CO-CREATING A POLICY AND ACTION AGENDA FOR SUSTAINABLE CHARCOAL TRANSITIONS

WORKSHOP REPORT

RIDGE CABIN RESORT, LIMURU, KENYA

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Climate Compatible Growth

UCL

IRENA
International Renewable Energy Agency

NUVONI RESEARCH

Contents

Executive Summary

Approximately 1 billion people in Sub-Saharan Africa continue to rely on charcoal and firewood as their primary cooking fuels. Despite efforts to promote clean energy solutions—LPG, electricity, ethanol—progress remains slow. Most policies frame charcoal as a harmful, outdated fuel linked to deforestation, climate emissions, and health risks. Yet charcoal remains deeply embedded in African energy systems, especially in growing urban areas.

Recognizing the urgent need to rethink charcoal's role, International Renewable Energy Agency (IRENA), University College London (UCL), and Nuvoni Centre for Innovation Research, convened a two-day workshop bringing together policymakers, researchers, civil society, private sector actors, and international organisations across Africa and beyond. The goal was to reassess evidence, reshape narratives, and co-create a modern charcoal agenda aligned with energy access, sustainability, livelihoods, and climate goals.

Key Insights

a. Evidence Gaps and Misconceptions

A major theme was that charcoal is often misunderstood due to weak, incomplete, or biased evidence, including:

- Many studies lump firewood and charcoal together, obscuring key differences for example in their health impacts.
- Health impact data should include other confounding factors such as kitchen size and stove type
- Environmental narratives often exaggerate charcoal's role in deforestation, whereas in many areas agriculture is the primary driver.
- Transitions to LPG/electricity show weaker-than-expected health benefits, highlighting complexity in exposure and behaviour.
- The language used for example *clean vs. dirty*, *traditional vs. Modern* reinforces stigma and oversimplifies the realities of energy use and fuel stacking.

b. The Role of Charcoal in Modern Energy Systems

The workshop highlighted that charcoal will remain significant well beyond 2050, especially in urban and peri-urban households. A blanket assumption that charcoal will "phase out" has resulted in policy paralysis and lack of investment in sustainable production methods and cleaner, efficient charcoal technologies. Sustainable and efficient charcoal can meaningfully contribute to energy security, livelihoods, and climate resilience.

c. Common Themes Across Countries

Government representatives from Kenya, Tanzania, Ethiopia, Uganda, Malawi, Zambia, and Rwanda highlighted that:

- Charcoal spans multiple ministries (energy, forestry, land, climate), causing fragmented oversight.
- Bans and restrictive policies rarely work, and where they do it is only temporary; they create illegal markets, worsen degradation, and ignore household realities.
- Implementation failures, not lack of policies, remain the biggest barrier.
- Charcoal is deeply tied to livelihoods, informal economies, and urban energy security.

There was an emerging consensus from the workshop that charcoal is here to stay, but must be continually improved and modernized, not eliminated. Sustainable charcoal requires design and implementation of the following measures:

- Clear technology standards

- Licensing and traceability
- Efficient kilns
- Sustainable feedstock and woodlots
- Coordinated inter-ministerial approaches
- Policy that reflects end-user realities – cost, convenience, reliability.

d. Strengthening Governance

There is need to formalize the sector and this will happen through: Licensing for producers, transporters, retailers; intergovernmental coordination; Clarity on land tenure and community rights as well as establishing national charcoal committees or bioenergy platforms.

e. Financing the Transition

There is need to provide concessional financing for: Kilns, Seedlings, Woodlots; and for coordinating bodies such as Charcoal Cooperatives and associations. There is also need to explore carbon finance for both production and end-use of charcoal as well as building local business models to reduce donor dependency.

f. Technology, Data and Innovation

- There is need to encourage adoption of efficient charcoal stoves;
- Improve national surveys to capture fuel stacking and task-based fuel use.
- Build digital ecosystems for data, monitoring, and coordination.

Opportunities and Next Steps

A New Narrative on Charcoal: Participants agreed on the need to reposition charcoal as:

- A renewable bioenergy resource when sustainably produced
- A legitimate component of modern energy planning
- Essential for urban cooking energy security
- A sector deserving research, investment, innovation, and coordinated governance

Proposed way forward

- To develop a co-created communique capturing consensus and clear recommendations.
- Use various means to challenge the negative perception on charcoal, including generation of evidence and targeted communications
- Establish a Modern Charcoal Working Group for continued collaboration.
- Produce a "Nairobi Paper" articulating the modern charcoal narrative.
- Engage regional and global platforms (Clean Cooking Summit 2026, COP, etc.).
- Support governments to integrate modern charcoal into national strategies, budgets, and NDCs.
- Mobilize finance for sustainable charcoal programs.

Conclusion

The workshop revealed a strong, shared recognition that charcoal is central to Africa's energy, both at present and into the future. Eliminating charcoal is neither realistic nor desirable in the near term. Instead, the focus must shift toward modernizing, regulating, and investing in a sustainable charcoal system that supports energy access, environmental stewardship, and livelihoods.

Introduction

One billion people in sub-Saharan Africa still cook with charcoal and firewood as their primary fuel. The Sustainable Development Goal (SDG) 7 (Affordable and Clean energy) calls for this practice to be eliminated by 2030, but progress remains slow despite major government and donor interventions promoting clean cooking.

There are two main clean cooking strategies being deployed: 1) making the "available clean" by improving biomass combustion with higher-tier cookstoves, or 2) making the "clean available" by switching to alternative fuels like LPG, electricity, ethanol. Policy efforts have tended to prioritise fuel switching, informed by evidence that links biomass use to deforestation, negative health outcomes and time burdens.

At the same time, a large body of evidence highlights the complexity of these relationships, pointing to context-specific environmental impacts, mixed health outcomes, and the importance of charcoal value chains for rural livelihoods. The mixed evidence calls for a reassessment of clean cooking strategies to reflect regional realities, acknowledging that biomass, particularly charcoal, is likely to remain a central part of African energy systems for some time.

Responding to this challenge, the International Renewable Energy Agency (IRENA), University College London (UCL) and Nuvoni Centre for Innovation Research jointly convened a workshop that brought a broad range of actors across the clean-cooking communities, creating space to reflect on different transition pathways, and explore more nuanced, contextually relevant policy approaches to charcoal.

Objectives of the workshop

The two-day workshop convened close to 30 participants, including senior government representatives from clean cooking access deficit countries, experienced researchers and practitioners in the clean cooking sector, representatives from international organisations and donor agencies, actors from the private sector and financial institutions, and civil-society groups. The countries represented in the room included Ethiopia, Kenya, Malawi, Mexico, Rwanda, Tanzania, UAE, UK, Uganda, USA, and Zambia. The workshop objectives were to:

- Consolidate diverse strands of evidence and policy thinking in order to position charcoal more clearly within sustainable energy transitions.
- Outline principles and priority policy and research directions necessary to advance sustainable charcoal transitions in sub-Saharan Africa.
- Co-create a shared agenda that reflects regional realities and explores more nuanced, contextually relevant policy approaches to charcoal.
  All the workshop objectives were met.

Opening session

Overview: The session was moderated by Dr Elsie Onsongo, the Executive Director of Nuvoni. She started by setting the tone of the workshop, reflecting on the 'why' of the workshop, after which Peter Thobora from the Ministry of Energy made formal remarks and declared the meeting open. Participants were then led through an introductory session that included four polls to get the workshop started.

Elsie Onsongo: Setting the tone

'Charcoal is not going away any time soon'

In her opening remarks and in setting the tone for the workshop, Elsie Onsongo welcomed all delegates and reflected on the journey that had culminated in the workshop. Recalling that over 1 billion people in Sub Saharan Africa are still relying on charcoal, Elsie expressed that practitioners in the room, who included policy makers, researchers, civil society and private sector were alive to the fact that charcoal is not going away any time soon, even in the face of policy developments.

Elsie, in welcoming the delegates, recalled how clean cooking is often framed as transition away from charcoal to something else. These are nuances, as Elsie mentioned, that would be critical to be reflected upon in the workshop. For the two days, work being done especially in charcoal production and charcoal value chains would be shared.

Giving some history into Nuvoni, Elsie elaborated the work that Nuvoni had done in the space including being key players in the development of the Kenya National eCooking Strategy (KNeCS) where they interacted with a lot of evidence around clean cooking.

She mentioned a national household survey that Nuvoni did in 2023 to map how many households had access to tier 3 plus electricity access. They found that almost 70% of Kenyans are connected to a tier 3 plus electricity connection.

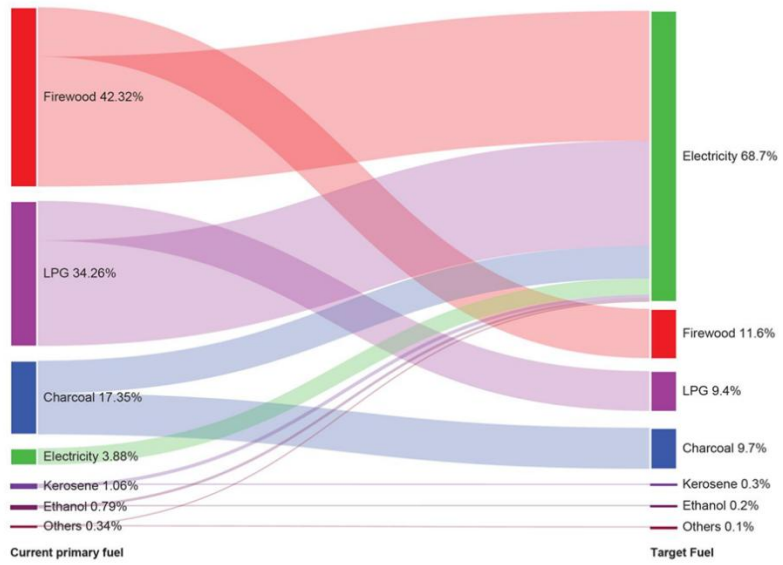
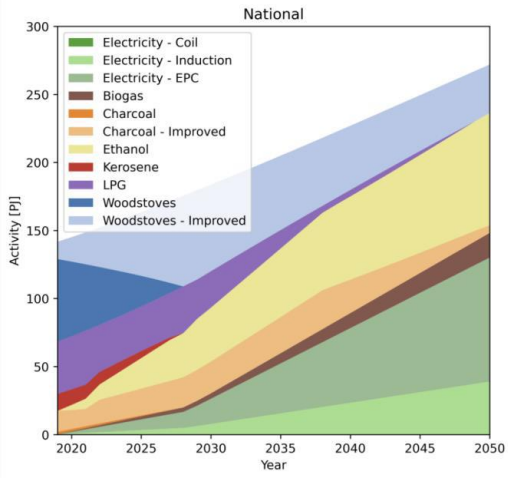


Figure 3.1 Transition to eCooking based on Tier 3+ Electricity Access

Elaborating further on this particular survey, out of 42% of people cooking with firewood, 11% would transition into using electricity, similar for LPG, where, out of the 34% using LPG, 9% would transition.

Whereas a caveat was given that these could be looked at as oversimplified arguments, the team at Nuvoni then started thinking about different scenarios

'If we are looking towards achieving Net zero, what needs to happen in terms of transitions?' is a question that the team considered. Since majority of Kenyans, as per the survey, were using wood fuels and charcoal, in the net zero scenario the team looked towards replacing any fuels that have emissions. The team did some modelling and by 2050 they were looking at just about 10% cooking with wood fuels, but charcoal is essentially almost eliminated.



eCooking Scenario

eCooking solutions such as EPC and induction cookers witness a steady growth as primary cooking solutions, more so in urban areas, accounting for approximately 9.5 percent in 2028 and increasing to 47.9 percent by 2050.

With secondary eCooking incorporated, the expected prevalence rate of eCooking in 2028 rises to 10.8 percent.

The team further modelled the impact of that scenario considering the question that what if things play out that way, what would it look like in terms of health impact, time savings, and environmental benefits?

Benefit	Measure	Unit of Measure	Baseline Scenario (10.76% eCooking)	Speculative/ Planned Activities Scenario (16.46% eCooking)	Experimental Tariff (17.06% eCooking)
Health Benefits	Health Impact	DALYS avoided	40,096	85,804	86,404
	Mortality Reduction	YLL	23,875	59,428	60,250
	Mortality Reduction	Lives	1,438	3,578	3,625
	Morbidity Reduction	YLD	10,167	25,324	25,673
	Morbidity Reduction	Cases	53,449	103,136	134,211
Impact on Drudgery	Total Time savings	HOURS	126,152,393	282,276,403	285,934,508
	Average time savings (adopting household)	HOURS	3,607	3,625	3,691
Environmental Benefit	CO2-equivalent reduction (CO2, N2O, CH4, CO, OC, BC)	TONNES	12,106,055	23,857,043	24,170,715
	Unsustainable wood harvest avoided	KGS	1,566,078,001	4,895,797,985	4,967,441,728
	Net Present Value of Social Benefits (Full Program)	**USD**	**241,698,448**	**297,284,891**	**163,901,305**

And the team had to really ask themselves critical questions

Elsie explained that as they interrogated the numbers, they asked themselves about the assumptions that were being made to generate the numbers. What kind of formulas were behind the tool?

'We felt anxious, you can see there are some discrepancies in the data but there is an imperative here. There is a policy that needs to be developed,' Elsie.

And the team continued reflecting. To what extent could they really stand behind the numbers based on the evidence that supports the generation of the numbers?

This is the position that brought them to the space. A personal journey that many in the room could resonate with.

Some critical reflections to set the tone of the workshop

- *Sometimes we can use evidence instrumentally, strategically, to achieve a certain objective, a certain goal, but we start to interrogate the evidence and start to wonder whether we should be changing our minds, whether we should be reversing our position.*
- *Should we be challenging our own assumptions?*

With the reflections and experience, Elsie hoped that the space could be honest, reflective, even provocative. Delegates were invited to explore the nuances together; even importantly considering the different journeys all brought to the room.

Overview of the two days

Day one was dedicated to insights from researchers across the different groups represented in the workshop. Day 2 would tilt more to co-creating aspects. Therefore, on the first day, delegates were invited to start thinking about

- What is modern charcoal?
- What do we do about the current policy environment?
- How do we rethink about how we do research?
- How do we translate research for policy and practice?
- What message do we want to send out to the rest of the world on how we should be thinking about sustainable charcoal transitions?

Peter Thobora: Opening Remarks

A journey of transition – from 'unclean to clean'

In his opening remarks, Peter Thobora the Deputy Director, Renewable Energy at the Kenya Ministry of Energy recalled that in 2019, a survey they carried out showed that 59% of Kenyans were using cooking systems that were not clean. In developing the Kenya Bioenergy Strategy (2020-2027) therefore, the government wanted the transition to happen from the 'unclean to the clean' which could be to electricity, bioethanol or even improved charcoal.

Peter reiterated that in Sub Saharan Africa, 1 billion people still cook with charcoal and firewood as their primary source adding that as per the SDGs, there was intention to eliminate this by 2030. He mentioned that in Kenya 9.1 million households still use traditional cooking systems with 1.7 million in urban areas compared to 7.4 million in rural areas.

In recalling that cooking touches every home across the country, and across the continent, Peter stated that the use of polluting fuels such as firewood, charcoal and kerosene, has effect on public health as well as the global environment.

"The main strategy to move the situation to cleaner, is making the available, clean, by improving the biomass combustion systems through use of higher stoves or making the clean available by switching to electricity, LPG, bioethanol among others," Peter.

Statistics in the year 2022 from the Kenya National Bureau of Statistics' demographics health survey showed that 69% of the population use fuel and charcoal as cooking fuels and that as a country, the Kenya National Cooking Transition Strategy targets to reduce the percentage of households that rely on solid biomass fuels from 69% to 7% low-emission/clean burning sustainable biomass by the year 2028 indicating that the country is on target.

Existing challenges

Peter mentioned existing challenges that would derail these country targets.

- ✓ In harvesting solid biomass, there is environmental degradation
- ✓ Inadequate regulation frameworks
- ✓ Viable business models coming in to play
- ✓ Low public awareness in terms of alternatives biomass fuels.

Existing opportunities

- ✓ Potential for generating biomass especially for briquettes, biogas, among others.
- ✓ Potential to cultivate energy crops for producing the biomass fuels.
- ✓ Increase awareness and scale up production and establish distribution systems

'We're still moving behind the rest of the world'

Peter indicated that as a country Kenya is targeting transition as a climate change requirement and hence the country's commitments to adopt measures to mitigate climate change as well as improving livelihoods of citizens. He recalled the available frameworks including the National Climate Change Action Plan as well as the Kenya National Cooking Transition Strategy.

Some of the priority areas being considered under the frameworks include bridging the gap in terms of access to clean cooking solutions, bridging the affordability gap from the demand side; promoting local manufacturing as well as reframing and raising awareness on role of clean cooking.

Peter hoped that at the end of the workshop, the team would have a direction as, he noted, the continent is still moving behind the rest of the world in terms of clean cooking.

Participants: In the room

The participants *(List in Annex),* grouped in diverse roles, took turns to introduce each other. They included:

- Policy makers
- Researchers
- Representing Civil Society Organisations/Non-Governmental Organisations
- Representing Charcoal Federation Organisers in Kenya

'The histories and the nuances'

The introductory session offered participants a chance to share their background and the work they were engaged in. There are those who have been in the energy space more than two decades, while others have been around for five years. Others are working within governments to shape policy, for example, in Zambia, where the government is actively reviewing and developing a Draft National Charcoal Strategy alongside Draft Charcoal Regulations. Others are engaged in federations and associations of charcoal producers, such as organized groups in Kenya (e.g., the Charcoal Producers Federation of Kenya).

As in the introduction by Elsie, it was clear to see that participants were also seeking clarities and consistencies in the sustainable charcoal work as some indicated that *'there are so many inconsistencies in this work'* while others said that when looking at charcoal and sustainability, there is need to flesh out the nuances while all the time being grounded by what the evidence is saying and what is 'on the ground'.

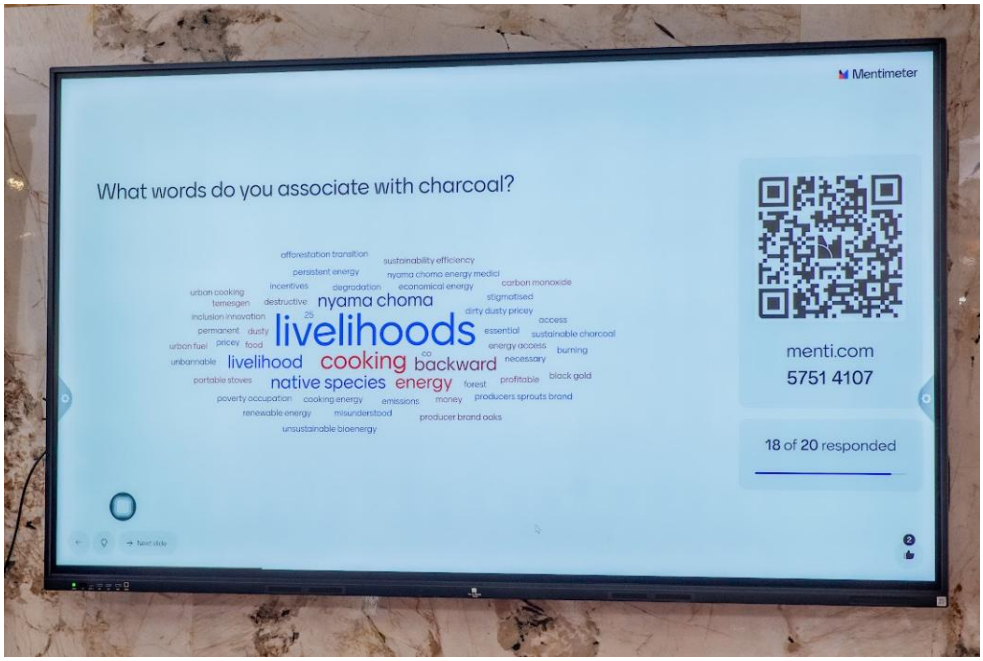
Other participants recalled the many years they had began on this work, how terminologies had changed in other spaces, and in others not. They recalled being called charcoal burners, while noting that burning painted a picture of something dangerous, and they spoke about the word 'producers' as a word that has been embraced over time, that truly speaks to the work they do, produce.

Other participants spoke of progress, and how the energy space practitioners can now speak in one voice as bio-energy practitioners, as opposed to the siloed way that had been embraced over many years.

It was also a moment where 'nuance' started to be felt, and as elaborated by many speakers, the workshop was meant to bring to the fore these nuances, so that a common voice could ring out on some of the issues. For example considering sustainability in charcoal production in the context of livelihood; looking at agriculture as playing a part in clearing forest as opposed to assumptions that charcoal burning is what was clearing forests, among many other nuances including language use of clean and unclean wording in the space of energy; as well as the political economy of the sector which has a big influence in the work happening in the sector.

It was a moment that that set a warm tone to the start of the workshop creating a warm space that felt welcoming for honest conversations.

Poll: What words do you associate with charcoal



In this poll, diverse words were shared by participants. Some words got more prominent space than others. *Livelihoods* occupied a prominent space which also reflected what had earlier been mentioned by participants as to the critical role charcoal plays in livelihoods.

In considering whether the words used implied either negative or positive connotations when thinking about charcoal, positive leaning words tended to be slightly more.

Positive leaning words include livelihood, essential, renewable energy, inclusion, innovation, producers, energy access, misunderstood, food, cooking energy, urban cooking, persistent energy, unbannable, money, economical energy, profitable, incentives, afforestation transition, sustainability efficiency.

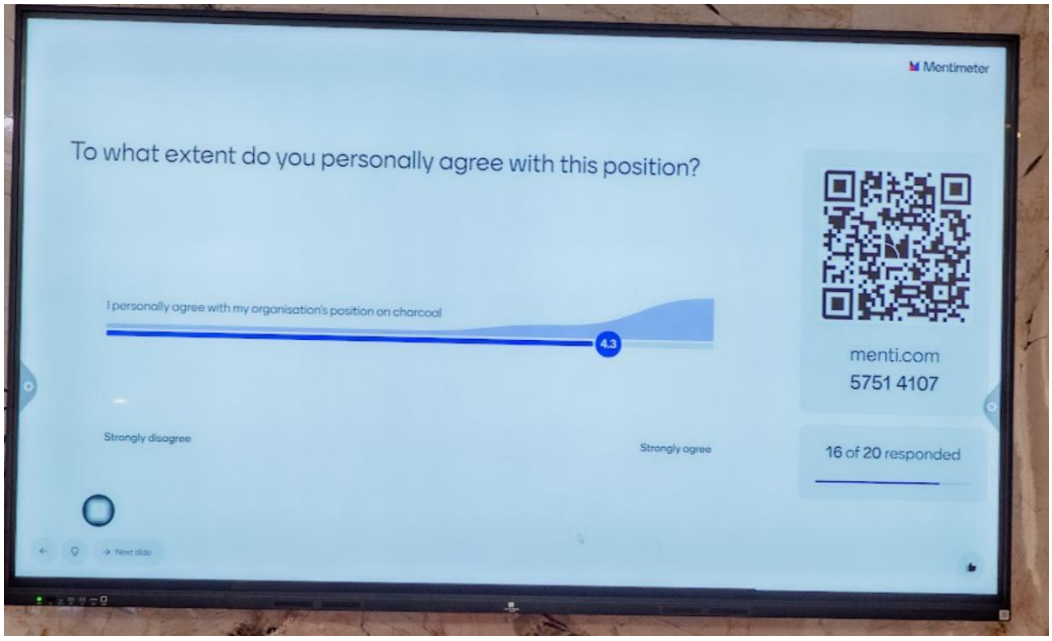
Negative leaning words include unsustainable bioenergy, dirty dusty pricey; backward, degradation; emissions; destruction; burning etc

Poll: What's your organisations' position on charcoal?

For many of the organisations in the workshop (54%), their organisations are actively working to reduce/replace charcoal. 23% are actively promoting the charcoal sector.

When asked to what extent the participants agreed with their organisation's position on charcoal, majority indicated they agreed, as shown in the next poll.

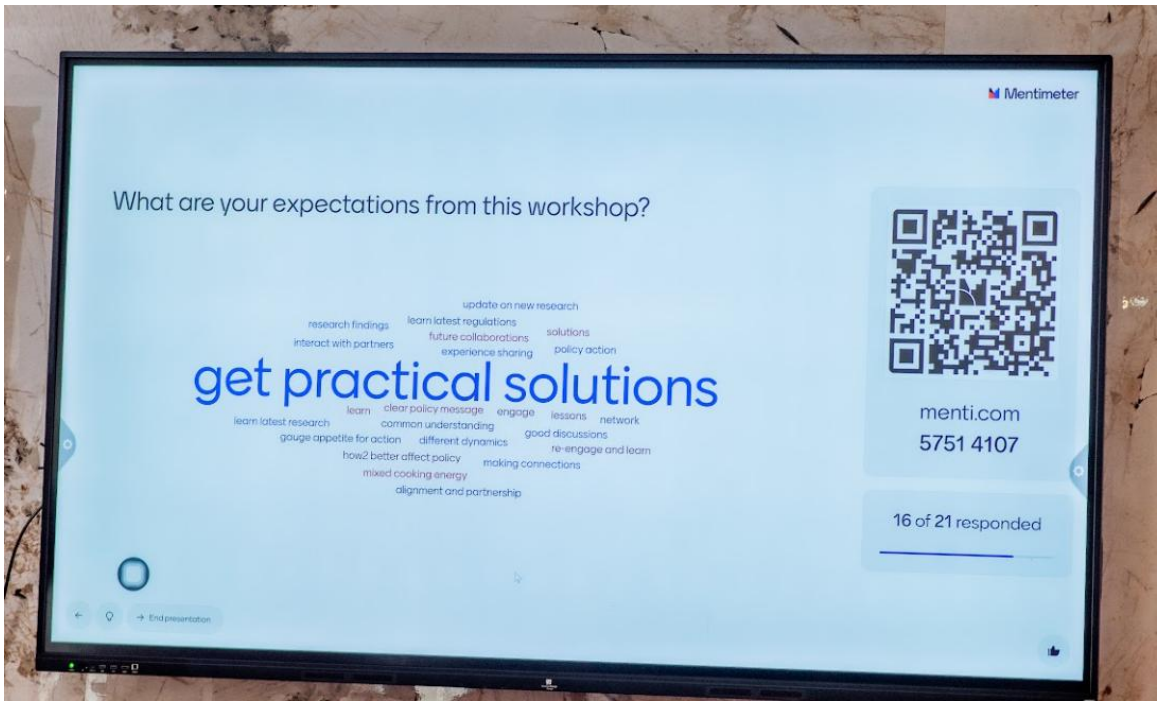
Poll: To what extent do you personally agree with this position?



Meeting expectations

In the next poll, participants were required to share some of their expectations. As shown below, to get practical solutions got a prominent response reiterating the need for the workshop to respond to pertinent questions respondents could have.

Other responses included updating on new research, developing common understanding, re-engaging and learning; to get clear policy messages, learning latest regulations as well as interacting with partners and experience sharing.



Session 1: Research Overview: Charcoal and firewood through the academic lens- dominant narratives and blind spots

This session by Tash Perros and Rebecca Clube from UCL explored academic perspectives on charcoal and firewood, examining dominant narratives, evidence gaps, and their implications for policymaking and funding in sub- Saharan Africa.

Highlights from the research

This is still work in progress. The aim of the research was to provide a context-specific understanding of how evidence is used to make policy decisions about cooking fuels in Kenya and Tanzania. A semi-structured academic literature review was adopted to review the evidence across key policy relevant areas – specifically health, gender, environment, livelihoods and climate. Search terms included every Sub-Saharan African country, including Kenya and Tanzania, as well as various terms to encompass different fuel types (charcoal, wood fuels, LPG, electricity, ethanol etc) commonly used in cooking, as well as technologies. It only included articles from the last 25 years (i.e. 2000-25).

Rural (99) environments were more studied than urban (45); majority of the articles were focused on health, although some had overlapping themes (particularly gender). Livelihoods were the least discussed.

Language used about fuels

Studies frequently used binary groupings: clean versus unclean; clean versus dirty; unpolluting versus polluting which could be inherently negative; Traditional/ biomass versus modern. Two studies used three groupings: “high” pollution (e.g. firewood, straw or dung); “medium “pollution included (e.g. kerosene, charcoal); and “low” pollution (e.g. electricity and LPG).

Looking at health overview - Burning fuel is seen to releases pollutants which means that Household members are exposed to these pollutants and that the exposure causes disease.

Summaries

The research offers summaries across the domains of health, gender, livelihoods, environment forest and land use as follows:

- ✓ Gender aspects most linked to health studies but also included topics such as time & drudgery and more general wellbeing indicators.
- ✓ Strong evidence to suggest women are primary cooks, and evidence demonstrating women's role in fuel collection duties
- ✓ Evidence that alternative fuels and technologies may have positive gender impacts, but studies were more fragmented in approach/ aims.

Livelihood aspects did not strongly emerge in this review; however, charcoal and other fuels provide income-generation opportunities, but with uneven impacts.

Environment – forestry

Evidence that deforestation and degradation are increasing problems in rural populated areas, but direct attribution to charcoal/ woodfuel activities more complex with context specific dynamics.

Improved Cook Stoves (ICS) and other technologies have potential to reduce wood fuel needs, but how that translates into forest savings is less clear.

Plenary discussions following presentation

What is the real intention behind eliminating charcoal?

A participant reflected on their own country. They noted that charcoal is a business and it involves a lot of people. They observed that the argument which has come from politicians and technocrats only involves 2 points:

- ✓ *Charcoal is killing people and people should stop using it;*
- ✓ *Assumptions that if alternative energy sources are used, forests will be okay*

'If today people use alternative energy e.g. LPGs, would forests still disappear?'

People clear land for agriculture. They cut twigs, they cut trees, and if there is an opportunity they make charcoal. But if not, they will leave that land for agriculture.

As regards communication using death messaging, these are emotional statements which also sweep away and do not address other factors that bring about, for example, respiratory diseases.

There is an intention to eliminate charcoal so that private companies make business using LPG.

The research team noted that these reflections aligned with what they found in the review. The ensuing conversation reflected on challenges in evaluating the real impacts of clean cooking interventions—particularly the accuracy, reliability, and design of studies assessing health, environmental, and livelihood outcomes.

Take away points

Weak Evidence Base & Study Design

- ✓ The best way to assess the impact of clean cooking technologies is through randomized controlled trials, but these are rare, expensive, and limited.
- ✓ Existing studies often fail to account for important variables, resulting in biased or weak evidence.
- ✓ Recent high-quality studies indicate that the health impacts of clean cooking interventions are lower than previously expected.

Charcoal and Biomass Challenges

- ✓ Many studies generalize biomass fuels; in reality, most biomass use is actually wood, not charcoal.
- ✓ Studying charcoal use is difficult due to its informal or illegal nature in some places, making data collection unreliable.
- ✓ This creates large evidence gaps around charcoal's real impacts.

Livelihood Impacts Are Under-Studied

- ✓ Researchers tend to favor quantifiable metrics like PM2.5, making livelihood impacts harder to capture and often overlooked.
- ✓ Interest in studying livelihoods is growing, but current search methods may not capture enough relevant research yet.

Mismatch Between Research and Policy

- ✓ There is a gap between how researchers and policymakers talk about clean cooking technologies.
- ✓ Terms like "clean" vs. "unclean" can be misleading or carry negative connotations.
- ✓ There's a need for more nuanced language, especially when discussing interim fuels, including charcoal.

Additional Study Approaches Emerging

- ✓ Beyond experimental studies and surveys, newer methods link survey data with modelled PM2.5 exposures, helping scale up exposure estimates.

Health Impact Complexity

- ✓ Exposure does not guarantee a health outcome; it only changes risk probability.
- ✓ Large datasets are needed to detect true effects, making studies both costly and uncertain.

Institutional Cooking Matters

- Impacts shouldn't only consider households; institutions (e.g., schools) often use large amounts of firewood, with different exposure risks and environmental effects and looking at it from a gender dimension, it being that it is mostly males who would be doing the cooking.

Environmental Considerations

- Sustainable fuelwood production and integrating profit models for fuelwood enterprises can reduce deforestation and support livelihoods.
- Clean cooking transitions must consider broader environmental trade-offs—for example, LPG may be cleaner at the end-use but has climate impacts due to transport and production.

Improved Cookstoves (ICS) Insights

- Some studies show ICS have larger-than-expected impacts, even more than charcoal or wood in some datasets. However, definitions of ICS vary, and results must be interpreted carefully.

LPG vs. Wood/Charcoal Health Benefits

- Despite being cleaner in emissions, studies haven't consistently shown significant health benefits from switching from wood to LPG, demonstrating the complexity of translating emission reductions into measurable health outcomes.

Session 2: Report Overview: A re-assessment of charcoal impacts and its role in modern cooking transition

The session by Caroline Ochieng (IRENA) took the participants through IRENA's report titled: *'A re-assessment of charcoal impacts and its role in modern cooking transition'*. This was followed by an interactive discussion on how these findings challenge existing assumptions and reshape the understanding of charcoal's role in energy transitions.

Highlights from presentation

Caroline emphasized the need for energy specialists to stay focused on energy access—especially cooking energy—as a core goal under SDG 7. She recalled that despite global progress, 1 billion people still lack access to modern cooking energy. She indicated that clean cooking is essential, not just for health and climate, but for energy security, especially in rapidly urbanizing African countries.

Caroline reiterated the need to counter persistent misconceptions about charcoal and its place in the energy transition calling on all participants to temporarily "think only as energy specialists."

Caroline mentioned some structural challenges in cooking energy and that shape the clean cooking landscape:

- *Rapid urbanization in Africa*
- *Population growth*

She noted that these factors increase demand for cooking energy—primarily wood and charcoal, which will remain major energy sources for decades. Hence the essential question becomes:

How do we secure sustainable cooking energy supplies now and in the future?

Charcoal remains:

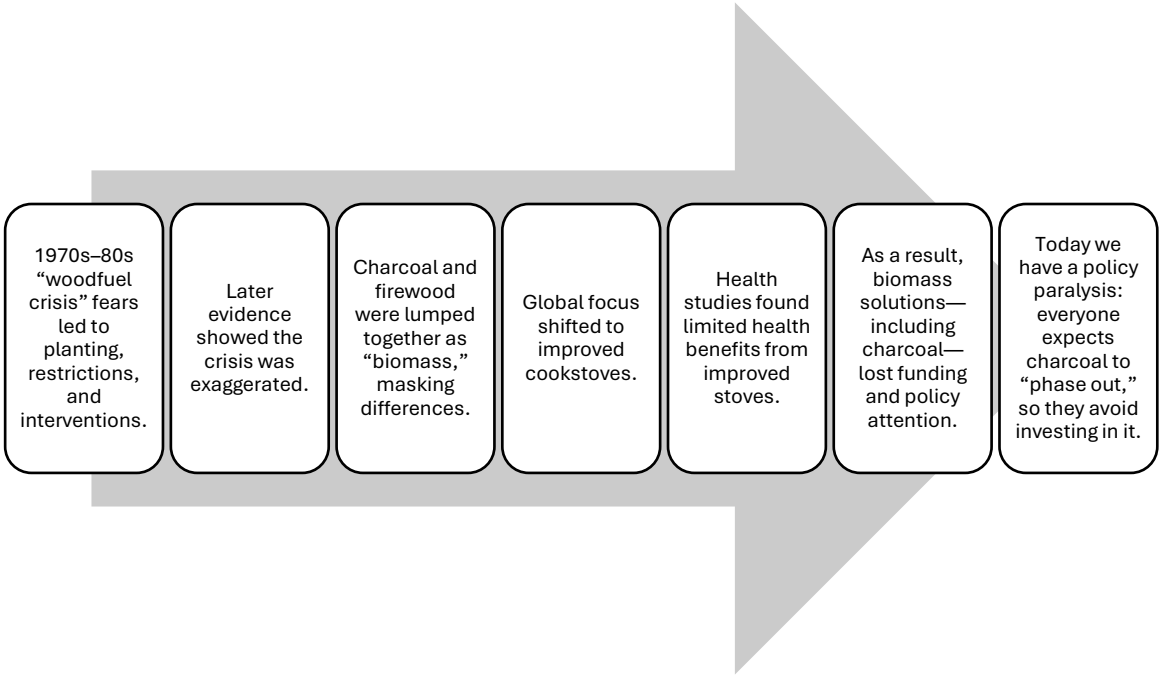
- Central in urban cooking.
- Embedded in African energy systems.
- Unlikely to disappear by 2050.

Yet, it receives little investment, modernization, or policy support. Caroline asked:

- Why is charcoal production still dominated by inefficient, old technologies?
- Why is there no significant push to improve charcoal kilns?
- Why is charcoal heavily stigmatized despite its centrality?

A look at how charcoal became stigmatized

The presentation traced a cycle:



Misconceptions about charcoal

The IRENA report challenges four major misconceptions:

1. **Health impacts:**

- Most health-impact data lumps firewood and charcoal together, giving a misleading picture.
- Very few studies isolate charcoal's specific effects.
- Charcoal's main risk is carbon monoxide in poorly ventilated spaces

2. **Deforestation**
    - Evidence points more to forest degradation than full deforestation.
    - However, degradation is serious and threatens long-term energy security.
    - The real concern is whether current extraction rates are sustainable.
3. **Climate impacts**
    - Impacts come mainly from:
        - Inefficient, traditional kilns; Land-use change and degradation.
    - Yet climate concerns must be balanced with ensuring energy access for millions.
4. **Charcoal as an obstacle to transition**
    - It is often argued that supporting charcoal slows adoption of LPG, ethanol, electricity.
    - Caroline questioned this claim: energy transitions can—and must—be multi-solution, not either/or.

Socioeconomic and livelihood considerations

The charcoal sector is largely informal, creating:

- Lost government tax revenue
- Unfair competition with regulated fuels like LPG and pellets
- Cartel-controlled markets

Producers earn very little; middlemen capture most of the value.

A modernized and regulated charcoal sector could offer:

- More equitable livelihoods
- Government revenue
- A fairer energy market

The need for modernised charcoal

Modernizing charcoal systems is essential and urgent. Improvements include:

- Selective harvesting and use of fast-growing species (up to 40% reduced tree loss)
- Modern charcoal kilns (up to 80% higher efficiency)
- Better post-harvest handling
- Efficient charcoal stoves

These collectively could transform charcoal into:

- A sustainable,
- Low-emission,
- Long-term,
- High-value cooking energy option.

"Africa faces a genuine energy security challenge in cooking energy, similar to the feared woodfuel crisis—only this time real and urgent" Caroline

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There is therefore need for:

- Reframing charcoal as a legitimate part of the clean cooking solution mix.
- Investing in modern, sustainable charcoal systems.

- Avoiding harmful narratives that delay action.
- Supporting multiple cooking technologies simultaneously

Plenary discussions

A core question was raised, *where is the place of the end user in clean cooking decisions and policy?*

A participant felt that while priorities are framed around climate/health/deforestation/energy transition, end users mostly decide on cost and ease-of-use (e.g., instant ignition, heat control, reliability). The implication is that current policy and monitoring frameworks (climate, deforestation, "primary fuel" indicators) don't reflect how households actually choose or use cooking solutions.

When it comes to policy and governance concerns, the end-user voice is missing in policymaking. Example: potential or actual blanket bans on charcoal risk ignoring user realities and affordability constraints.

A point raised also was on a fragmented strategy landscape whereby multiple documents (bioenergy strategies, clean cooking transition strategies) from the same ministry use different language and have different priorities, hampering coherence.

- Other contributions spoke about policy blind spots in land/tenure where commercial charcoal rules reference producer associations, but don't distinguish community land vs. private land, nor cases where the producer is also the land/tree owner.

- Conversations called for policy harmonization in including the need to align targets, definitions (e.g., "modern charcoal"), enforcement, and land/tenure nuances.

- A participant also called agricultural expansion as *a third major driver of deforestation* (alongside urbanization & population growth).

- Urban "choicelessness": In Kampala and similar cities, many households can't afford LPG/electricity; they are effectively locked into charcoal, creating predictable demand that can drive unsustainable harvesting.
    - Reported practices: indiscriminate felling and uprooting trees (including roots) to meet demand.
    - Modern charcoal pathway proposed:
        - Sustainable, private woodlots/agroforestry (hedgerows, mixed species).
        - Product differentiation ("sustainably produced" charcoal).
        - Improved conversion technologies (higher carbonization yields).
        - Improved end-use devices (stoves) to double number of meals cooked per unit of biomass fuel.
- On Metrics and Measurement Issues - Primary vs. secondary fuel distinction is misleading for policy and progress tracking.
    - Surveys (e.g., KNBS census question "main cooking fuel") miss stacking. Suggested measurement improvements:
        - Capture all fuels/devices used and for which tasks.

- Track time, cost per meal, reliability, convenience.
- Monitor exposure/health improvements when stoves are actually used (not just owned).

- Framing and Narrative Shifts Suggested
  - Move away from binary notions: "primary vs. secondary," "clean vs. dirty," "transition vs. backward."
  - Embrace energy stacking as normal and plan to make the whole stack clean(er) over time.
  - Reframe end users as choosing within constraints, not "stuck" or "irrational."

Some Practical Ideas and Action Points off the conversations

For policy & strategy: Institutionalize end-user evidence in policy design (participatory consultations, willingness-to-pay, user journey mapping); Harmonize policies across energy/bioenergy/forestry/land—use a common results framework and shared definitions; Tailor charcoal regulation to land tenure: different rules for community land vs. private woodlots; simplify compliance for smallholder producers; Recognize and standardize "modern charcoal": sustainable feedstock, efficient kilns, traceability, and labeling.

For markets and supply: Catalyze sustainable supply: seedlings, extension services, and finance for private woodlots/agroforestry; Scale improved kilns and training to raise yields and reduce pressure on forests; Promote high-efficiency charcoal stoves to stretch each bag further; Keep LPG/electric options available but ground programs in cost and convenience realities (e.g., pay as you cook, small cylinder exchange, last mile distribution).

For data and monitoring: Update survey instruments to capture stacking (multiple fuels/devices, task-based usage); Track experience metrics: time to light, heat control, cooking speed, kitchen cleanliness, total cost of cooking per week/month; Include safety (burns, leaks, fires) and reliability (fuel availability).

For platforms & convenings: Use the upcoming green/clean cooking summits to: Invite smallholder woodlot owners, charcoal producer associations, women's groups, urban consumers, and local regulators; Debate myths, present modern charcoal models, and agree harmonized policy language and measurement standards.

Open Questions to Carry Forward

- What exact definition of "modern charcoal" should Kenya/Uganda adopt (feedstock standards, kiln efficiency thresholds, labeling and verification)?
- How to design subsidies/financing that respect user priorities (cost and ease) without distorting markets?
- What minimum viable survey module would capture stacking and task-specific fuel use at scale (for KNBS and comparable agencies)?
- How to reflect land tenure realities in permitting so that private tree owners are encouraged—not penalized?
- What's the right mix of fuels/devices for urban low-income settings over the next 5 years, given price volatility and grid reliability?

Session 3: Research Overview: Revisiting policy narratives on charcoal: Insights from Kenya and Tanzania

In this session, Elsie Onsongo and Mourice Kausya from Nuvoni shared insights from Kenya and Tanzania on the role of evidence in clean cooking policymaking processes over the last 10 years. The overall project goal was to understand how evidence has historically shaped, or failed to shape, clean cooking policy decisions in Kenya and Tanzania.

The policy review is designed to:

- ✓ Understand how different cooking fuels (especially charcoal and firewood) have been framed over time in policies.
- ✓ Assess the use, misuse, or neglect of evidence in policy formulation and program design.

Highlights from presentation

Understanding Policy Documents and Evidence Use

- The team reviewed what policy documents *explicitly state* about clean cooking, charcoal, and transitions.
- A key observation: health impacts are often used as the major justification for transitioning, yet health policies rarely address cooking–related mortality.
- Over the past ten years, policy narratives have shifted, but not always consistently.
- Gender issues appear more prominently in newer policies (post-2016), recognising the specific vulnerabilities of women and children.

Gaps Between Evidence and Policy

- Evidence does not consistently shape policy; sometimes it is used to reinforce predetermined positions rather than guide objective analysis.
- Across policies, charcoal is frequently framed negatively:
  - As a health risk (pollution, mortality).
  - As a climate liability (emissions).
  - As a driver of poverty.
- The team struggled to find *neutral* analysis—bias is embedded in many policy processes.
- Some imperatives appear to be imposed externally, sometimes through selective citations.
- Evidence tends to shape problem definition, but rarely the choice of intervention.

Missing Nuance and Overarching Trends

- Many policies lack nuance; interviews revealed more complexity than is captured in written documents.
- There is a noticeable shift from control-based approaches toward:
  - Market-based interventions.
  - Behaviour-change approaches ("educating the public to use cleaner fuels").

- Even "neutral" evidence sources are often questionable or incomplete.
- Certain types of evidence are prioritized over others, leading to skewed interpretations.
- The "good fuels vs. bad charcoal" framing distorts analysis.

Key Questions Raised

- ✓ ***Who frames the conversation on charcoal?*** Often not the users, but researchers, donors, and international bodies.
- ✓ The lack of data in certain areas leads to broad negative conclusions.
- ✓ Should sustainable fuelwood/charcoal automatically be labelled "dirty"? Many felt framing needs to change.
- ✓ Participants stressed the need to differentiate: Charcoal from on-farm trees; Charcoal as an agroforestry by-product; Charcoal from protected areas (illegal). Policies rarely distinguish these, contributing to blanket negative narratives.

Charcoal Within the Economy and Policies

- Charcoal is not only an energy source but also a trade commodity.
    - Suggested to include an economic analysis ("charcoal as black gold").
    - Global charcoal trade: key exporters include Indonesia, China, and Poland; African exporters include Namibia, Nigeria, South Africa, and Egypt. Kenya and Uganda have banned exports.
- Kenya's policies show some acceptance of charcoal production despite bans:
    - In 2012, policy allowed controlled production.
    - Around 59% of Kenyans still rely on charcoal.
    - Full transition to higher-tier fuels is economically unrealistic in the near-term.

Contributions from Participants

Experience from Sustainable Charcoal Promotion

- Charcoal is a legitimate business and trade sector.

Attempts to anchor charcoal in energy policy often failed; more traction came through natural resources policy.

- The forest sector contributes ~3.4% to GDP; charcoal makes up roughly 50% of this. Removing charcoal would dramatically reduce contribution.
- Data exists but is rarely used effectively.
- Clean Energy vs. Local Realities
- LPG is expensive; subsidies are government-funded and dependent on foreign currency.
- Clean cooking transitions must consider affordability, sustainability, and local contexts.

Current Policy Landscape

- Although forestry policies often appear anti-charcoal due to deforestation concerns, there are also:
    - Programs supporting sustainable charcoal production.
    - Improved production methods that can increase yield by up to 30%.
    - Efforts to encourage improved cookstoves (ICS) and reduce reliance on traditional stoves.
- Transitioning completely away from charcoal in Kenya is not feasible; the goal should be:
    - Cleaner production,

    - Better efficiency,
    - Reduced environmental harm.

Observations on the Analysis Process

- Policy documents lack nuance; interviews sought to restore missing context.
- This work is essentially a discourse analysis — uncovering narratives, biases, and framings.
- Post-SDG policies increasingly reflect global clean-cooking narratives, often shaped by:
    - WHO (health framing),
    - SDG 7 indicators,
    - International clean-energy priorities.
- Some mismatches occur between Kenya's bioenergy strategy and newer global imperatives.

Definitions and Framing Challenges

- Definitions of "transitioning," "clean," or "renewable" are inconsistent.
- Charcoal can be a renewable energy when produced sustainably.
- "Clean" is usually defined only at *point of use* (in-house pollution), ignoring:
    - Sourcing,
    - Transport,
    - Production,
    - Lifecycle sustainability.
- The team must agree on its own definitions and narrative for the workshop output.

Path Forward / Recommendations

- Disaggregate analysis across:
    - Energy policies,
    - Forestry policies,
    - Bioenergy strategy,
    - Action plans.

    - *Include the **Bioenergy Action Plan** to balance interpretation.*

- Clarify the different narratives and where they come from.
- Acknowledge and articulate nuance more clearly.
- Identify where problem definitions differ from proposed solutions.
- Recognize transitional pathways within charcoal, not only away from it.

Session 4: Policy Discussion: Charcoal realities: Government perspectives on national contexts and policy pathways

This was the first of a two-part policy discussion that brought together government representatives to share national experiences on charcoal and related policy design. It was moderated by Murefu Barasa (EED Advisory) – Moderator, it consisted of three panellists: Tmesgen Tefera (Ethiopia); Peter Thobora (Kenya) and Susan Machange (Tanzania)

Highlights of the session

The session explored how different countries approach charcoal policy design, the complexity of multi-ministerial involvement, and the challenges of creating sustainable and inclusive policies. Panellists reflected on how different governance contexts shape policy choices.

Policy Approaches

Countries tend to adopt one of three main stances:

- Non-interventionist – minimal government involvement.
- Militant/Restrictive – bans and tight controls.
- Facilitative – allowing charcoal but within regulated, sustainable frameworks.

Country Perspectives

Ethiopia

- Charcoal overlaps across ministries (Agriculture for deforestation; Water and Energy for energy use).
- No explicit national policy on charcoal under the Ministry of Energy.
- Charcoal is permitted in certain contexts:
- During large infrastructure projects (e.g., Grand Ethiopian Renaissance Dam) when biomass is cleared.
- With temporary or conditional licenses.
- Access to clean cooking is below 10%.
- Transition cannot ignore charcoal because:
    - It is widely used.
    - Improved cookstoves make charcoal more efficient.
- National policies focus on clean cooking, so charcoal is barely mentioned. In agriculture policy, charcoal production is discouraged.
- Forests and catchment areas permit licensed charcoal production.
- Charcoal production is private but permitted to some extent.
- Minimal focus so far on:
    - Charcoal standards.
    - Quality control.

Key recommendation: standardization and licensing to ensure quality, control environmental impact, and allow taxation.

- Licensing across the value chain: Producers; Transporters; Brokers; Retailers
- Proper licensing ensures:
  - Government revenue (taxation).
  - More efficient governance of the chain.
- Must consider affordability, especially for rural consumers.

Tanzania

- Charcoal is managed through multiple institutions.
- Tanzania has four national policies/strategies advocating for clean cooking
- Policies promoting improved cookstoves and briquettes
- Several policies touch on charcoal

Challenges:

- Fragmentation across policies.
- Limited integration of private sector and local actors.
- Financing gaps for sustainable charcoal producers.
- Many initiatives are supported by development partners. However, local NGOs work to ensure alignment between:
  - Private sector needs
  - Government priorities
  - Donor-funded programs
- NGOs play a strong advocacy role for broader energy mixes beyond LPG.

Recommendation: build capacity, connect producers with finance, and standardize production.

Kenya

- Policy development is structured under energy, forestry, climate change, and devolution systems.
- Charcoal sits between national and county governments, creating:
  - Overlapping mandates
  - Double taxation risks (particularly highlighted by participants)

Emphasis on:

- Intergovernmental cooperation.
- Clear separation of national vs county roles (e.g., production licensing vs transportation).
- Inclusive policy-making involving civil society, private sector, NGOs, and counties.

Cross-Cutting Issues Raised

External (donor) Influence

- Many charcoal-related policies and studies are donor-funded.
- Deeper reflection as to whether this distorts policy priorities
- Consensus among speakers: *Funding is not a problem if local priorities remain in control.*

Need for Inclusion

Policies must include:

- Government (national + local)
- Private sector
- NGOs
- Charcoal producers
- End users, who are often ignored but crucial.

Standardization and Licensing

Seen as essential for:

- Ensuring sustainable charcoal.
- Improving efficiency.
- Creating traceability.
- Allowing fair taxation without overburdening producers.

Importance of Governance Layers

- Where authority is split (e.g., Kenya), coordination is critical.
- Implementation is often blocked by:
    - Conflicting regulations
    - Unclear mandates
    - Lack of capacity at subnational level

Legal and Land Tenure Barriers

Example from Mexico: sustainable charcoal production was blocked by lack of land ownership documents.

- Multiple permits required.
- High illegal activity due to bureaucratic barriers.
- When charcoal is legalized/formalized, profits shift from intermediaries to producers.

Core barrier: tenure and land rights.

Similar challenges noted in East Africa.

Recommendations Shared by Panellists

For Countries Designing New Charcoal Policies

- Ensure inclusion of all stakeholders from the start, especially producers and end users.
- Standardize production and set quality benchmarks.
- Create a licensing system for:
    - Producers
    - Transporters
    - Retailers
- Balance affordability and sustainability, since charcoal remains a key household fuel.
- Clarify mandates across ministries and levels of government.
- Differentiate sustainable vs unsustainable charcoal clearly in policies.
- Provide financial access for small producers (through banks, projects, or subsidies).
- Engage donors but maintain country-driven priorities.
- Avoid policies that "give with the right hand and take with the left."Some existing policies are counterproductive.
- Coordination across ministries is critical.

On Inclusive Policy Making: End users' voices are often missing; Adequate public participation is essential; Government often co-develops policy with: NGOs; Private sector; Community groups; Policy briefs from non-government actors can be instrumental.

On Global vs Local Interests, there is need to balance local realities with donor-driven priorities; Pre-engagement with donors ensures alignment with national priorities; Mitigation required when donor programs risk misalignment.

Session 5: Thematic Break-Out Groups

The aim of this session was to identify the challenges to modern charcoal along the value chain. It was moderated by Julia Tomei, Tash Perros, and Rebecca Clube all from UCL.

Julia explained to the participants that they would identify challenges then the next day they would focus on co-creating practical solutions.

Participants were divided into three mixed groups The exercise aimed to map challenges along the **charcoal value chain**, focusing on three areas: **supply**, **demand**, and the **enabling environment**.

Each table had flip charts and coloured post-it notes:

Pink = supply issues
Green = demand issues
Yellow = enabling environment issues

Examples include:
Supply: feedstock production, kiln issues, trade regulations
Demand: household and institutional use, technology, affordability
Enabling environment: policy, finance, gender and inclusion, integration

Each challenge would be written on a separate post-it and marked as **low**, **medium**, or **high importance**. Groups were encouraged to identify linkages and synergies between challenges.

A simplified charcoal value chain was provided (from biomass production through to end-use), but teams were free to expand or adapt it.

Group 1 feedback

- To have donor influence
- Reactionary policy making
- Lack of integration within the biomass agenda
- Business case for modern charcoal
- Affordability gap for modern charcoal

Group 2

- Information block
- Technology training related to information,
- Quality questions, challenge in demands for charcoal
- Consumers are not confident to make purchase
- General lack of coordination across sectors
- Tax incentives policies
- A lack of coordinated efforts in the sector

Group 3

- ✓ Inefficient feed stock, availability of seedlings, lack of trees, production seeds, high yielding technologies for charcoal those available are not suitable for the context,
- ✓ Lack of available high yield tech
- ✓ For the end user, attitudes and perception, charcoal from supermarket considered for the rich, the sustainable is perceived as a rich person product those at the bottom woint buy
- ✓ Misaligned strategy between stakeholders
- ✓ Difficulty in coordination
- ✓ Lack of political will

Reflections and Framing for Day 2: Key Learnings About the Future of Modern Charcoal

The Power of Language

- The terms we use—*clean vs. dirty*, *modern vs. traditional*, *producers vs. burners*—shape the narrative around charcoal.
- Language influences how stakeholders perceive the sector, the solutions proposed, and the stories told.
- We need to be intentional about language so it reflects reality rather than reinforcing stigma.

Recognising Complexity

- Charcoal sits within a complex system; solving one problem in one area may create unintended challenges elsewhere.
- Reductionist approaches—especially those focused solely on limiting investment—do not match the realities of people's livelihoods.
- We must embrace the full breadth of the charcoal ecosystem rather than oversimplifying it.

Policy Challenges and Opportunities

- Policy debates reveal fragmentation: different sectors and agencies propose isolated solutions that don't always align.
- Oversimplification of the charcoal value chain leads to narrow policies that fail to address systemic issues.
- Diverse production methods, technologies, and fuel types need to be recognised rather than treated as a single category.

Diversity Across Contexts

- There are significant differences both within and between countries.
- A key question is: *How can we support each other across diverse contexts while recognising these differences?*
- Another important question: *Can we (and do we want to) speak with one voice on charcoal?*

Emerging Points

Modelling and Evidence

- There is a need to model land cover implications of wood harvesting more accurately.
- An optional pre-session would introduce approaches for modelling land cover dynamics.

6. Energy, Enthusiasm, and Collaboration

- There is strong enthusiasm around the topic of charcoal and its future.
- The challenge is: *How do we sustain this positivity and momentum after leaving here?*
- Maintaining this level of conversation and collaboration is important for long-term impact.

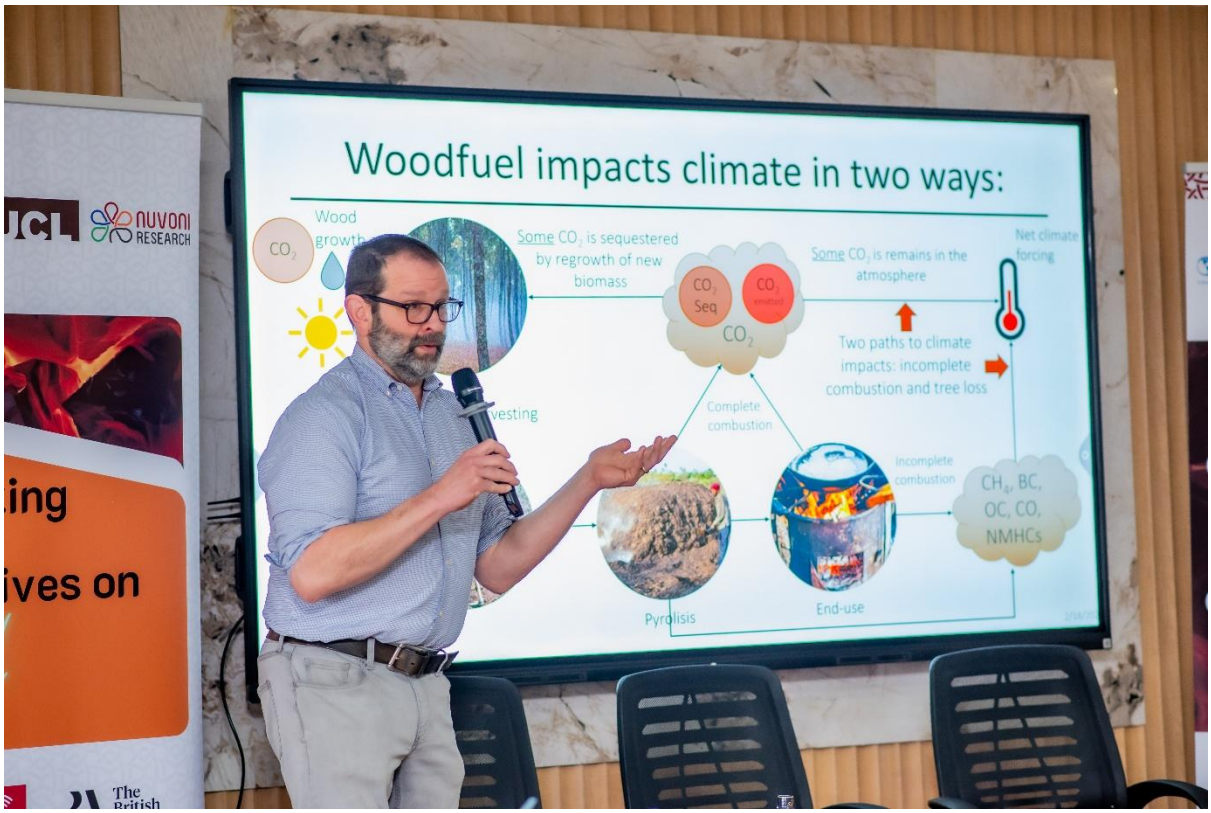
7. The Role of Government and the Private Sector

- Government needs to engage more deeply with the private sector's experience and expertise.
- Policies and interventions will only succeed if they include voices from across the entire value chain.

Day 1 Sights

Session 6: Modelling Charcoal Impacts using the MoFuSS tool

The session by Adrian Ghilardi (TNC, National Autonomous University of Mexico) and Rob Bailis (SEI) introduced participants to the Modeling Fuelwood Savings Scenarios (MoFuSS) - a GIS-based model designed to estimate avoided CO2e emissions resulting from a reduction in woodfuels use.



Highlights of the session

For over a decade, the research team has been studying how large-scale wood fuel harvesting affects land cover. Although individual households harvest wood for subsistence, scaling this behaviour across billions of people—plus commercial charcoal and fuelwood production—creates significant environmental and climate impacts.

To analyse this, the team developed the **MoFuSS model** (Modelling Fuelwood and Sustainability Scenarios). An earlier version was called the **WISDOM model**. Around three years ago, the UNFCCC requested the team to use MoPUS to develop new global default values for **fNRB** (Fraction of Non-Renewable Biomass), a key parameter used by carbon project developers to calculate emission reductions from improved cooking or fuel-switching projects.

Woodfuel, Combustion, and Climate Impacts

Wood production follows the natural carbon cycle: trees absorb CO_2 and store carbon. When wood is burned (either as fuelwood or charcoal), the carbon is released back into the atmosphere:

- Complete combustion emits mostly CO_2.
- Incomplete combustion—especially common in traditional stoves and during charcoal production—releases pollutants such as methane, black carbon, organic carbon, carbon

monoxide, and non-methane hydrocarbons. These compounds contribute to radiative forcing and have major health impacts.

Charcoal is especially harmful because pyrolysis intentionally creates incomplete combustion, emitting more climate-warming pollutants. After harvesting, some of the CO_2 released is reabsorbed as vegetation regrows—unless land use changes permanently (e.g., agriculture or infrastructure). MoFuSS attempts to model specifically this harvest vs. regrowth balance.

What the MoFuSS Model Does

MoFuSS is a highly flexible modelling platform that operates at project, national, and multi-country scales. As the scale increases, more simplifying assumptions are necessary.

The model estimates two core components:

1. Woodfuel harvesting (demand)
2. Forest/vegetation regrowth (supply)

The balance between the two determines areas of likely degradation or sustainability.

For the UNFCCC global exercise, MoFuSS produced default fNRB values for all low- and middle-income countries.

Model Components and Data

MoFuSS is built with multiple programming languages and thousands of lines of code. It uses:

- Population distribution maps
- Fuel choice and fuel consumption estimates
- Land-cover and biomass maps
- Rules for how different users source wood (self-collection vs. charcoal transported via roads)
- Travel-time and terrain-based algorithms
- Stochastic (randomized) elements to reflect real-world uncertainty
- Monte Carlo simulations to represent a range of possible outcomes

From these, the model generates probability maps of where wood harvesting most likely occurs and estimates landscape degradation over time. Uncertainty is significant—but UNFCCC policy tolerates a small statistical margin because many carbon methodologies require simplified values.

Current Challenges and Improvements

Challenges include:

- Large uncertainty in mapping woodfuel-driven degradation
- Difficulty separating woodfuel extraction from other drivers such as agriculture or timber
- Limited data on charcoal production locations and supply chains
- Rapidly changing land-cover and biomass datasets that outpace policy adoption
- Lack of detailed information from project developers on where and when stove deployments occur

The team is working on enhancements, including:

Incorporating land-use change (e.g., forest-to-agriculture)

- Integrating new biomass and land-cover maps
- Adding agroforestry options
- A web interface allowing users to run models remotely
- Exploring remote-sensing signatures for charcoal kilns to improve attribution

Relevance for Policy and Charcoal Management

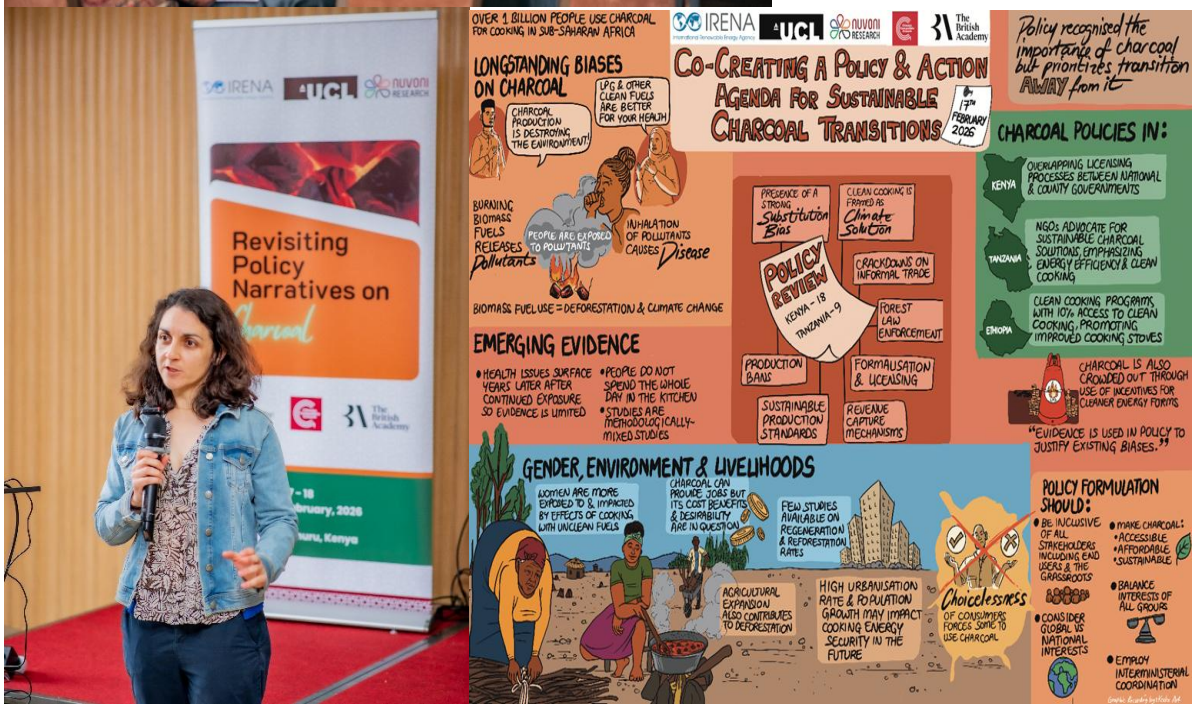
MoFuSS outputs can:
Identify hotspots where woodfuel harvesting is unsustainable

- Support governments in planning **charcoal management zones**, fuelwood supply enhancement, or agroforestry interventions
- Show where depletion is likely to occur fastest
- Highlight areas where supply is strong and could be managed sustainably

Although not a perfect tool, it provides evidence to guide policy decisions on sustainable charcoal production, afforestation, and rural energy planning.

Workshop Day 2

After the earlier optional session of the MoFuSS Model, participants were officially welcomed to the second day's session by Elsie Onsongo (Nuvoni). Elsie introduced the participants to a visual that captured the previous day's proceedings. The visual summarized in a pictorial and simple way the day's discussion to support wider reach of the workshop's messages.



Tash Perros (UCL) then reflected together with the participants, through the previous day's sessions highlighting the key messages.

Session 7: Panel Discussion: Spotlight on what works: Pathways for sustainable charcoal

The panel, moderated by Sylvia Herzog (The Charcoal Project), showcased successful innovations and policies that demonstrate pathways for advancing sustainable charcoal production and use in Africa. The panellists included Charles Meshack (Tanzania Forest Conservation Group); Patrick Kituku (Charcoal Producers Federation of Kenya); Michael Tebere (Kijani Forestry, Uganda); David Jessee (Kenya Bioenergy Round Table, Kenya)

Charles Meshack (Tanzania Forest Conservation Group) discussed TFCG's work on village land forest management, emphasizing Tanzania's large area of village land forests.

The model promotes community-based forest management, where villages designate forest areas, develop management plans, and gain economic benefit from sustainable harvesting.

Major challenges

- Weak policy enforcement despite existing frameworks.
- Competition for land use, which pressures village forest reserves.
- Limited coordination between government sectors: energy, forests, land, and local government.

Success factors

- Regeneration capacity of forests—trees regenerate from roots, stumps, and seeds.
- The model has grown to 40 villages and can scale further.

Requirements for scaling:

- Investment in community capacity building.
- Stronger institutional support.
- Market incentives for sustainably produced charcoal.

Michael Tebere (Kijani Forestry, Uganda) presented on Kijani Forestry, a private social enterprise working with farmers using innovative agroforestry and sustainable woodfuel systems.

Their Three Operational Models include:

Smallholder Farmer Model

- Farmers integrate 1 acre per year for 6 years using agroforestry.
- Trees are intercropped with food crops.
- Huge income increases
    - 600% increase by year 5,
    - 1500% by year 8,
    - 1800% by year 11 onward.

- Currently engaging 65,000 farmers across 5 sub-regions.

Forest and Woodland Restoration

- Demonstrated ecological success (e.g., return of wildlife like leopards).
- Restores degraded land while supporting biodiversity and carbon sequestration.

On-field Biochar Production

- Addresses rampant bush burning during the dry season by turning waste biomass into biochar, giving farmers "cash instead of ash."

Value Chain Innovation

- Establishing tree nurseries (treenets) on farmers' own land—bringing seedling production closer to communities, reducing costs.
- Using improved kilns achieving 45–60% efficiency, compared to 12% for traditional kilns.
- Creating sub-county charcoal warehouses:
- Charcoal will be bagged, branded, and sold by weight.
- Each bag will have a QR code showing origin and tree species.
- Enables full traceability and regulation.
- The system is designed to support domestic and international charcoal markets.

Patrick Kituku (Charcoal Producers Federation of Kenya) stated that the Federation was established in 2017 and has 64 charcoal producer associations and active in 17 of Kenya's 47 counties. Its core mandates include: Advocacy and representation; Market access support; Data collection and technical assistance and Linking producers with transporters and buyers.

Policy Issues in Kenya:

- Charcoal regulations have had major gaps for decades.
- Lack of political goodwill has stalled policy execution for nearly 10 years.
- The Federation is pushing for:
    - Subsidies for modern kilns (too expensive for rural producers).
    - Policies supporting fast-maturing tree species and regeneration.
    - Official recognition of natural regeneration as a sustainable feedstock.
- Emphasized urgent need for coherent national support to scale sustainable production.

David Jessee from Kenya Bioenergy Round Table, Kenya highlighted Kenya's progress toward coordination in the biomass energy sector, which previously lacked coherence.

Kenya is now forming:

- A National Bioenergy Committee
- An Innovation Platform under the national biomass strategy.

Innovation Platforms gather experts to solve specific technical problems—for example:

- Packaging & bottling of bioethanol
- Efficient kiln designs
- Standardization and certification challenges

He emphasized:

- The need to frame charcoal as part of the broader bioenergy ecosystem.
- Strong collaboration across sectors to avoid fragmented efforts.

- Opportunities for the sustainable charcoal movement to integrate into national energy planning.

Plenary highlights

Communities need:

- Access to village forest land.
- Clear governance systems.
- Forestry training and business skills.
- Links to markets.

Women play a major role:

- In Uganda, **70% or more of farmers** involved are women.
- Women have full use-rights for land they cultivate even without formal ownership.

Innovation Priorities

- Kijani's biggest innovation:
  - bringing nurseries (treenets) to the farm, reducing cost and increasing ownership.
- Kenya needs:
  - Subsidized improved kilns,
- Policies supporting feedstock regeneration.

Investment Requirements

- In Tanzania, each village forest management unit requires around **$10,000** to set up governance systems, mapping, and planning.

The panel showcased diverse but converging models for scaling sustainable charcoal in East Africa.

Common themes included:

- Stronger governance and enabling policies
- Community empowerment and income generation
- Technological innovation in charcoal production
- Investments in regenerative forestry
- Need for national coordination across sectors

All panellists emphasized that sustainable charcoal is achievable with the right policy environment, financing, and community engagement.

Session 8: From challenges to catalytic opportunities

In this interactive session led by Anne Nyambane (NORCAP-FAO) and Rob Bailis (SEI, participants identified key challenges across the charcoal value chain, reflect on emerging insights, and voted on the most promising catalytic opportunities. They worked in breakout groups, where they refined these ideas for advancing sustainable charcoal transitions.

Instruction: The participants identified major challenges across the charcoal value chains. They would use a process called back-casting. It meant that they would assumes that the future states we want to materialise is a result of current policies. Given that, how do we get to point B given that we are on point A? The participants had to generate a vision of the future. They would decide on the category and choose the specific challenge. The problems have been solved, the group had just to show how they were solved.

Presentations from group work

Group 3: Governance Challenges

Informal Nature of the Charcoal Sector: The charcoal sector operates largely informally, which contributes to negative public perception and weak regulatory oversight.

Lack of an Enabling Fiscal Framework: There is no supportive fiscal or policy framework to facilitate adequate financing for a sustainable charcoal value chain.

Weak Governance and Limited Independence: Governance structures lack independence at multiple levels. Stakeholder interests—including those of donors—often influence decision-making. Additionally, limited political goodwill undermines efforts to strengthen transparent and accountable governance.

Governance Solutions

In 2040, we focused on formalising the charcoal sector to promote sustainability and improve governance. Using a bottom-up approach, we engaged communities, listened to their needs, and incorporated their insights into the frameworks we developed.

Key Governance Actions

Sustainable Forest Management: Ensured that forests are maintained and that charcoal production follows sustainable practices.

Financing and Enforcement: Mobilised financing and strengthened enforcement agencies to ensure that legal frameworks are effectively implemented.

Digital Systems for Traceability: Developed digital systems to monitor and enforce where charcoal is sourced, improving transparency and accountability.

Fiscal Frameworks and Business Models: Created fiscal frameworks supported by attractive and sustainable business models while phasing out unsustainable charcoal production methods.

Financing Approach: We prioritised government-sourced financing to reduce dependency on donor funding. At the same time, we supported local livelihoods through sustainable business models that promote long-term economic resilience.

Group 2: Sustainable and Thriving Charcoal Sector

The goal is to establish a thriving charcoal sector where sustainability and efficiency are optimized. This requires addressing the entire supply, demand, and use chain.

Key Challenges: Lack or inadequate financing for sustainably produced charcoal; Limited funding for efficient technologies across the value chain, including: Processing, Utilization, Transportation. Even aggregating sustainably produced charcoal requires proper investment.

Lesson from briquettes: The sector benefited from tax exemptions, showing how policy and financing support can drive growth.

Focus Area: Prioritizing localized solutions that allow the local economy to thrive, while ensuring the charcoal value chain becomes more sustainable and efficient.

Type of Model & Concepts Developed

Focus on **supply-side financing mechanisms**

Two proposed mechanisms:

One targeted at **large commercial producers**.

Another for **smaller producers**, ensuring they are not pushed out even as large players scale up.

Discussion highlighted several **institutional reforms** required for private financing to become feasible.

Formalization and Enabling Environment

In areas where charcoal production is currently *illegal*, formalization must occur before private capital can participate.

Once formalized, financing can be directed to the production side.

Historically, the private sector has shown low interest in the charcoal value chain due to long-standing stigma.

Decoupling charcoal from negative perceptions could help attract investment.

Demand-Side Mechanisms

The key mechanism to shape demand is promoting the use of high-quality, efficient cookstoves.

Carbon finance can be leveraged to reduce the cost of these appliances, making improved cookstoves more accessible.

Success heavily depends on having a proper enabling environment.

Methodology Challenges

There is currently no clear carbon methodology for fuels.

If both supply and demand sides had recognized methodologies, it would open opportunities to access carbon credits, not just credits tied to end-user devices.

Emphasis on Feedstock and Restoration

- Need to strengthen feedstock production and align it with restoration programs.
- Sustainable charcoal production should be positioned as a restoration initiative.
- If government restoration programs exist, the charcoal association should be included in planning and implementation.

Group 1: Engaging stakeholders across the entire value chain, noting that many currently operate in silos.

- Ensuring traceability from sourcing the raw material all the way to consumption.
- Strengthening digital data systems to support:
    - Accountability

    - Quality assurance
    - Value-chain visibility
- Building a digital ecosystem that supports industry-wide coordination, regulation, innovation, and monitoring.
- Establishing a formalized industry supported by:
    - Technology promotion
    - Standards and certification
    - Technology governance
    - Enabling policy
    - Adequate financing

Recognizing that technology, policy, and financing are mutually reinforcing, and all are needed to build a sustainable future charcoal industry.

Key Challenge Identified: Technology

- The group selected technology as the central challenge, noting that current technologies used across the charcoal value chain are inefficient or harmful.

Specific Challenges

- Sourcing and harvesting practices are unsustainable.
- Carbonization kilns are mostly traditional, low-efficiency, and high-emission.
- Packaging and retailing practices are outdated or poorly regulated.
- Existing technologies do exist, but their uptake is extremely low.
- The major barrier is capital — the cost of acquiring, adopting, and scaling new technologies.

Financing as a Cross-Cutting Challenge

Government encourages cooperatives and sustainable woodlots to register under carbon credit mechanisms, but:

- There is currently no functional mechanism to make this accessible.

The group argued that even without carbon finance, the government should:

- Create a patient capital fund to support large-scale charcoal production and plantation establishment.
- Encourage long-term investment because first harvests can repay costs and offer profit.

The real gap may not be alternatives — it is financing and incentives.

Even where efficient kilns are introduced, people use them minimally, suggesting:

The need to understand choice mechanisms

And create proper incentives so that the rational choice is to adopt efficient technologies.

How to Reach the 2040 Vision

The group explored pathways to move from the current state to the envisioned 2040 industry.

Proposed Interventions

Incentivize all actors along the value chain, including:

- Training farmers
- Supporting local artisans to produce efficient kilns
- Improving transport efficiency
- Providing low-interest, dedicated loans for producers and processors

Capacity Building Across the Chain

- Consumers should be informed about the benefits of high-quality charcoal.
- Producers and intermediaries should understand how efficiency affects profit.

Inclusive Support for Small-Scale Producers

- Many small producers are families supplying local markets.
- They should not be left out of the transition.
- Their inclusion aligns with the principles of a Just and Inclusive Energy Transition.

Propose:

- Aggregating small producers into associations/cooperatives
- Supporting them with seedlings
- Providing shared or central processing technologies
- Ensuring they can produce sustainably and competitively

Scaling Up Industrial Production

Industry structures seen in crops like cotton and tobacco can be replicated.

Government can:

- Establish regulatory frameworks
- Encourage formation of associations/cooperatives
- Build institutional structures for a fully formalized industry

Key Reflections

- A new charcoal industry is not breaking new ground — Kenya and the region have precedents in other sectors.
- Success will require:
  - Technology adoption
  - Clear incentives
  - Financing mechanisms
  - Institutional development
  - Inclusive approaches

- A key question is whether we are targeting small-scale producers or commercial-scale operations.
- There are already established value chains in these countries that we can build on.
- When we look at sectors such as cotton, tea, and coffee, we find hybrid production systems that could be adapted or replicated for the charcoal industry.

- Taking a bioenergy approach, for example through ethanol production, follows the same principles—ranging from small-scale to large-scale distilleries.
- The knowledge and expertise already exist; what is needed is replication and customization to fit local contexts.
- Business models are already available, and can be adapted for the charcoal and broader bioenergy value chains.

Session 9: Charcoal realities: Government perspectives on national contexts and policy pathways - Policy Implementation

Caroline Ochieng (IRENA) -moderated this session, in conversation with Martin Asiimwe (Rwanda); Mumba Shambayi (Zambia); Thokozani Nelson Malunga (Malawi); and Herbert Abigaba (Uganda). Caroline began by mentioning that there was a cross-cutting consensus that charcoal is here to stay; it cannot be eliminated in the short to medium term; that it needs to be better regulated, more sustainable, and integrated into national cooking energy strategies. She reiterated that charcoal discussions can be politically and socially sensitive, yet they must be contextualized within:

- Forestry
- Energy access
- Livelihoods
- Social and cultural dynamics

The following offers summary highlights into the conversations on government perspectives with a focus on policy implementation.

Country Experiences & Lessons

Uganda: Regulatory Context

- Uganda has a long-standing charcoal regulation system: charcoal is licensed at the village level, from production to transport.
- Three governance approaches have been adopted over the last decade.
- A 2023 Presidential Executive Order imposed a temporary charcoal ban due to:
- Extreme deforestation in northern Uganda
- Illegal and unsustainable production

Current Situation

- The ban is still affecting the sector, but illegal production persists.
- Uganda's National Green Cooking Strategy (to 2040) acknowledges:
    - Biomass will remain key
    - Charcoal will still play a major role

Key Issues

- Charcoal is often criticized publicly but used privately.
- The need to design policies that reflect:
- Real household energy needs
- Social and cultural contexts
- Enforcement limitations

Zambia

Sector Realities

- No "one-size-fits-all" energy solution; charcoal remains central.
- 98% of nationally produced charcoal is for cooking, predominantly in urban areas.
- Despite low electricity tariffs, electricity supply is unreliable → continued dependence on charcoal.

Regulatory Challenges

- Charcoal bans have been introduced in hotspot forest areas, but:
    - Workforce for enforcement is insufficient
    - Illegal production remains high
- Charcoal production fees (~$20) are not prohibitive, encouraging more entrants.

Current Efforts

- Amending charcoal regulations and developing a national charcoal strategy.
- Supporting private sector through:
- Energy Week exhibitions
- Awareness on efficient charcoal stoves

Lessons

- Policy exists, but implementation is the biggest challenge.
- Need for:
- Better enforcement capacity
- Training for charcoal producers
- Support for sustainable kilns

Malawi: Legal Framework

Unsustainable (illegal) charcoal is prohibited by law.

Licencing required for:

- Production
- Storage

- Transportation

Licences issued only after proving sustainable forest resource ownership.

What Works

- Strong enforcement:
- Forestry officers and police routinely confiscate illegal charcoal.
- Illegal charcoal is now risky, unpopular, and expensive.
- Result:
- Using illegal charcoal becomes more expensive than cleaner alternatives (electricity, LPG).

But Enforcement Alone Is Insufficient

- People still need to cook → illegal smuggling continues.
- Government investment in alternative and sustainable charcoal production is essential.

Recommendations from Malawi

- Provide capital support (seedlings, modern kilns).
- Establish community-level sustainable woodlots.
- Waive taxes on sustainable charcoal to allow it to compete against illegal charcoal.
- Attract companies to scale sustainable charcoal production.
- Flood the market with affordable, well-packaged, sustainable charcoal.
- Increase awareness campaigns.

Rwanda

Context

- Small land mass; high competition for forest resources.
- Charcoal discussions often receive pushback, but the sector is "unstoppable". How can it be made sustainable?

Policy Evolution

- 2019 Bioenergy Strategy:
  - Promote cleaner cooking
  - Balance forestry and energy needs
- Forestry Authority established to oversee sector sustainability.
- Refugee influx has increased pressure on forests.

Current Strategies

- Target: increase forest cover to 20% by 2030.
- Charcoal producer associations manage forests directly under government oversight.
- Some degazetted areas leased for:
  - Electric pole production
  - Charcoal from residues

Challenges

- Modern kilns introduced but producers sell charcoal to industries (e.g., cement companies) rather than households.
- Bans don't work unless people have viable alternatives.
- Financial barriers for clean cooking businesses.

Key Priorities

- Capacity strengthening for producers.
- Business model development.
- Improve finance mechanisms for green cooking companies.
- Implementing the national clean cooking strategy.

Cross-Cutting Issues and Recommendations

Enforcement Alone Is Not Enough

Bans fail without:

- Alternatives
- Capital
- Community involvement
- Evidence shows communities will still find ways to produce and use charcoal.

Need to Flood the Market With Sustainable Charcoal

- Large-scale production needed to compete with illegal charcoal.
- Support both:
- Illegal producers transitioning to legal operations
- Companies needing concessional finance

Research and Evidence Gaps

- Need clear definitions of "sustainable charcoal".
- Studies needed on:
- Fast-growing species suitable for charcoal
- Best kiln technologies
- Value chain dynamics

Coordination Challenges

- Charcoal sits across **7 government sectors** in some countries.
- Need inter-ministerial committees and national charcoal/clean cooking taskforces.
- Important to bridge the gap between **academia, policy, and communities**.

Representation and Inclusion

- Producers must be included in:
- Decision-making
- Training
- Awareness programs
- Data must reach grassroots actors.

Awareness and Behaviour Change

- Efficient charcoal stoves
- Proper packaging
- Consumer awareness

Final Reflections Shared

- Banning charcoal doesn't work without viable alternatives.
- Laws are essential to differentiate legal from illegal charcoal.
- Policies must come with resources for implementation.
- Ground-up approaches are needed—charcoal is a livelihood.
- Bridging the gap between research and policy is critical.
- Sustainable charcoal requires:
- Renewable forest sources
- Efficient kilns
- Efficient end-use stove

Session 10: Actor-Type Breakouts

In this session led by Adrian Ghilardi (TNC, National Autonomous University of Mexico) participants got into groups by actor type to identify their specific roles, needs, and contributions in advancing the catalytic opportunities, followed by a plenary to share and align commitments. The groups consisted of policymakers, researchers, NGOs and private sector.

In their roles, the participants were to figure out what they can do to advance the modern charcoal agenda; they were to also indicate what they need to do that then finally respond to, how do you imagine the Network working?

Policy group

- Provide legal policy and enforce them
- Charcoal has been vested bin many sectors, strengthen intergovernmental agency coordination
- Need capacity building for producers

What do you need

- Evidence on the benefits of modern charcoal from researchers,
- Impact of modern charcoal vs traditional charcoal
- Technical expertise and technical expertise, along the entire value chain
- Funding from donors to formalise entrepreneurs along the value chain. For example, the Kenya Green Climate Fund programme implemented by GIZ focused on formalising producers of clean cookstoves.

Researchers

- Use the evidence we generate

- Setting definition
- Support on evidence-based policy
- Translation of our research,
- Impact evaluations
- Health surveys disaggregating
    - Use scientific evidence to challenge narratives
- Setting definitions

What do you need

- Invitations to be in study design
- General access to governmental data and more streamlined data between countries
- More collaborations with the private sector and the data they have and to assess their business model

Private sector

- Visibility on international scale
- Guiding regulations
- Most of the positive projects will bring revenue and can help pushing regulation in the right direction
- Success stories, collaborate with regulators improving value chain bringing benefits to government in budgetary, economic

What you need

- Increase visibility
- We need support with scientific validation
- Collaborate with governments
- Government budgetary implications---motivate more projects—mainstream economic impact reports

NGOs

- Intend of funds
- Manpower
- Advocacy for the sector and awareness raising

What do you need

- Policy makers to listen to our input and implement policies
- Research scientists access to data and analysis and supporting evidence
- Private sector share info and best practices to help other entrants into the sector

Session: Synthesis and Next Steps

As part of the workshop closure, Mary Njenga (CIFOR-ICRAF) led the participants through Synthesis and Next Steps. Here are summary highlights from the session.

A key question was asked: *How do we document the outcomes of this workshop and move forward together?* A need for a **clear, succinct documentation** that:

- Convinces donors and partners.
- Captures consensus.
- Is co-created by all participants.

Key Elements to Include in the Communique / Brief

- Strong Messaging

1. **A positive narrative on sustainable charcoal**
   - Charcoal must be repositioned as part of *renewable bioenergy*, not a harmful legacy fuel.
2. **Correct misrepresentations and myths**
   - Charcoal has been misrepresented in cooking energy debates.
   - Clarify:
     - The **fuel itself is not the problem**.
     - The issue is the **methods of production**, which we aim to modernize.
     - Provide research/evidence on health impacts and improved technologies.
3. **Define "modern charcoal" clearly**

Emphasize sustainability, improved production systems, and integration into clean energy transitions.

Explain charcoal's role in the clean energy transition

It is *not* a transitional fuel that will disappear.

It is here to stay—but must be sustainably produced and regulated.

Recognize charcoal as an energy product within the larger bioenergy ecosystem.

Policy and Governance Recommendations

Policy framing

What should Sub Saharan Africa governments do to support modern charcoal?

Possible content:

- Enabling policy and regulation.
- Budget allocations.
- Cost–benefit assessments using credible data.
- Fiscal incentives.

Budget and investment implications

- Need for strong recommendations on:
- Cost-benefit evidence.
- Social and economic benefits.
- Charcoal sector valued at **~$250M/year** but poorly tracked — strong case for reform.

Importance of political voices

- A document gains power when it carries voices of influential leaders who help disseminate it.

Strategic Considerations

Future Voice and Advocacy

Changing narratives will require:

- Time, patience, and strategic engagement.
- Presence in regional/global events.
- Publishing a **"Nairobi Paper."**
- Engaging 5–6 governments.

Take advantage of upcoming platforms:

- Clean Cooking Summit (July, Kenya).
- Annual renewable energy conferences.
- COP and other international forums.

Goal: **Mainstream modern charcoal in global and African policy agendas.**

Forming a Modern Charcoal Working Group

Need for:

- Continued collaboration.
- A mechanism for sustained engagement.
- Possible network or community of practice.

Questions to resolve:

- Who wants to join the working group?
- Who wants updates but no active involvement?
- How will we keep the group running without funding?

Use the working group to:

- Share evidence.
- Advocate for the communique.
- Influence national-level decision-makers.
- Funding and Opportunities
- Sustainable charcoal is eligible for climate finance and donor funding—important point for countries that have not yet submitted their NDCs.
- Need to mobilize funding for:
    - Continued collaboration.
    - Research.
    - Advocacy activities.
    - Engagement in global forums.

Immediate Next Steps

- Draft the communique (co-created).
- Disseminate within governments and partner organizations.
- Plan structured advocacy engagements, including:
    - Political leaders

    - Parliamentarians
    - Energy ministries
- Coordinate inputs for a longer-term Nairobi Paper.
- Strengthen the strategy for perception change around charcoal.

Open Questions from the Workshop

- Have mindsets around charcoal begun to shift?
- How do we maintain momentum after the workshop?
- What is needed to reach the point where funds begin to flow?
- How do we bring allies on board to strengthen our messaging?

Appreciation to:

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