

Small flame but no fire

Wood fuel in the (Intended) Nationally Determined Contributions of countries in Sub-Saharan Africa

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RESEARCH
PROGRAM ON
Forests, Trees and
Agroforestry

Working Paper 232

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DOI: 10.17528/cifor/006651

Amugune I, Cerutti P, Baral H, Leonard S and Martius C. 2017. *Small flame but no fire: Wood fuel in the (Intended) Nationally Determined Contributions of countries in Sub-Saharan Africa*. Working Paper 232. Bogor, Indonesia: CIFOR.

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We would like to thank all funding partners who supported this research through their contributions to the CGIAR Fund. For a full list of the 'CGIAR Fund' funding partners please see: <http://www.cgiar.org/who-we-are/cgiar-fund/fund-donors-2/>

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Abbreviations

AfDB	African Development Bank
AFOLU	Agriculture, Forestry and Other Land Uses
CCU	Climate change unit
CONEDD	Conseil National pour l'Environnement et le Développement Durable (CONEDD), Ouagadougou (Burkina Faso) [National Environment and Sustainable Development Council]
AER	Agence d'Électrification Rurale du Cameroun (AER), Yaounde (Cameroon) [Rural Electrification Agency]
FEICOM	Fonds Spécial d'équipement et d'intervention Intercommunale (FEICOM), Yaounde (Cameroon) [Special Council Support Fund for Mutual Assistance]
FONERWA	National Climate and Environment Fund (FONERWA), Kigali (Rwanda)
GCF	Green Climate Fund
GHG	Greenhouse gas
GIIMC	Grupo Inter-Institucional para Mudanças Climáticas (GIIMC), Maputo (Mozambique) [Inter-Institutional Group on Climate Change]
INDC	Intended Nationally Determined Contribution
LEDS	Low emissions development strategies
LPG	Liquid petroleum gas
LULUCF	Land-use, Land-Use Change and Forestry
MET	Ministry of Environment and Tourism, Kampala (Uganda)
MRV	Measuring, reporting and verification
NAMA	Nationally Appropriate Mitigation Action
NAP	National Adaptation Plan
NAPA	National Adaptation Program of Action
NCCAMS	National Climate Change Adaptation and Mitigation Strategy
NCCC	National Climate Change Committee
NCCP	National Climate Change Policy
NDC	Nationally Determined Contributions
NEAP	National Environmental Action Plan
REDD	Reducing Emissions from Deforestation and Forest Degradation
REMA	Rwanda Environment Management Authority, Kigali (Rwanda)
SDG	Sustainable Development Goals
SSA	Sub-Saharan Africa
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change

Acknowledgments

This research is part of CIFOR's Global Comparative Study on REDD+ (www.cifor.org/gcs). The funding partners that have supported this research include the Norwegian Agency for Development Cooperation (NORAD) (Grant no. QZA-16/0110 No. 1500551) and the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) (Grant no. KI II 7 - 42206-6/75), and the CGIAR Research Program on Forests, Trees and Agroforestry (CRP-FTA) with financial support from the CGIAR Fund Donors.

Key messages

- Wood fuel is extremely important for energy security in Africa. Some eighty percent of both rural and urban populations in the 49 countries that comprise South-Saharan Africa rely on wood-based biomass to satisfy their energy needs, especially for cooking.
- We reviewed and assessed INDC/NDCs of a selection of sub-Saharan countries to identify how they focus on wood fuel. Only five of the 22 countries analyzed do not mention wood fuels at all (Sub-Saharan Africa comprises 49 countries). Two of these five (South Africa and Botswana) are heavily dependent on coal, while three of them (Ghana, Mozambique and Guinea Bissau) give no conclusive reason for this omission.
- In a majority of the analyzed INDC/NDCs (78%) wood fuel is identified as a priority measure of some sort, but to varying degrees. The INDC of Somalia stands out with a section on charcoal production and export that explains in detail how charcoal production affects the environment.
- Seventeen countries that mention wood fuel show intention to increasingly use renewable energy as a mitigation measure (wind, solar and hydropower are mostly mentioned). Three countries want to increase the efficiency of electricity grids.
- Most INDC/NDCs refer to a variety of national plans and policies, but for the majority of countries (17 of 22), it is not apparent what progress has been made in implementing these plans.
- Many INDC/NDCs cite the supporting national policies and strategy documents. Countries have ambitious plans, but need much more clarity on responsibilities, institutions, planning, roadmaps and financial help to implement them. It is important that the NDCs be integrated broadly into national planning processes for future development pathways, and associated activities and investments.
- Only 55% of the investigated INDC/NDCs provide a budget for their implementation. External financial support is vital for successful implementation of many INDC/NDCs, but countries do not generally indicate amounts and kinds of funding they already receive.
- When charcoal is portrayed as a problem, the prioritized solution is often electrification (e.g. hydro-energy or fossil-fuel powered generators), but increasing other forms of renewable energy, such as wind and solar, is sometimes mentioned as an alternative.
- Half of the sampled countries have national energy policies with renewable energy targets. The others have non specific energy actions referring to general policies (NAPs and NAPAs). Lack of energy specific policies is therefore a common phenomenon that needs addressing. It is important that NDCs be integrated into national planning processes for future development pathways, and that associated activities and investments be outlined in more detail.
- Overall, future NDCs in SSA need to become more specific regarding wood fuel. While all of them mention roadmaps, only just about half of them identify institutional responsibilities for the wood fuel sector. This stands in stark contrast to the importance of wood fuel as a key energy source in Sub-Saharan African countries.

1 Introduction

Reliance on wood-based energy from firewood and charcoal is far greater in sub-Saharan Africa (SSA) than in any other region in the world. A study by Behrendt et al.(2013) shows that in the 49 countries comprising SSA, the majority (80%) of both rural and urban populations rely on wood-based biomass to satisfy their energy needs, especially for cooking. In Africa, the most common forms of wood fuel are firewood and charcoal, which are mostly used by domestic households and small industries for heating purposes (Bailis et al. 2015).

The use of wood fuel is ambiguous as it can lead to forest degradation and deforestation, but can also become part of sustainable, bio-based energy systems in the context of low emissions development strategies (van Pelt and Leisch 2016). It is therefore of interest for climate change policy development to understand how wood-based energy is addressed in the *Intended Nationally Determined Contributions* (INDCs) and *Nationally Determined Contributions* (NDCs) of SSA countries. Are unsustainable practices recognized and targeted? Is sustainable wood energy part of the mix of solutions? And are indicators given to gauge success on both fronts?

All 49 countries in SSA successfully submitted their INDCs¹ ahead of the 21st Conference of the Parties (COP21) facilitated in 2015 in Paris by the United Nations Framework Convention on Climate Change (UNFCCC). Shortly after, the ratified agreements on INDCs became NDCs which were submitted to the NDC registry on the UNFCCC website² (Osman-Elasha et al. 2016). We considered both INDCs and NDCs in this study, but in a comparison, we found that there were few differences between them due to the automatic nature of the transference of INDCs to NDCs. Therefore, in this paper, we refer to them collectively as INDC/NDCs.

This study aimed to identify: (i) how wood-based energy use is covered in the various INDC/NDCs; (ii) the various legal frameworks and processes under which renewable energy is to be managed; and (iii) how the countries' plans for wood fuel's future management will contribute to reduced GHG emissions.

1 Available at http://unfccc.int/focus/indc_portal/items/9240.php. The term 'INDC' is used under the UNFCCC for reductions in greenhouse gas emissions that all signatories were asked to publish for the 2015 UNFCCC held in Paris, France. Countries based their INDCs on their specific national priorities, circumstances and capabilities.

2 Available at <http://www4.unfccc.int/ndcregistry/Pages/All.aspx>

2 Methods

Stratified random sampling was applied to select a subset of countries of the SSA region for analysis. Twenty-two countries were randomly selected from the data set³. The INDC/NDC documents were reviewed using the following criteria: how wood fuel was introduced, listed or framed in the INDCs; the existence or listing of renewable energy plans and energy efficiency plans; and the existence of supporting national policies and strategic documents that may or may not be implemented. These criteria were used to show whether and how countries prioritized wood-fuel consumption and how they could formulate a strategy for the sustainable consumption of wood fuel and use of alternative energies.

A literature search was carried out using bibliographic databases, such as Web of Science (Thomson Reuters) and Scopus (Elsevier), and institutional websites and databases (e.g. UNFCCC). The key words used to search for relevant literature were: ‘wood fuel’, ‘energy policies’, ‘renewable energy’ and ‘woody biomass energy’. Francophone countries in the sub-Saharan region submitted their INDCs in French; these were translated to English via a PDF document translator website⁴. A matrix was developed to rate wood-fuel consumption, the proposed problem, against the solutions (alternative energies, energy efficiency, supporting policies, green growth economy, etc.) proposed by the countries.

3 The regions of Sub-Saharan Africa (west, central, east and south).

4 <https://www.onlinedoctranslator.com/>

3 Results

The countries in our sample focused on different issues in varying levels of detail in their INDCs. Yet, some common elements are presented by all countries: low carbon development plans, summaries of adaptation and mitigation measures, quantified emissions reduction goals for 2030, overall estimations of investment needed to finance INDC measures and plans, technology transfer and capacity-building needs (Osman-Elasha et al. 2016).

3.1 The focus on wood fuel in African countries' INDC/NDCs

Five of the 22 countries analyzed do not mention wood fuel at all in their INDC/NDCs. Two of these (South Africa and Botswana) are heavily dependent on coal and will likely continue to be so. This might explain the absence of wood fuel from their INDC/NDCs. The other three (Ghana, Mozambique and Guinea Bissau) gave no conclusive reason.

Three of the 22 countries did not mention wood fuel in the problem statement but referred to it as a mitigation measure/adaptation action to be implemented. This may suggest that these countries depend on wood fuel to a certain degree or enough that current wood fuel use is considered unsustainable.

Fourteen countries mention wood fuel in their problem statement and give various reasons (e.g. land-use change, climate variability and GHG inventory). Eight (36%) of these 14 countries have also quantified the problem, stating that wood fuels are responsible for 70%–97% of national fuel consumption, which illustrates the extent of wood-fuel consumption in the country.

3.2 Renewable energy as mitigation

Seventeen countries mention wood fuel in their document. All of these express an intention to engage in renewable energy development of some sort as a mitigation measure. They list various actions that will promote the use of renewable energy in the country (see Table 1). Fourteen focus on wind, solar and hydropower to fill the current deficit. The three remaining countries focus on increasing the efficiency of electricity grids.

3.3 Energy sector reforms as a mitigation action

The INDC/NDCs of the countries analyzed identify the energy sector as a priority for mitigation action. Planned or listed activities range from general sector-wide targets, such as increasing renewable electricity generation, to specific action items, such as distributing clean cook stoves (e.g. Cameroon). In terms of legal frameworks to support this, eight of the 17 countries that include wood fuel in their INDC/NDCs refer to national energy policies, through which the renewable energy targets are supposed to be achieved, while the other nine countries refer to general policies within their INDC/NDCs that include energy actions. The INDC/NDCs generally lack information on implementation.

3.4 Adaptation

Seventeen of the 22 countries mention a National Adaptation Plan (NAP) or equivalent national plan or strategy, and/or have begun adaptation implementation according to their INDCs. Eleven have

completed their NAP or equivalent national plan or strategy. Six are in the process of planning or declare an intention to plan (either developing a NAP or equivalent national strategy) and five provide no indication of adaptation planning in their INDCs.

3.5 From plans to implementation

Most INDC/NDCs seem rooted in a variety of plans and policies (existing or in progress) such as national development plans, climate change response policies, low carbon development strategies, NAPs, National Action Program for Adaptation (NAPA), National Climate Change Action Plans and Nationally Appropriate Mitigation Actions (NAMA). However, in the majority of countries (17 of 22), it is not apparent from the INDC/NDCs what progress has been made on the implementation of already adopted national policies and strategies. The remaining countries mention implementation of the policies at national level, but the extent to which this implementation has progressed remains unclear.

Most countries included in the present analysis show an increasing trend toward introducing national policies with instruments related to climate-resilient development (81% of the countries, see Table 1). Information provided by the countries highlights an increasing trend toward the mainstreaming of climate change into national and sectoral development priorities. This seems a positive development, as analysis from Reducing Emissions from Deforestation and Forest Degradation (REDD) countries shows that if countries do not have national ‘ownership’ of the policy process, national advances in REDD+ are limited (Korhonen-Kurki et al. 2014).

In general, it can be argued that the realities of policy development related to the preparation of the INDCs provide grounds for increased action in the future. However, the timing and scale of such enhanced action depends on the determination of governments and the long-term effectiveness of the 2015 agreement.

3.6 Indicators of success

The majority of the countries analyzed (17 of the 22) specify deforestation as a policy progress indicator, which seems an inadequate measure to gauge progress on instruments and practices in the wood-fuel sector. Five of 22 countries (Botswana, Burundi, Kenya, Mozambique and South Africa) mention climate variables as their indicators, e.g. drought, floods, temperature variability. Mitigation action measures commonly mentioned toward reducing deforestation are afforestation, reforestation activities and natural regeneration of forests, for which budgets are included in the INDCs (Table 2).

Reforestation and ecosystem restoration are major and crucially needed elements of pathways to meeting the Paris goals, because only the land sector has the potential to build a positive sink for carbon emitted to the atmosphere. The reforested and restored areas would need to be protected against illegal logging and degradation from selective firewood extraction. The INDC/NDCs in our sample do not seem to recognize the importance of this, with the exception of five countries (Ghana, Guinea Bissau, Malawi, Zambia and Tanzania).

It seems that sectoral indicators to address wood-fuel sustainability are underdeveloped. For sustainable management of the sector, administrations need to gain better understanding of how unsustainable practices are effectively being pushed back, and what the results of this are along the whole value chain. Likewise, indicators are needed to show how sustainable practice toward integrating bio-based fuels in a healthy energy mix is fostered. Synergies can be gained in linking this to the efforts that countries undertake to achieve the UN Sustainable Development Goals (SDGs), where SDG 7 aims to “Ensure access to affordable, reliable, sustainable and modern energy for all.”

3.7 Synergies between mitigation and development action

Sixteen of the 22 countries mention the need to develop synergies between the suggested actions to address climate change and development priorities (see also discussion above on integration with SDGs). Development includes social and economic development and poverty eradication, e.g. improvement in air quality, human health and job creation. In the 16 countries, links are being made in the INDC/NDCs between adaptation and mitigation measures, in particular agriculture and forestry; for example, sustainable land management practices, improved livestock production practices, and protection and restoration of forests. These are adaptation measures with mitigation co-benefits. Synergies are being sought at project, sector or landscape level, in planning or institutional frameworks at national, regional and local level, and in urban and rural settings. This synergy is viewed as part of their overall low-emission, climate-resilient development strategy.

3.8 Finance

All countries in our sample mention the need for financial support from the international community and donors in order to be able to fulfill their INDC/NDCs, with regard to both mitigation and adaptation actions in the INDC/NDC.

Only three countries (Mozambique, Malawi and Guinea Bissau) do not provide any financial budget figures for their contribution activities, although they mention that financial support will be crucial for them. The majority, 12 countries, mention elaborate financial budgets for these sectors and further distinguish clearly between mitigation and/or adaptation activities mentioned in the INDC/NDCs. This is an indication that governments have been making efforts toward more elaborate financial budget plans. The agriculture sector is likely to receive the majority of the funding (see Table 2). Six countries (Central African Republic, Kenya, Ghana, Namibia, South Sudan, Tanzania and Zambia) only provide blanket financial budgets stating that it will enable them to fulfill their adaptation and mitigation contributions.

3.9 Implementation of INDC/NDC with road maps and institutional set-ups

All countries mention implementation plans with road maps for their INDC/NDCs (see Table 3). They include the creation of specific laws and policies to facilitate INDC implementation; for example, capacity building, technology transfer and funding, and stakeholder consultation for the INDC preparations. Ten countries mention institutional set-ups, which include indicating which government departments are responsible for INDC implementation. Also included are budget allocations for adaptation and mitigation measures (see Table 3). Eight countries mention partial budgets meant for adaptation and mitigation measures. Only four countries do not provide a budget (Liberia, Malawi, Mozambique and Somalia).

4 Discussion and conclusions

The main aim of this study was to understand the role and consideration given to wood fuel in INDCs in selected countries in sub-Saharan Africa. The majority of the countries (78%) have identified wood fuel either as a problem to be addressed in their INDC/NDCs, or as part of their mitigation and adaptation measures. This is a positive sign. However, the priority given to wood fuel varies between these countries. A highlight is the INDC of Somalia, which has a section on charcoal production and export that explains in detail how charcoal production affects the environment. Some countries that do not mention wood fuels in their INDC/NDCs, e.g. Ghana, instead mention renewable energy, degraded land and reforestation as part of their mitigation and adaptation measure. We would like to note that a limitation of the present study (and of the analyzed INDC/NDCs in general) is the lack of reliable wood-fuel consumption data. More support is needed for the collection, processing and publication of reliable data.

Few countries have quantified the environmental or climate impacts of wood-fuel consumption. There is lack of consensus on specific criteria and information that should be provided regarding the scope and nature of INDCs. The lack of standardization gives wide flexibility for countries to include the types of information they deem adequate (Merrill et al. 2015). While this may have been intentional in the development of the INDC process, it will hamper comparison among INDCs and make it difficult to measure progress in later phases. Energy profiles vary from one country to another, based on country wealth, access to electricity, and availability and cost of wood and fossil-fuel energy. Growth of electricity demand in SSA countries is anticipated as they continue to develop. Modernization of energy generation and transmission infrastructure increases efficiency and hence reduces costs and emissions, e.g. South Africa program on reforming coal power stations, but may relegate wood fuel, a potentially clean and sustainable resource, further into the background.

Concerning renewable energy, these countries show a trend towards the increase of energy mix and more investment in solar, hydro and wind power to increase electrification potential in their respective countries. Despite the fact that 90% of the countries analyzed mention increased renewable energy as a mitigation measure, it is difficult to accurately judge the level of ambition countries have with their renewable goals. Information on the current share of renewables/installed renewable capacity, projected energy consumption development and the type of financing that is envisioned is needed, in addition to the renewable targets, to make accurate assessments (Stephan et al. 2016).

Around half of the countries in the sample have national energy policies with renewable energy targets. The others have nonspecific energy actions that refer to general policies (NAPs and NAPAs) with energy actions. Lack of energy specific policies is therefore a common phenomenon that needs addressing. There is need for energy specific policies to underpin an effective implementation of renewable energy actions. General policies may have clauses on renewable energy but mostly do not outline proper steps. In addition, the responsibilities are not made clear, resulting in the overlap of jurisdictions of the respective government sectors for environment and energy.

The majority of INDC/NDCs do not mention fossil-fuel subsidies or reforms. Among those that do are the INDC/NDCs of Ghana and Burkina Faso, but in most countries, apparently, fossil-fuel subsidy reforms have not been fully taken on board in the INDCs. In spite of the fact that this could have a clear impact on global emissions, as well as economic benefits for the countries.

Adaptation measures suggested by the analyzed countries mention specific policies and laws. The majority (78%) of the countries mention a NAP or equivalent national plan or strategy, and/or have begun adaptation implementation. Eighty-one percent of the countries (see Table 1) mention policies

specific to climate change. Understanding the degree of implementation would require further detailed analysis of country policies and activities, e.g. from interviews assessing national activities. Therefore, it is important that NDCs be integrated into national planning processes for future development pathways, and that associated activities and investments be outlined in more detail.

Finance is a central issue in the UNFCCC negotiations. All of the countries analyzed have mentioned that implementing their INDCs depends on funding. It is encouraging to see that 55% of the analyzed countries present elaborate financial budgets, which detail allocations to different sectors and whether mitigation or adaptation actions are targeted. There is no indication of a common basis for the calculation of these costs and budgets in the INDCs, making it difficult to compare country efforts equitably and prioritize assistance. Furthermore, countries mostly do not report on what kind and amounts of funds are already being received. These countries need to explore ways to work together, to identify similar priority investment areas and develop coherent, realistic budgets to prove transparency, accountability and commitment to regional development.

The majority of the countries do not specify any institutional set-up which could indicate poor institutional preparedness. The low priority given to wood fuel suggests that responsibility for managing wood fuel is mostly treated as side aspect of other environmental/energy concerns, such as development of electricity/petrol, nature protection, climate change, agriculture and/or timber production.

More support is needed for the collection, processing and publication of reliable data. With a rapidly changing context for wood-based biomass energy, policy makers need reliable baseline data to design appropriate measures. Such data includes wood availability and potential production; population growth, urbanization dynamics and consumers' fuel switching behavior. To improve wood energy data, databases should be established at regional and national levels. This can be achieved through establishing regular field surveys for wood energy, supply, demand and data analyses to monitor the changes over time (Sepp and Sepp 2014).

A crucial finding is that out of the 22 countries analyzed, 14 have submitted their NDCs to the UNFCCC website. It was noticed that these countries have re-submitted their INDCs as NDCs. There is no difference noted between the two documents. This attests to the difficulty of finding accurate data on wood fuel in SSA, also noted by Broadhead (FAO 2008).

References

- Bailis R, Drigo R, Ghilardi A and Masera O. 2015. The carbon footprint of traditional woodfuels. *Nature Climate Change* 5(3):266–272. <https://doi.org/10.1038/nclimate2491>
- Behrendt H, Megevand C and Sander K. 2013. Deforestation trends in the Congo Basin: Reconciling economic growth and forest protection. Working Paper 5: Wood-based Biomass Energy. World Bank, (April). https://profor.info/sites/profor.info/files/Biomass%20Energy_Sectoral%20Report_FINAL%5Bweb%5D_may13_0.pdf
- Broadhead JS, Bahdon J and Whiteman A. 2001. Past trends and future prospects for the utilisation of wood for energy. Global Forest Products Outlook Study. Working Paper No 5. Rome: FAO.
- Central African Republic. 2015. Central African Republic Intended Nationally Determined Contribution (INDC). September, 1–15.
- Federal Government of Somalia. 2015. Somalia’s Intended Nationally Determined Contributions (INDCs), 1–8.
- Government of Burkina Faso. 2015. Intended National Determined Contribution (INDC) of Burkina Faso, September.
- Government of Ivory Coast. 2015. Contributions Prevues Determinees au Niveau National de la Cote D’Ivoire, 1–17.
- Government of Ivory Coast. 2015. The Ivory Coast Intended Nationally Determined Contributions (INDC), 1–17.
- Government of Kenya. 2015. Kenya’s Intended Nationally Determined Contribution (INDC), July.
- Government of South Africa. 2015. South Africa Intended Nationally Determined Contribution (INDC), 1–11.
- Korhonen-Kurki K, Sehring J, Brockhaus M and Di M. 2014. Enabling factors for establishing REDD + in a context of weak governance. *Climate Policy* 14(2): doi.org/10.1080/14693062.2014.852022
- Merrill L, Harris M, Casier L and Bassi AM, for the Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD). 2015. Fossil-fuel subsidies and climate change: Options for policy-makers within their Intended Nationally Determined Contributions. Copenhagen: Nordisk Ministerråd, 24 p.: [dx.doi.org/10.6027/NA2015-905](https://doi.org/10.6027/NA2015-905)
- Ministry of Water and Environment. 2015. Uganda’s Intended Nationally Determined Contribution (INDC), October, 1–18.
- Osman-Elasha DB, Nyong PA, Dorsouma A, Duru U, Philips G, Owiyo T, Oh N and Opio-Omoding J. 2016. African INCDs: Investment needs and emissions reductions in the energy sector. May.
- Republic of Botswana. 2015. Botswana Intended Nationally Determined Contribution (INDC), 1–5.
- Republic of Burundi. Republic of Cameroon. 2015. Burundi Intended Nationally Determined Contribution (INDC), September.
- Republic of Cameroon. 2015. Cameroon Nationally Contribution Intended Determined (INDC).
- Republic of Ghana. 2015. Ghana’s intended nationally determined contribution (INDC) and accompanying explanatory note. *Gh-INDC* 1–16.
- Republic of Guinea Bissau. 2015. Guinea Bissau Intended Nationally Determined Contributions (INDC), October, 1–47.
- Republic of Liberia. 2015. Liberia Intended Nationally Determined Contributions (INDC).
- Republic of Malawi. 2015. Malawi Intended Nationally Determined Contribution (INDC), 1(1), 11–20.
- Republic of Mali. 2015. Mali Intended National Determined Contribution (INDC), September.
- Republic of Mozambique. 2015. Mozambique Intended Nationally Determined Contribution (INDC), 1–12.
- Republic of Namibia. 2015. Namibia Intended Nationally Determined Contributions (INDC), September.
- Republic of Rwanda. 2015. Rwanda Intended Nationally Determined Contribution (INDC), November, 1–24.

- Republic of South Sudan. 2015. Intended Nationally Determined Contribution (INDC), (14), 1–9. <http://travel.state.gov/content/passports/english/alertswarnings/republic-of-south-sudan-travel-warning.html>
- Republic of Zambia. 2015. Intended Nationally Determined Contribution (INDC), (4291), 12. http://www4.unfccc.int/submissions/INDC/Published Documents/Zambia/1/FINAL+ZAMBIA'S+INDC_1.pdf
- République du Congo Gouvernement. 2015. Tribution prevue determinee au niveau national dans le cadre de la CCNUCC Conférence des Parties 21 (INDC), september.
- Sepp S and Sepp C. 2014. Towards sustainable modern wood energy development. Deutsche Gesellschaft für Internationale Zusammenarbeit (October). <https://www.giz.de/fachexpertise/downloads/giz2015-en-report-wood-energy.pdf>
- Stephan B, Schurig S and Leidreiter A. 2016. What place for renewables in the INDCs? World Future Council. https://www.worldfuturecouncil.org/file/2016/03/WFC_2016_What_Place_for_Renewables_in_the_INDCs.pdf
- United Republic of Tanzania. 2015. United Republic of Tanzania's Intended Nationally Determined Contributions (INDCs), 8. http://www4.unfccc.int/submissions/INDC/Published Documents/United Republic of Tanzania?/1/INDCs_The United Republic of Tanzania.pdf
- Van Pelt M and Leisch J. 2016. Analysis of Intended Nationally Determined Contributions. https://www.climatelinks.org/sites/default/files/asset/document/INDC White Paper - June 2016_public_RALI.pdf
- Zhang W and Pan X. 2016. Study on the demand of climate finance for developing countries based on submitted INDC. *Advances in Climate Change Research* 7(1–2):99–104. doi.org/10.1016/j.accre.2016.05.002

Annex

Table 1. Wood fuel in INDC submissions (2015) of sub-Saharan African countries

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*Botswana	No mention of wood-fuel consumption in the INDC document, which focuses instead on climate variability affecting the country, e.g. droughts, low rainfalls, soil conditions, etc. “Botswana is vulnerable to the impacts of climate change and places high priority on adaptation to reducing vulnerability” (Republic of Botswana 2015:2). Not quantified.	No mention of renewable energy intentions in the INDC document.	<ul style="list-style-type: none"> • “Botswana is developing a Climate Change Policy and Institutional Framework which will be supported by a Strategy and Action Plan to operationalize the Policy. The Policy will be approved by Parliament in 2016” (Republic of Botswana 2015:1). • “Developing a National Adaptation Plan (NAP) and Action Plan which will highlight all the priority areas including Climate Smart Agriculture which include techniques such as low to zero tillage, multi-cropping to increase mulching which reduce evapotranspiration and soil erosion” (Republic of Botswana 2015: 2). There is no mention of its implementation in the INDC document. These policies are to support the institutional framework to ensure adaptations and mitigations put in place to reduce climate vulnerability in Botswana. 	<ul style="list-style-type: none"> • Climatic variables, e.g. droughts, low rainfalls, soil conditions, etc.

continued on next page

Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*Burkina Faso	<p>There is mention of demand for firewood in the INDC:</p> <ul style="list-style-type: none"> “80% of dolo beer brewers use an improved cook stove, 95% of which are in rural areas and 100% in urban and semi-urban areas. This contributes to a reduction in the demand for firewood”. “540,000 improved cook household stoves are produced and distributed, at least 50% in urban and semi-urban areas.”(Government of Burkina Faso 2015: 16) Quantified. 	<p>“Diversification of energy sources (solar, wind, biogas)” (Government of Burkina Faso 2015: 12)</p> <p>The above has been mentioned in the INDC as a suggested adaptation measure. Below are intended mitigation actions mentioned in the INDC that are yet to be adapted and implemented:</p> <ul style="list-style-type: none"> “The use of improved cook stoves will make it possible to save the wood energy that is consumed (in comparison to traditional cook stoves).” “Transformation of methane waste is an additional source of energy (as well as a new source of regular jobs) and the cities will be able to get rid of their wastes for the good of the population.” “The use of alternative energy sources (solar, biofuels etc.) makes it possible to reduce energy costs for homes and business, which increases their productivity” (Government of Burkina Faso 2015: 28). 	<p>“Developed and adopted are a number of policy and strategy documents relating to climate change”. These include:</p> <ul style="list-style-type: none"> The National Strategy for implementing the Climate Change Convention adopted in 2001. The National Action Program for Adaptation to Climate Change (NAPA) in 2007. The development of a framework NAMA (2008). The National Adaptation Plan (NAP2014) (Government of Burkina Faso 2015:2). 	<ul style="list-style-type: none"> Forest degradation

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
Burundi	<p>“Widespread scarcity of firewood and wood charcoal due to combined pressure from human activities, rising temperatures and changes to biomass growth rates.” This is mentioned as a major impact relating to climate change in Burundi (Republic of Burundi 2015: 3).</p> <ul style="list-style-type: none"> Not quantified 	<ul style="list-style-type: none"> “In the energy sector, Burundi is in the process of building three hydroelectric power plants, of which will increase the country’s electrification rate to 35%“. (Republic of Burundi 2015:8) <p>The above is mentioned as a mitigation measure, which is under way as stated by the government, but its implementation is subject to funding as well.</p> <ul style="list-style-type: none"> “Improve agricultural and livestock production activities (drainage, conservation, drying and cold chain) including the use of renewable energy sources (hydraulic, solar and wind)”. (Republic of Burundi 2015:5) <p>The above is mentioned as an adaptation need to improve the population’s wellbeing. The key measure is the government to support facilities that use renewable energy sources.</p>	<p>Policies and strategy documents mentioned in the INDC have been categorized into two types:</p> <ol style="list-style-type: none"> Documents specifically concerned with adaptation to climate change; of which these documents were not mentioned whether they have been implemented or not in the INDC: <ul style="list-style-type: none"> National Adaptation Program of Action (NAPA 2007) National Climate Change Policy (2012) National Strategy and Action Plan on Climate Change (2012). Policy and strategy documents that take GHG emissions generating activities into consideration <ul style="list-style-type: none"> First and second national communications on climate change (2001 and 2010) National Adaptation Plan of Action to climate change (2007) Summary report on GHG inventories (2009) Summary report on GHG emissions mitigation studies (2009) National Climate Change Policy (2013) National Strategy and Action Plan on Climate Change (2013) Sectoral Strategy for the Energy Sector in Burundi (2011) National Environment Strategy (SNEB, 1997) (Republic of Burundi 2015:10) <p>The above policies documents are used to formulate the assumptions and objectives mentioned in the INDC.</p>	<ul style="list-style-type: none"> Climate variability

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*Cameroon	<ul style="list-style-type: none"> • “unsustainable consumption of firewood”. (Republic of Cameroon, 2015:5) <p>The above problem is mentioned in the INDC document under mitigation measures. It is to be reduced, for example, through sustainable management of energy wood, improved stoves, and the promotion of biogas and/or butanization in the countryside.</p> <ul style="list-style-type: none"> • Not quantified. 	<p>Renewable energy is mentioned in the INDC, as one of several mitigation actions that are yet to be implemented.</p> <p>Below are some examples of planned mitigation actions pertaining renewable energy:</p> <ul style="list-style-type: none"> • Conduct a comprehensive assessment of renewable energy potential. • Improve collaboration between existing entities (FEICOM (Special Council Support Fund for Mutual Assistance), PNDP (National Program for Participatory Development), and EAR, for the development of community projects in renewable energy). • Accelerate the implementation of the rural electrification master plan developed by EAR; create other financial facilitations for rural lighting as the Rural Electrification Fund (EAR) (Republic of Cameroon 2015: 7). 	<ul style="list-style-type: none"> • National Adaptation Plan to Climate Change: This policy was validated in June 2015 and “includes, inter alia, an assessment of climate changes in each of five agro-ecological zones. An assessment of the sensitivity, vulnerability and sector and geographic resilience, a 2016–2025 action strategy, evaluation of losses, risks and gaps, a five-year action plan 2016–2020 declined by 20 fiches- detailed projects” (Republic of Cameroon 2015:9) • National Policy, Strategy and Action Plan for Energy Efficiency in the electricity sector in Cameroon (2014), which is yet to be implemented (Republic of Cameroon 2015:6) <p>There is no mention of whether these policies have been implemented.</p>	<ul style="list-style-type: none"> • Deforestation

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*Central African Republic	<p>“Sectoral greenhouse gas emissions in relation to wood fuel is 4.91% wood energy” (Central African Republic 2015: 6).</p> <p>The above statement was mentioned as inventory taken for GHG emissions in 2010, which total 116,285.49 kteq CO₂ with sectoral contributions of 5.19% for energy (of which 4.91% is wood energy).</p> <ul style="list-style-type: none"> Quantified. 	<p>Renewable energy target technologies for the energy sector, which are yet to be implemented, mentioned in the INDC:</p> <ul style="list-style-type: none"> Hydroelectric micro-dams Solar heat and solar photovoltaic (PV) energy Mechanization processes for organic matter Improved carbonization <p>(Central African Republic 2015: 12).</p>	<ul style="list-style-type: none"> “Development of a National Climate Change Adaptation Plan” (Central African Republic 2015: 13) <p>The above policy is a prospective adaptation measure.</p>	<ul style="list-style-type: none"> Deforestation
Congo	<p>“The demand for wood-fuel energy has dominated 80% of households.” (République du Congo Gouvernement 2015: 10).</p> <p>The above is due to low electrification rates and little to no use of renewable energy potentials.</p> <ul style="list-style-type: none"> Quantified. 	<p>There is mention of renewable energy, with the expressed intention of increasing exploitation. Some examples include:</p> <ul style="list-style-type: none"> Congo has developed an ambitious plan for development of hydropower, with the objective 2025 to ensure a supply of electricity to 85% hydroelectric and 15% by the gas. Congo is also developing a solar electrification plan isolated villages. <p>(Energy Strategy 2015–2025 Congo). (République du Congo Gouvernement 2015: 11).</p>	<ul style="list-style-type: none"> Congo Energy Strategy 2015–2025. National Strategy and Action Plan for Climate Change and Variability (SNPA/CCV 2004) has been developed. No mention of its implementation. National Action Plan for the Environment (NEAP), central to identifying the country’s vulnerability to the effects of Climate change <p>(République du Congo Gouvernement 2015: 3).</p> <p>There is no mention of implementation measures.</p>	<ul style="list-style-type: none"> Deforestation

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*Ghana	<p>No mention of use of wood-fuel energy in country INDC, or how the wood fuel is being consumed.</p> <p>There is only mention of reforestation/afforestation of degraded lands in relation to the INDC policy action to “Promote sustainable utilization of forest resources through REDD+.” (Republic of Ghana 2015:14).</p>	<ul style="list-style-type: none"> • There is mention of renewable energy penetration intentions, which are to be scaled up by 10% by 2030. • “Promote clean rural households lighting, e.g. increase solar lantern replacement in rural non-electrified households to 2 million.” • “Expand the adoption of market-based cleaner cooking solutions, e.g. scale up adoption of liquid petroleum gas (LPG) use from 5.5% to 50% peri-urban and rural households up to 2030 and scale up access and adoption of 2 million efficient cook stoves up to 2030.” • “Double energy efficiency improvements to 20% in power plants, e.g. scale up 120 MSCF (million standard cubic feet) natural gas replacement of light crude oil for electricity generation in thermal plants.” <p>(Republic of Ghana 2015:12).</p>	<ul style="list-style-type: none"> • National Energy Policy • National renewable energy Act (Act 832) • Set up feed-in-tariff for renewable energy technologies • Established of national renewable energy fund • Design renewable energy purchase obligation • Sustainable Energy Action Plan • National bioenergy strategy • Phasing out fossil-fuel subsidies. <p>(Republic of Ghana 2015:12)</p> <p>The above mitigation policies and measure have been mentioned in the INDC as supporting documents to the INDC policy actions, though there is no mention of whether these policies have been implemented or are in the process of being implemented.</p>	<ul style="list-style-type: none"> • Degraded lands • Reforestation

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
Guinea Bissau	<p>“Deforestation is responsible for emitting large amounts of CO₂ into the atmosphere. The estimates show a decline of around 625,000 m³ of wood per year.” (Republic of Guinea Bissau 2015:9).</p> <p>There is no mention of how the wood is being used, either timber, or wood fuel.</p>	<p>“Electric power generation systems from renewable energies (hydro, photovoltaic systems, wind systems).” (Republic of Guinea Bissau, 2015:11).</p> <p>Renewable energy mentioned in the INDC are mentioned as mitigation measures, and are yet to be implemented.</p>	<p>“A wide range of policies, strategies and plans were drawn up and adopted with finance assistance from FAO” including:</p> <ul style="list-style-type: none"> • Energy Master Plan (2013) • Regional Policies on Renewable Energy and Energy Efficiency SE4All (Universal Access to Energy) - 2014 • National Plan for Renewable Energy (NREAP) - 2014 • National Plan for Energy Efficiency (2014) • Forestry Master Plan • National Environmental Management Plan (2004) • National Plan for Natural Resource Management <p>(Republic of Guinea Bissau 2015: 3–4)</p>	<ul style="list-style-type: none"> • Deforestation • Reforestation
*Ivory Coast	<p>Wood-fuel energy is mentioned not as a problem, but also as mitigation action to be taken, e.g. “Promotion of improved stoves and Promotion of charcoal in alternatives through valuation of agricultural biomass.” (Government of Ivory Coast 2015:7).</p> <ul style="list-style-type: none"> • Not quantified. 	<ul style="list-style-type: none"> • “Facilitate the development of projects on the relevant sectors” which includes • Small hydropower • Methane (waste, agricultural residues...) • Photovoltaic (solar) photovoltaic (PV) promotion kits, system • PV pumping...) • Biomass (sustainable use of wood energy). <p>(Government of Ivory Coast 2015:10).</p> <p>The above-mentioned projects are mentioned as mitigation actions that are yet to be implemented.</p>	<ul style="list-style-type: none"> • “Established in 2012 the National Program Climate Change (NCCP) to coordinate, propose and promote measures and strategies in the fight against climate change.” (Government of Ivory Coast, 2015: 1). There is no mention of implementation of this policy. • “National Strategy Fight against Climate Change 2015-2020 was adopted in late 2014.” (Government of Ivory Coast 2015: 1). 	<ul style="list-style-type: none"> • Forest degradation • Deforestation

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*Kenya	<p>“Reliance on wood fuel by a large proportion of the population.”(Government of Kenya 2015: 1).</p> <p>This is mentioned in the INDC, due to increasing demand for agricultural land and urban development.</p> <ul style="list-style-type: none"> • Not quantified 	<ul style="list-style-type: none"> • “Geothermal, Solar and Wind energy production” (Government of Kenya 2015: 2) <p>The government plans to implement the above kinds of renewable energy and other clean energy options to reduce overreliance on wood fuels. These are mitigation measures.</p>	<ul style="list-style-type: none"> • “National Climate Change Response Strategy (NCCRS 2010), National Climate Change Action Plan (NCCAP 2013), and a National Adaptation Plan (NAP)” (Government of Kenya 2015: 1). <p>The above-mentioned policies are under preparation, which provides a vision for a low carbon and climate-resilient development pathway.</p> <ul style="list-style-type: none"> • “National Climate Change Framework Policy and legislation” (Government of Kenya 2015: 1). <p>The above-mentioned policy is in its final stages of enactment to facilitate effective response to climate change.</p>	<ul style="list-style-type: none"> • Land-use change • Climate change impacts

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
Liberia	<p>There is mention of wood fuel in the INDC and how it is consumed:</p> <ul style="list-style-type: none"> “In 2004, it was estimated that over 95% of the population relied on firewood and charcoal for cooking and heating needs and palm oil for lighting.” In 2009 it was estimated that 70% of the urban population use charcoal for cooking as compared to 5% of the rural population; 91% of the rural population use firewood for cooking as compared to 21% of the urban population.” <p>(Republic of Liberia 2015: 1–2)</p> <ul style="list-style-type: none"> Quantified. 	<p>There is mention of renewable energy, as a “mitigation measure to reduce the reliance on traditional fuel which is charcoal and firewood as mentioned in the INDC” (Republic of Liberia 2015: 4).</p> <p>Below are some plans for mitigation actions on renewable energy mentioned in the INDC which are yet to be implemented:</p> <ul style="list-style-type: none"> “Strengthen institutional and individual capacity in renewable energy technology and management.” “Implement and strengthen policy that promotes private investment in renewable energy (hydro, biomass and solar etc.)” “Rehabilitate existing hydropower plants and build new hydropower plants to increase hydropower production capacity.” “Produce and distribute 280, 543 energy saving cook stoves that use fuel wood and 308,004 energy saving cook stoves that use charcoal by 2030.” “Implement large scale biomass projects to generate about 30 MW by 2030.” <p>(Republic of Liberia 2015: 12).</p>	<ul style="list-style-type: none"> National Energy Policy (2009) “Developed with a set of goals targeted at maximizing efficiency, minimizing costs and adverse environmental impacts as principle of extending energy access to all Liberians.” (Republic of Liberia 2015: 4) “A National Adaptation Plan (NAP) is currently being developed as a means of identifying Liberia’s medium and long-term adaptation needs” (Republic of Liberia 2015: 1). “National Climate Change Policy is also being developed to ensure that a qualitative, effective and coherent climate change adaptation process takes place, and to serve as the pillar for comprehensive sectoral strategies and action plans” (Republic of Liberia 2015: 1). <p>There is no mention of implementation of these policies in the INDC.</p>	<ul style="list-style-type: none"> Forest degradation

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
Malawi	<p>There is mention of “unsustainable use of fuel wood and charcoal” (Republic of Malawi 2015: 3).</p> <p>The above is mentioned in the INDC because “97% of Malawians rely on biomass energy for cooking fuel, resulting in a high rate of deforestation and forest degradation” (Republic of Malawi 2015: 4).</p> <ul style="list-style-type: none"> Quantified 	<p>Renewable energy in Malawi, especially “solar, wind and micro hydropower plants”, for which most of the set targets (The Malawi Energy Policy, 2003) were not achieved, due to limited funds. (Republic of Malawi 2015: 5).</p>	<ul style="list-style-type: none"> “National Climate Change Management Policy” (Republic of Malawi 2015: 2) The above policy is pending Cabinet approval and endorsement, to spur climate change activities in Malawi. National Environmental Action Plan (NEAP) (1994) National Environmental Policy (revised 2004) (Republic of Malawi 2015: 13) <p>The above-mentioned policies provide policy guidance and direction to manage the environment, natural resources and climate change.</p>	<ul style="list-style-type: none"> Deforestation Afforestation (which includes natural and assisted regeneration) Forest degradation
*Mali	<p>There is mention of wood energy (firewood and charcoal), as an indicator for the emissions for the energy sector (Republic of Mali 2015: 9).</p> <p>The above is mentioned as an inefficient indicator, meaning that use of wood fuel predominates, resulting in a strong pressure of consumption on the national forest.</p> <ul style="list-style-type: none"> Not quantified 	<p>“Mali has significant potential for renewable energy including”:</p> <ul style="list-style-type: none"> Solar energy: 6 kWh/m² (7–10 h) Biomass: 2000 hectares of Jatropha plantations, 1.4 million liters of alcohol from sugar cane Hydraulics 1150 MW (only 22% operated) Wind: 3–7 m/s <p>(Republic of Mali 2015: 9).</p> <p>The above-mentioned renewable energy potentials are yet to be fully implemented.</p>	<p>Mali has developed several policies, strategies and action plans to ensure sustainable development with measures to adapt to climate change:</p> <ul style="list-style-type: none"> “National policy changes climate, complemented by its strategy and action plan: Reference and control framework for all projects and programs implemented in Mali on the fight against climate change”. “National Policy on energy: Contribute to the sustainable development of the country through the provision of energy services accessible to many of the people at the lowest cost and favoring the promotion of socioeconomic activities”. “Development Strategy of Renewable Energy - Promote widespread use of technology and Renewable Energy Equipment Increase”. <p>(Republic of Mali 2015: 19–20).</p> <p>There is no mention if these policies have been implemented.</p>	<ul style="list-style-type: none"> Deforestation

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
Mozambique	<p>Wood-fuel consumption not mentioned in INDC document. There is a focus on coastal degradation, the cyclone effects to the country and mitigation measures against climatic effects, such as drought and flooding, global warming, etc.</p> <ul style="list-style-type: none"> Not quantified. 	<p>When the INDC is implemented, it will promote an inclusive climate-proofed development, with a higher degree of access to efficient technologies and cleaner energy sources, promoting environmental integrity and the creation of green jobs. (Republic of Mozambique 2015:11).</p>	<ul style="list-style-type: none"> National Climate Change Adaptation and Mitigation Strategy (NCCAMS) (2013 to 2030) – “to increase resilience in the communities and the national economy including the reduction of climate risks, and promote a low- carbon development and the green economy through the integration of adaptation and mitigation in sectoral and local planning” – there is no mention of implementation of the policy in the INDC (Republic of Mozambique 2015: 1) Energy Strategy (being updated and to be approved by 2016) New and Renewable Energy Development Strategy (2011 to 2025) Conservation and Sustainable Use of the Energy from Biomass Energy Strategy (2014 to 2025) Master Plan for Natural Gas (2014 to 2030) Renewable Energy Feed-in Tariff Regulation (REFIT) Mozambique’s Integrated Urban Solid Waste Management Strategy (2013–2025) National REDD+ Strategy (in preparation and to be approved in 2016) Renewable Energy Atlas for Mozambique (Republic of Mozambique 2015: 9) <p>The above-mentioned policies and strategies are yet to be implemented as a means to mitigation contribution.</p>	<ul style="list-style-type: none"> Climatic effects

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*Namibia	<p>“The AFOLU (Agriculture, Forestry and Other Land Uses) sector is a key category and among the highest emitters. Emissions come from the use of fuelwood, production of charcoal and wood removals for construction and other purposes, especially in the rural areas”(Republic of Namibia, 2015: 9).</p> <ul style="list-style-type: none"> Not quantified. 	<p>“Increase share of renewable energy (hydro, solar, wind and biomass) in electricity production from 33% to 70% by 3020” (Republic of Namibia, 2015: 7).</p> <p>The above is mentioned in the INDC, as a mitigation measure under the energy sector to reduce fossil-fuel consumption. This action is yet to be implemented.</p>	<ul style="list-style-type: none"> National Climate Change Strategy and Action Plan (2013) (Republic of Namibia 2015:5) The above strategy and action plan covers the period 2013-2020. It does not discuss implementation. National Climate Change Committee (NCCC) (1999) The above policy is “implemented by the Ministry of Environment and Tourism (MET) through the climate change unit (CCU) that was created to follow and monitor climate change projects” (Republic of Namibia 2015: 5). <p>“Namibia is presently developing its first Nationally Appropriate Mitigation Action (NAMA) and is working on its National Adaptation Plan (NAP) to better guide the country on its way to mitigate and adapt to climate change.” (Republic of Namibia 2015:5).</p>	<ul style="list-style-type: none"> Deforestation
*Rwanda	<p>“The Rwandan forestry sector provides the main part of the primary energy needs (97% of cooking energy) to the population.” (Republic of Rwanda 2015: 7)</p> <p>The above problem statement in the INDC shows that, since 2002, there has been a consistent gap in wood-product supply and demand with deficits reaching 12 million cubic meters in 2009. This deficit shows how the forest sector is and likely to remain under pressure.</p> <ul style="list-style-type: none"> Quantified. 	<p>There is mention of renewable energy enhancements in Rwanda, of which they have various mitigation actions in place that are yet to be implemented.</p> <p>Some of these actions include:</p> <ul style="list-style-type: none"> “Construction of hydro, solar power plants and methane to electricity power plants hence shifting from using fossil fuels for its electricity needs.” “Establish up to 100 solar PV mini-grids in rural communities” (Republic of Rwanda 2015: 14). 	<ul style="list-style-type: none"> “Green Growth and Climate Resilience Strategy (2011) – it is on-going and will be “Partially or fully achieved by 2050. <p>Initial National Communication to the UNFCCC in 2005, National Adaptation Programs of Action (NAPA) in 2006, and the Second National Communication in 2012. The Third National Communication is under preparation.” (Republic of Rwanda 2015: 2–3).</p>	<ul style="list-style-type: none"> Forest degradation Deforestation

Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*Somalia	<p>There is “huge production and export of charcoal to the Gulf countries from Somalia” (Federal Government of Somalia 2015: 3)</p> <p>The above was mentioned; this is due to the lack of alternative source of energy for domestic cooking and a market incentive for export.</p> <ul style="list-style-type: none"> • Not quantified 	<p>“Somalia is rich in renewable energy resources, untapped hydropower, extensive geothermal energy resources, many promising wind sites, and abundant sunshine, which can produce solar power.” (Federal Government of Somalia 2015:9).</p> <p>The major obstacles to development of these potentially available energy resources are political, financial and institutional. There was no mention of implementation.</p>	<ul style="list-style-type: none"> • National Adaptation Program of Action (NAPA) (2013) – formulated by United Nations Development Program (UNDP) and UNFCCC with funding from the Global Environment Facility and the Somalia: Energy Sector Needs Assessment and Action/Investment Program (2015) formulated by the Federal Government of Somalia and the African Development Bank (AfDB)” (Federal Government of Somalia, 2015: 11–12). <p>There are potential remedial actions, some of which have been indicated in the NAPA policy mentioned above, which are to overcome the deforestation and rangeland degradation. Some of these potential remedial actions are:</p> <ul style="list-style-type: none"> • sustainable land management and food security through enhanced productivity • integrated water management • reducing risk among of vulnerable populations from natural disasters • the utilization of renewable energy resources such as solar, hydroelectric and wind; these sources were used in the past or are in use in Somalia and their potentials are well known • the implementation of the UN Security Council Resolution 2036 (2012) that calls for international cooperation to ban illegal export of charcoal from Somalia and the various laws passed by the Somalia’s authorities both federal and some states • the introduction and advocating the use of more efficient kilns for charcoal making and efficient stoves for local use, in order to reduce trees felling for local use • reforestation using regional nurseries and forest plantation using indigenous and introduced suitable tree species. <p>Such initiatives could reverse the deforestation and land degradation.</p> <p>There is no mention of implementation of the policy in the INDC.</p>	<ul style="list-style-type: none"> • Forest degradation

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*South Africa	<p>There is no mention of wood-fuel consumption in the INDC document. Though there is mention of how South Africa was “dependent on use of coal” (South Africa 2015: 2).</p> <ul style="list-style-type: none"> Not quantified. 	<p>There is mention of renewable energy in the INDC, though there is room for more implementation, there is progress in this sector:</p> <p>“facilitated substantial investment in renewable energy and two new high-efficiency coal-fired power stations are nearing completion as part of the aging plant replacement program.” (South Africa 2015: 2)</p> <p>These technologies are suggested measures and are yet to be implemented to reduce GHG emissions:</p> <ul style="list-style-type: none"> “Decarbonized electricity Electric vehicles and hybrid electric vehicles Energy efficient lighting Solar water heaters Solar PV Carbon capture and sequestration Advanced bioenergy (SouthAfrica 2015: 10) 	<ul style="list-style-type: none"> National Development Plan (2012)- “which provides a ‘2030 vision’ to guide the country’s sustainable development trajectory where poverty is eliminated and inequalities are reduced by 2030” (South Africa 2015:2) National Climate Change Response Policy (2011): Good progress has been made in implementing climate-compatible sectoral plans, such as the integrated energy and electricity plans, industrial policy action plans and the new growth path.(South Africa 2015: 4) “National Climate Change Adaptation Strategy and Plan – which is being developed to be integrated into all relevant sector plans” (South Africa 2015: 2) <p>“The full implementation of these policies and plans will bend the curve of South Africa’s GHG emissions toward a peak, plateau and decline trajectory range.” (South Africa 2015:2).</p>	<ul style="list-style-type: none"> Climatic effects

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
South Sudan	<p>“96% of the population have total dependence on forests as a source of energy (fuel wood and charcoal)” (Republic of South Sudan 2015: 1)</p> <p>The above fact is mentioned in the INDC as the population is dependent on climate sensitive natural resources.</p> <ul style="list-style-type: none"> Quantified. 	<p>There is mention of intended activities as mitigation measures on renewable energy in the INDC:</p> <ul style="list-style-type: none"> Construction of a hydroelectricity plant at the Fulla rapids Increase the use country’s high potential for solar and wind energy to meet energy demand <p>Increase the efficiency of biomass use (particularly fuel wood and charcoal) in the traditional energy sector (Republic of South Sudan 2015: 3).</p> <p>South Sudan intends to develop clean energy whenever possible, with deliberate efforts by the government toward enhancing the above-mentioned renewable energy.</p>	<ul style="list-style-type: none"> “Environment Policy Framework and Environmental Bill” The Policy and Bill, when operationalized, “will address the drivers of environmental degradation and contribute toward the mitigation of climate change while ushering the country toward a path of environmentally sustainable development” (Republic of South Sudan 2015: 1). “National Adaptation Program of Actions” (NAPA 2015) This will form the basis for adapting to the new realities of climate change impacts (Republic of South Sudan 2015: 1). 	<ul style="list-style-type: none"> Deforestation Diesel generators

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
Tanzania	<p>“Enhance efficiency in wood fuel utilization” (United Republic of Tanzania 2015: 4)</p> <p>The above is mentioned in the INDC as an adaptation measure.</p> <ul style="list-style-type: none"> Not quantified. 	<p>“Enhancing the use of renewable energy potential across the country (hydro, solar, wind, biomass and geothermal)” (United Republic of Tanzania 2015: 4)</p> <p>The above is mentioned as an adaptation contribution. These actions are yet to be implemented.</p> <p>Tanzania intends to meet its contributions through these mitigation actions:</p> <ul style="list-style-type: none"> “Promotion of clean technologies for power generation; and diverse renewable sources such as geothermal, wind, solar and renewable biomass.” “Expanding the use of natural gas for power production, cooking, transport and thermal services through improvement of natural gas supply systems throughout the country” (United Republic of Tanzania 2015:7). 	<p>National Climate Change Strategy (2012) and the Zanzibar Climate Change Strategy (2014)</p> <p>“The two climate change strategies and other national climate change and development related documents and processes were the basis for the identification of adaptation and mitigation priorities along with detailed consultations with sectoral experts and other stakeholders” (United Republic of Tanzania 2015:1).</p> <ul style="list-style-type: none"> National Communications (2003 and 2015); the National Adaptation Program of Action (2007); Natural Gas Policy (2013); the Zanzibar Environmental Policy (2014); the Renewable Energy Strategy (2014); the Natural Gas Act (2015); the National Forestry Policy (1998); the National Transport Master Plan (2013); the National Environmental Policy (1997); the Zanzibar Environmental Policy (2013); the National Environmental Action Plan (2012 – 2017); <p>The National REDD+ Strategy and Action Plan (2013) and the National Environment Management Act (2004). (United Republic of Tanzania 2015: 1–2).</p> <p>Tanzania has adopted and implements various other policies, legislations, strategies, plans and programs in the course of addressing climate change, which are listed above.</p>	<ul style="list-style-type: none"> Deforestation Afforestation Reforestation

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*Uganda	<p>“89.5% of the country’s energy needs are currently met by charcoal and firewood”. (Ministry of Water and Environment 2015: 14)</p> <p>The above statement in the INDC is viewed as a major problem to the forest resources depletion, “recognizing that the development of the electricity sector is key to achieving the reduction in wood and charcoal burning necessary to reduce deforestation.” (Ministry of Water and Environment 2015: 14).</p> <ul style="list-style-type: none"> Quantified 	<p>Priority adaptation actions to be implemented:</p> <ul style="list-style-type: none"> “Encouraging efficient biomass energy production and utilization technologies” “Promoting renewable energy and other energy sources” “Ensuring the best use of hydropower by careful management of the water resources” “Promotion and wider uptake of energy efficient cooking stoves or induction cookers” “Promotion and wider solar uptake of solar energy systems.” <p>(Ministry of Water and Environment 2015: 7).</p>	<ul style="list-style-type: none"> National Climate Change Policy (NCCP) (2015) National Adaptation Program of Action (NAPA) Developed a 10-year Climate Smart Agriculture Program (2015–2025) Renewable Energy Policy Energy Policy. <p>Uganda also intends to “implement strategies, plans and actions for low greenhouse gas emission development” in the context of its development goals. (Ministry of Water and Environment 2015: 3).</p> <p>The above-mentioned policies are yet to be implemented.</p>	<ul style="list-style-type: none"> Deforestation

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Table 1. Continued

Country	Mention of wood fuel and why it is viewed as a problem	Alternative energy in relation to wood fuel problem; implemented or proposed	Supporting national policies and strategy documents	Indicators (action to be assessed) in relation to wood fuel
*Zambia	<p>There is mention of “charcoal production and firewood collection” (Republic of Zambia 2015:6).</p> <p>The above fact is mentioned in the INDC as an effect of Land-use, Land-Use Change and Forestry (LULUCF).</p> <ul style="list-style-type: none"> Not quantified. 	<ul style="list-style-type: none"> “Fuel switch (diesel/Heavy Fuel Oils (HFO) to biodiesel) Fuel switch (coal to biomass) - Switch from existing isolated diesel to mini-hydro Introduce and increase blending of biofuels with fossil fuels and where possible substitution with biofuels Off grid [renewable electricity] to non-electrified rural – PV and wind On grid expansion program to support economic growth and grid extension through inter-basin water transfer” <p>(Republic of Zambia 2015: 4).</p> <p>The above are to be implemented under the Renewable Energy and Energy Efficiency program, which will contribute to the National Mitigation Goal.</p>	<p>“In view of these challenges, Zambia has in the recent past developed various climate change-related policies, strategies, projects and programs in response to climate change impacts”. These include:</p> <ul style="list-style-type: none"> The National Policy on Environment (NPE, 2007) The National Climate Change Response Strategy (NCCRS, 2010) National Forestry Policy of 2014 National Energy Policy of 2008 The National Agriculture Policy of 2014 Transport Policy of 2002 National Strategy for Reducing Emissions from Deforestation and Forest Degradation (REDD+, 2015) Second National Biodiversity Strategy and Action Plan (NBSAP2) The National Adaptation Plan of Action on Climate Change (NAPA, 2007) Technology Needs Assessment (TNA, 2013) Nationally Appropriate Mitigation Actions (NAMAs, 2014) Second National Communication (SNC, 2015) <p>(Republic of Zambia 2015: 2)</p> <p>There is no mention if these policies are being implemented.</p> <ul style="list-style-type: none"> “The country is also in the process of developing its National Adaptation Plan (NAP) for long-term adaptation planning and mainstreaming of climate change into national development planning process” (Republic of Zambia 2015: 2). “The development of the Seventh National Development Plan (SeNDP), 2017-2021) is also underway which will take into account climate change issues” (Republic of Zambia 2015: 2). 	<ul style="list-style-type: none"> Reforestation Deforestation

Sources: country INDC/NDCs as listed in Box 1. An asterisk preceding the country name (*) indicates that the NDC was submitted to the UNFCCC website. These countries have re-submitted their INDCs as NDC, thus there are few differences between both documents. Only two countries have ratified their NDCs (Cameroon and Rwanda – Status May 2017).

Table 2. Climate finance in the INDCs of the 22 countries investigated

COUNTRY	Sectors with specific budgets given in INDCs		
	FORESTRY	AGRICULTURE	ENERGY
Botswana	n.a.	n.a.	18.4 billion USD
Burkina Faso	903,000,000 USD	1,156,050,000 USD	87,696,000 USD
Burundi	10,000 USD	n.a.	1,446,118 USD
Cameroon	150 million USD	385 million USD	310 million USD
CAR		3.802 billion USD	
Congo		5.14 billion EUROS	
Cote d'Ivoire	30.2 million USD	1.583 billion USD	n.a.
Ghana		22.6 billion USD	
Guinea Bissau		n.a.	
Kenya		40 billion USD	
Liberia		n.a.	
Malawi		n.a.	
Mali	12.92 billion USD	20.6 billion USD	1.16 billion USD
Mozambique		n.a.	
Namibia		33 billion USD	
Rwanda	n.a.		24.15 billion USD
Somalia	23,671,610 USD	6.45 million USD	n.a.
South Africa		0.15 billion USD	0.36 billion USD
South Sudan		50 billion USD	
Tanzania		61 billion USD	
Uganda	36 million USD	n.a.	5.4 billion USD
Zambia		50 billion USD	

Note: Sectoral breakdowns are given where available.

Sources: Country INDCs listed in Box 1.

Table 3. Implementation plans with road maps, institutional set-ups, and budget allocation

Country	Implementation plans with road maps	Allocation of responsibilities plus institutional set-ups	Budget allocations
Botswana	<ul style="list-style-type: none"> • Formulation of INDC is mentioned with specific elements, which are market mechanisms • Planning of INDC implementation is mentioned: creation of specific laws and policies 	No mention of institutional set-ups, but allocation of responsibilities to the Government of Botswana.	USD 18.4 billion to achieve set target of 15% GHG emission reduction by 2030 (mitigation needs)
Burkina Faso	<ul style="list-style-type: none"> • Planning of INDC implementation is mentioned: creation of specific laws and policies • Stakeholder consultation for INDC preparation mentioned with specific actors (government institutions, private sector, NGOs) 	<ul style="list-style-type: none"> • Establishment of an INDC Coordination Unit to report to the Permanent Secretariat of the National Environment and Sustainable Development Council (SP-CONEDD)^a • A coordination entity responsible for scheduling the implementation activities of the various projects • A technical adaptation cell that will be concerned with coordinating the implementation and follow-up of the adaptation projects and which could become a Designated National Authority for Adaptation (DNA-AD) • A technical mitigation cell that will be concerned with coordinating the implementation and follow-up of the mitigation projects in coordination with or on behalf of the Burkina Faso DNA. 	<p>USD 5.8 billion for adaptation/investment needs</p> <p>USD 1.8 billion for mitigation/investment needs</p>
Burundi	<p>Mention of implementation methods:</p> <ul style="list-style-type: none"> • Capacity building (partly) conditional to INDC implementation • Technology transfer needs • Need for financial support • Consideration of gender, youth and vulnerable groups 	“The Government of Burundi will implement the INDC through the Ministry of the Environment, which is the government institution in charge of ensuring the implementation of international conventions relating to the environment”. (Government of Burkina Faso, 2015: 11)	<p>USD 3.7 million for adaptation investment needs</p> <p>USD 1.45 billion for mitigation investment needs</p>
Cameroon	<p>Stakeholder consultation for INDC formulation mentioned with specific actors (civil society)</p> <p>INDC implementation is mentioned, no specific roadmaps mentioned</p>	No mention of institutional set-ups.	<p>USD 39.2 billion for mitigation investment needs</p> <p>USD 1.81 billion for adaptation investment needs</p>
CAR	<p>INDC formulation with stakeholder consultation mentioned with specific actors (government institutions, experts)</p> <p>Planning of (I)NDC implementation mentioned creation of specific laws and policies</p>	No mention of institutional set-ups.	<p>USD 1.55 billion for adaptation investment needs</p> <p>USD 2.25 billion for mitigation investment needs</p>

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Table 3. Continued

Country	Implementation plans with road maps	Allocation of responsibilities plus institutional set-ups	Budget allocations
Congo	<p>Planning of INDC implementation is mentioned, creation of specific policies and laws</p> <p>Stakeholder consultation is mentioned with specific actors (civil society, private sector, NGOs)</p>	<p>The National Strategy of Sustainable Development provides for the establishment of a National Fund</p> <p>Sustainable development (in addition to the Forest Fund) dedicated to the promotion of the green economy in all its components, economic and social in particular</p> <p>Creation of this fund will be positioned in line with the National Climate Fund that develop in various countries, taking into account the particularities of the Congolese strategy.</p>	EUR 5.14 billion, no partial costs mentioned
Ivory Coast	Implementation of INDC is mentioned: creation of specific laws and policies	Mentioned implementation methods, no mention of institutional set-ups.	<p>USD 19.108 billion for mitigation investment needs</p> <p>USD 1.757 billion for adaptation investment needs</p>
Ghana	<p>Implementation of INDC is mentioned, but no mention of road map to its implementation</p> <p>Only mentioned investment requirements, financial sources and capacity-building need</p>	No mention of institutional set-ups.	<p>USD 9.81 billion for mitigation investment needs</p> <p>USD 12.79 billion for mitigation investment needs</p>
Guinea Bissau	<p>Means of implementation is mentioned and specified: capacity building, climate finance, technology transfer</p> <p>No mention of road maps to implement INDC</p>	<ul style="list-style-type: none"> The UNFCCC and the Kyoto Protocol ratified on 27 October 1995 and 18 November 2005, respectively. National Poverty Reduction Strategy (PRSP II) and National Strategic Document – TERRA RANKA 2015-2025. 	<p>USD 0.7 billion for mitigation investment needs</p> <p>USD 42 million for adaptation investment needs</p>
Kenya	<ul style="list-style-type: none"> Planning of INDC implementation is mentioned: creation of specific laws and policies Means of implementation is mentioned and specified: capacity building, climate finance, technology transfer 	No mention of institutional set-ups for INDC implementation.	USD 40 billion for both mitigation and adaptation investment needs

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Table 3. Continued

Country	Implementation plans with road maps	Allocation of responsibilities plus institutional set-ups	Budget allocations
Liberia	<ul style="list-style-type: none"> INDC preparation stakeholder consultation: mentioned with specific actors (government institutions, civil society, private sector, academia, NGOs) <p>Planning of INDC preparation is mentioned: creation of specific laws and policies</p>	No mention of institutional set-ups for INDC implementation.	No budget given
Malawi	<ul style="list-style-type: none"> INDC stakeholder consultation is mentioned with specific actors (National and international experts) Mention of policy frame work to support implementation e.g. Malawi Poverty Reduction Strategy Program, Malawi Economic Growth Strategy and Malawi Growth and Development Strategy I & II 	No mention of institutional set-ups for INDC implementation.	No budget given
Mali	<ul style="list-style-type: none"> Planning of INDC implementation mentioned: creation of specific laws and policies 	No mention of institutional set-ups for INDC implementation.	USD 1.062 billion for adaptation investments needs USD 34.68 billion for mitigation investment needs
Mozambique	<ul style="list-style-type: none"> INDC preparation stakeholder consultation is mentioned with specific actors (government institutions, civil society, private sector) Planning of INDC implementation is mentioned: creation of specific laws and policies 	<ul style="list-style-type: none"> The institutional arrangements established to implement and measuring, reporting and verification (MRV) the mitigation component of the INDC are those established by the National Climate Change Adaptation and Mitigation Strategy (NCCAMS) and operationalized by the National System to Monitor and Evaluate Climate Change. The relevant entities are the CCU, the Knowledge Management Centre, hosted in the Science Academy of Mozambique, the National Climate Change Network, the Inter- Institutional Group on Climate Change (GIIMC) and the National GHGs Inventory System, already included in the National System to Monitor and Evaluate Climate Change. 	No budget given

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Table 3. Continued

Country	Implementation plans with road maps	Allocation of responsibilities plus institutional set-ups	Budget allocations
Namibia	<ul style="list-style-type: none"> INDC preparation stakeholder consultation is mentioned with specific actors is mentioned with specific actors (government institutions, civil society, private sector, NGOs, academia, communities) 	<ul style="list-style-type: none"> The Cabinet of Namibia is the Government entity responsible for approving policies. The INDC will not be an exception to this rule and after the required technical validation, it will be officially endorsed by Cabinet before submission to the UNFCCC The Climate Change Unit (CCU)^b is supported directly by a formalized multi-sectoral National Climate Change Committee (NCCC) for the implementation and coordination of sector-specific and cross-sectoral activities while also providing advice and guidance on climate change issues The National Planning Commission, which usually monitors implementation of development programs, can assist in monitoring of activities stemming from the INDC. The private sector will be a privileged partner of government for implementing the INDC, either on their own or as funding partners. 	<p>USD 10.4 billion for mitigation investment needs</p> <p>USD 22.6 billion for adaptation investment needs</p>
Rwanda	<ul style="list-style-type: none"> INDC preparation stakeholder consultation is mentioned with specific actors (Civil society, private sector, academia) Planning of INDC implementation is mentioned: creation of specific laws and policies 	<ul style="list-style-type: none"> Rwanda has set up different bodies and operationalized institutional arrangements, namely the Green Economy Technical Coordinating Committee and the National Fund for Environment and Climate Change (FONERWA) as a national green fund to mobilize additional internal and external climate funds Ministry of Natural Resources (MINIRENA)^c has been accredited as implementing entity for Adaptation Fund and Green Climate Fund (GCF) while Rwanda Environment Management Authority (REMA)^d has been nominated as national designated authority for GCF. These institutions are based on a sector-wide approach and work closely with development partners, civil society, academia and the private sector. 	<p>USD 24.15 billion – initial costing of implementing the green growth and climate resilience strategy in the Water resource Management, Agriculture and Energy sector up to 2030</p>
Somalia	<p>Planning INDC implementation is mentioned: creation of specific laws and policies</p>	<p>No mention of institutional set-ups for INDC implementation.</p>	<p>No partial costs mentioned specific to either mitigation or adaptation investment needs by the Government of Somalia</p>

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Table 3. Continued

Country	Implementation plans with road maps	Allocation of responsibilities plus institutional set-ups	Budget allocations
South Africa	<ul style="list-style-type: none"> INDC preparation stakeholder consultation is mentioned with specific actors (civil society, policy makers, academia, private sector, development partners) Capacity building (partly) conditional to INDC implementation Planning INDC implementation is mentioned: creation of specific laws and policies 	No mention of institutional set-ups for INDC implementation.	USD 2.9 billion for adaptation investment costs USD 1380.5 billion for mitigation investment needs
South Sudan	<ul style="list-style-type: none"> INDC preparation stakeholder consultation is mentioned with specific actors (industry, academia, technical experts) Planning INDC implementation is mentioned: creation of specific laws and policies 	The INDC was endorsed by the Minister of Environment and various stakeholders at a validation workshop in Juba. The Ministry of Environment will lead the implementation of the INDC. Cross-sectoral contributions will be discussed and implemented through the National Council of Ministers.	USD 50 billion is required for mitigation and adaptation actions across sectors up to 2030
Tanzania	<ul style="list-style-type: none"> INDC preparation stakeholder consultation is mentioned with specific actors (government institutions, civil society, private sector, academia) Capacity building (partly) conditional to INDC implementation 	No mention of institutional set-ups for INDC implementation.	USD 60 billion for mitigation investment needs USD 10 billion for adaptation investment needs
Uganda	<ul style="list-style-type: none"> Planning INDC implementation is mentioned: creation of specific laws and policies Capacity building (partly) conditional to INDC implementation 	No mention of institutional set-ups for INDC implementation.	USD 2.4 billion for adaptation investment needs USD 5.436 billion for mitigation investment needs
Zambia	<ul style="list-style-type: none"> Capacity building (partly) conditional to INDC implementation Planning INDC implementation is mentioned: creation of specific laws and policies 	No mention of institutional set-ups for INDC implementation.	USD 35 billion for mitigation investment needs USD 20 billion for adaptation investment needs

a According to the options for a national sustainable development policy, the CONEDD will evolve into a National Council for Sustainable Development.

b The Ministry of Environment and Tourism (MET), which is responsible for all environmental issues in the country, is also the National Focal Point to the UNFCCC. It is the coordinating body for all climate change activities through its CCU of the Directorate of Environmental Affairs.

c MINIRENA is the Ministry responsible for formulating and monitoring national policies related to climate change and environment.

d REMA is the official organ responsible for implementing national policies and strategies related to climate change and environment.

e Report on Costing of Green Growth and Climate Resilience Strategy.

Source: Country INDCs listed in Box 1.

Box 1. INDC documents analyzed in this study

- Central African Republic. (2015). Central African Republic Intended Nationally Determined Contribution (INDC), (September), 1–15.
- Federal Government of Somalia. (2015). Somalia’s Intended Nationally Determined Contributions (INDCs), 1–8.
- Government of Burkina Faso. (2015). Intended National Determined Contribution (INDC) of Burkina Faso, (September).
- Republic of Botswana. (2015). Botswana Intended Nationally Determined Contribution (INDC), 1–5.
- Republic of Burundi. (2015). Intended Nationally Determined Contribution (INDC), (September).
- Republic of Cameroon. (2015). Cameroon Nationally Contribution Intended Determined (INDC).
- Republic of Ghana. (2015). Ghana’s intended nationally determined contribution (INDC) and accompanying explanatory note. *Gh-Indc*, 1–16.
- Republic of Guinea Bissau. (2015). Guinea Bissau Intended Nationally Determined Contributions (INDC), (October), 1–47.
- Government of Ivory Coast. (2015). Contributions Prevues Determinees au Niveau National de la Cote D’Ivoire, 1–17.
- Government of Kenya. (2015). Kenya’s Intended Nationally Determined Contribution (INDC), (July).
- Government of South Africa. (2015). South Africa Intended Nationally Determined Contribution (INDC), 1–11.
- Ministry of Water and Environment. (2015). Uganda’s Intended Nationally Determined Contribution (INDC), (October), 1–18.
- Republic of Liberia. (2015). Liberia Intended Nationally Determined Contributions (INDC).
- Republic of Malawi. (2015). Malawi Intended Nationally Determined Contribution (INDC), *I*(1), 11–20.
- Republic of Mali. (2015). Mali Intended National Determined Contribution (INDC), (September).
- Republic of Mozambique. (2015). Mozambique Intended Nationally Determined Contribution (INDC), 1–12.
- Republic of Namibia. (2015). Namibia Intended Nationally Determined Contributions (INDC), (September).
- Republic of Rwanda. (2015). Rwanda Intended Nationally Determined Contribution (INDC), (November), 1–24.
- Republic of South Sudan. (2015). Intended Nationally Determined Contribution (INDC), (14), 1–9. <http://travel.state.gov/content/passports/english/alertswarnings/republic-of-south-sudan-travel-warning.html>
- Republic of Zambia. (2015). Intended Nationally Determined Contribution (INDC), (4291), 12. http://www4.unfccc.int/submissions/INDC/Published Documents/Zambia/1/FINAL+ZAMBIA’S+INDC_1.pdf
- République du Congo Gouvernement. (2015). Tribution Prevue Determinee au Niveau National dans le Cadre de la CCNUCC Conférence des Parties 21 (INDC), *septembre*.
- United Republic of Tanzania. (2015). United Republic of Tanzania’s Intended Nationally Determined Contributions (INDCs), 8. http://www4.unfccc.int/submissions/INDC/Published Documents/United Republic of Tanzania/?/1/INDCs_The United Republic of Tanzania.pdf

Box 2. NDC documents analyzed in this study

- Central African Republic. (2015). Central African Republic Intended Nationally Determined Contribution (INDC), (September), 1–15.
- Federal Government of Somalia. (2015). Somalia’s Intended Nationally Determined Contributions (INDCs), 1–8.
- Government of Burkina Faso. (2015). Intended National Determined Contribution (INDC) of Burkina Faso, (September).
- Government of Ivory Coast. (2015). Contributions Prevues Determinees au Niveau National de la Cote D’Ivoire, 1–17.
- Government of Kenya. (2015). Kenya’s Intended Nationally Determined Contribution (INDC), (July).
- Government of SouthAfrica. (2015). South Africa Intended Nationally Determined Contribution (INDC), 1–11.
- Ministry of Water and Environment. (2015). Uganda’s Intended Nationally Determined Contribution (INDC), (October), 1–18.
- Republic of Botswana. (2015). Botswana Intended Nationally Determined Contribution (INDC), 1–5.
- Republic of Burundi. (2015). Intended Nationally Determined Contribution (INDC), (September).
- Republic of Cameroon. (2015). Cameroon Nationally Contribution Intended Determined (INDC).
- Republic of Ghana. (2015). Ghana’s intended nationally determined contribution (INDC) and accompanying explanatory note. *Gh-Indc*, 1–16.
- Republic of Guinea Bissau. (2015). Guinea Bissau Intended Nationally Determined Contributions (INDC), (October), 1–47.
- Republic of Liberia. (2015). Liberia Intended Nationally Determined Contributions (INDC).
- Republic of Malawi. (2015). Malawi Intended Nationally Determined Contribution (INDC), *I*(1), 11–20.
- Republic of Mali. (2015). Mali Intended National Determined Contribution (INDC), (September).
- Republic of Mozambique. (2015). Mozambique Intended Nationally Determined Contribution (INDC), 1–12.
- Republic of Namibia. (2015). Namibia Intended Nationally Determined Contributions (INDC), (September).
- Republic of Rwanda. (2015). Rwanda Intended Nationally Determined Contribution (INDC), (November), 1–24.
- Republic of South Sudan. (2015). Intended Nationally Determined Contribution (INDC), (14), 1–9. <http://travel.state.gov/content/passports/english/alertswarnings/republic-of-south-sudan-travel-warning.html>
- Republic of Zambia. (2015). Intended Nationally Determined Contribution (INDC), (4291), 12. Retrieved from http://www4.unfccc.int/submissions/INDC/Published Documents/Zambia/1/FINAL+ZAMBIA’S+INDC_1.pdf
- République du Congo Gouvernement. (2015). Tribution Prevue Determinee Au Niveau National dans le cadre de la CCNUCC Conférence des Parties 21 (INDC), *septembre*.
- United Republic of Tanzania. (2015). United Republic of Tanzania’s Intended Nationally Determined Contributions (INDCs), 8. http://www4.unfccc.int/submissions/INDC/Published Documents/United Republic of Tanzania/?/1/INDCs_The United Republic of Tanzania.pdf

DOI: 10.17528/cifor/006651

CIFOR Working Papers contain preliminary or advance research results on tropical forest issues that need to be published in a timely manner to inform and promote discussion. This content has been internally reviewed but has not undergone external peer review.

Woodfuel is extremely important for energy security in Africa. About eighty percent of both rural and urban populations in the 49 countries that comprise South-Saharan (SSA) Africa rely on wood-based biomass to satisfy their energy needs, especially for cooking. Under the Paris Agreement for Climate Change, countries have submitted their 'Intended Nationally Determined Contributions' (INDCs) to the Secretariat of the United Nations Convention for Climate Change (UNFCCC), to define their national ambitions. After Paris, these have now become legally binding NDCs. Therefore, the role that woodfuel plays in the NDCs of SSA countries needs to be assessed. We reviewed and assessed INDC/NDCs of a selection of SSA countries to identify how they focus on wood fuel. This paper provides a first analysis of the role that woodfuels play in the NDCs. Only five of the 22 countries analyzed do not mention wood fuels at all. While all of those that do mention roadmaps, only just over half of them offer budgetary considerations, and about half of them identify institutional responsibilities for the woodfuel sector. In many NDCs, woodfuel is seen as a backwater technology, and not the renewable energy source it could become if sustainably harvested and managed. We find that, overall, next iterations of the NDCs in SSA countries need to become more specific regarding the role of woodfuels in national climate and development policies.



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