resources unless they derive some use values from them. There is also a need for a multi stakeholder approach in development and implementation of various government policies on forests and energy as well as water resources.

Social acceptance of policy instrument

Regarding social acceptance, generally the majority of Kenyans are in support of green policy reforms on plastics use and forest loss but do not support any increase in prices of fossil fuels. Compared to other green policy reforms, taxes on fossil fuels had low support due to the fact that taxes imply higher costs for many households. It was evident that creation of awareness on pollution and climate change issues is important for an increased acceptance of policy instruments. Additionally, acceptance of green policy reforms increased a lot when Kenyans were informed that the revenue was going to be used for a specific purpose: such as education, infrastructure, environment programs or social programs targeting the poorest households in society. In conclusion, public acceptability of green policy reforms plays a critical role in making policy

implementation easier and thus Kenyan government should ensure there is enough consultation with key stakeholders and the public before implementing any green policy reform.

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APPENDIX

Appendix 1: Overview IGE visions, strategies, and programs

Table 1: Overview of national cross-sectorial IGE visions, strategies, and programs

Name of vision/strategy/program	Year of implementation and until when	What are the main objectives?	Are policy indicators specified? If so, which?	Which organisation is responsible for implementation?	Which organisation is responsible for monitoring?	Have evaluations been conducted or planned to be?
Green Economy Strategy and Implementation Plan	2016 – 2030	To enable Kenya, attain a higher economic growth rate consistent with the Vision 2030 which is embedded in the principles of sustainable development in the overall national growth strategy.	Policy Indicators on sustainable infrastructure, Building resilience, Sustainable natural resource management, Resource efficiency, Social inclusion and sustainable livelihood .	MoTIHUD, MoALFC, MENR, TNT&P, MoEP, CG, MoE, MoH	Ministry of Environment	Planned to be conducted by 30 June 2021.
National Climate Change Response Strategy (NCCRS)	2010 – 2030	Enhance understanding of the global climate change regime: the negotiation process, international agreements, policies and processes and most importantly the positions Kenya needs to take in order to maximise beneficial effects of climate change.	Indicators Not so specific	Ministry of Environment, MoALFC	MEFMinistry of Environment	Planned to be conducted by 30 June 2021.
National Adaptation Plan	2015 – 2030	Integrate climate change adaptation into national and county level development planning and budgeting processes; Enhance the resilience of public and private sector investment in the national	Indicators are not so specific	Ministry of Environment, MoALFC	MEFMinistry of Environment	Planned to be conducted by 30 June 2021.

Name of vision/strategy/program	Year of implementation and until when	What are the main objectives?	Are policy indicators specified? If so, which?	Which organisation is responsible for implementation?	Which organisation is responsible for monitoring?	Have evaluations been conducted or planned to be?
		transformation, economic and social and pillars of Vision 2030 to climate shocks.				
National Climate Change Act	2016 -	AN ACT of Parliament to provide for a regulatory framework for enhanced response to climate change; to provide for mechanism and measures to achieve low carbon climate development, and for connected purposes.		The Act is applied in all sectors of the economy by the national and county governments	MEF- National and county governments	Planned to be conducted by 30 June 2021.
National Climate Change Action Plan (NCCAP)	2018 - 2022	Reduce risks to communities and infrastructure resulting from climate-related disasters, such as droughts and floods. Increase forest/tree cover to 10% of total land area, rehabilitate degraded lands, including rangelands and, increase the resilience of wildlife	Yes, There are specific indicators on Disaster risk management; (1) Food and Nutrition Security; (2) Water and blue economy; (3) Forestry, wildlife and tourism; (4) Health, sanitation and human settlements; (5) Manufacturing; (6) Energy and Transport (Details, appendix).	National Government and County Governments	MEF National and county governments	Planned to be conducted by 30 June 2021.

Name of vision/strategy/program	Year of implementation and until when	What are the main objectives?	Are policy indicators specified? If so, which?	Which organisation is responsible for implementation?	Which organisation is responsible for monitoring?	Have evaluations been conducted or planned to be?
Kenya Climate Smart Agriculture Strategy 2017-2026 (KCSAS)	2018–2022	The KCSAIF seeks to provide guidance in mainstreaming Climate Smart Agriculture (CSA). The Implementation Framework intends to ensure increased agricultural productivity and sustainably and build resilience of the national agricultural systems. Further, KCSAIF aims at providing various options for implementation of the Kenya Climate Smart Agriculture Strategy 2017-2026 (KCSAS).	Climate change adaptation investments in the agricultural sector. (2) Total agricultural sector GHG emissions. (3) GHG emissions per unit of agricultural sector GDP. (4) Renewable energy investments in the agricultural sector. (5) Proportion of climate resilient Households Other indicators are based on specific outcomes as follows: institutional coordination. (2) Agriculture Productivities and socially inclusive value chain Integration, Enhancing Resilience and Associated Mitigation Co-Benefits, Communication Systems on CSA Extension and Argo-	MoALF Country government.	MoALF Country government.	Planned to be conducted by 30 June 2021.

Name of vision/strategy/program	Year of implementation and until when	What are the main objectives?	Are policy indicators specified? If so, which?	Which organisation is responsible for implementation?	Which organisation is responsible for monitoring?	Have evaluations been conducted or planned to be?
			weather Issues strengthened and Mainstreamed and Monitoring & Evaluation.			

Appendix 2: References to Country Profile

Kenya	Data	Reference
Size Population density	580 367 km ² 91/km ²	<p><i>Countries by Area - WorldAtlas</i> https://www.worldatlas.com/features/countries-by-area.html#countriesBySize Accessed: 2022-02-04</p> <p><i>World Development Indicators DataBank (worldbank.org)</i> https://databank.worldbank.org/reports.aspx?source=world-development-indicators Last Updated: 12/22/2022 Accessed: 2023-02-13</p>
Key sectors in the economy	Agri: 22 Industry:17 Service: 54 Manufacturing: 7	<p>Year 2021 value added (% of GDP)</p> <p><i>World Development Indicators DataBank (worldbank.org)</i> https://databank.worldbank.org/reports.aspx?source=world-development-indicators Last Updated: 09/16/2022 Accessed: 2022-10-14</p>
Population Growth	53,7 million 2.3%	<p>Year 2020</p> <p><i>World Development Indicators DataBank (worldbank.org)</i> https://databank.worldbank.org/reports.aspx?source=world-development-indicators Last Updated: 09/16/2022 Accessed: 2022-10-14</p>
Life Expectancy (F/M)	68.5/63.8	<p>Year 2020</p> <p><i>World Development Indicators DataBank (worldbank.org)</i> https://databank.worldbank.org/reports.aspx?source=world-development-indicators Last Updated: 09/16/2022 Accessed: 2022-10-14</p>
Poverty rate	15.9%	<p>Year 2020</p> <p><i>Africa SDG Index and Dashboards Report - Sustainable Development Report</i> https://www.sdindex.org/reports/2020-africa-sdg-index-and-dashboards-report/ Accessed: 2021-12-01</p>
Access to electricity	71%	<p>Year 2020</p> <p><i>World Development Indicators DataBank (worldbank.org)</i> https://databank.worldbank.org/reports.aspx?source=world-development-indicators Last Updated: 09/16/2022 Accessed: 2022-10-14</p>
GDP/capita	2082 USD	<p>Year 2021</p> <p><i>World Development Indicators DataBank (worldbank.org)</i> https://databank.worldbank.org/reports.aspx?source=world-development-indicators</p>

		<i>Last Updated: 12/22/2022</i> Accessed: 2023-02-13
Rainfed/Irrigated agriculture	99.4/0.6%	Year 2020 <i>Land Use Indicators, Land area equipped for irrigation</i> https://www.fao.org/faostat/en/#data/EL Accessed: 2022-10-13
Land area covered in forest	5%	Year 2015 <i>Forest Monitoring, Land Use & Deforestation Trends Global Forest Watch</i> https://www.globalforestwatch.org/ Accessed: 2022-01-12