



MAKING CLIMATE FINANCE WORK FOR AFRICA

Using NDCs to Leverage Climate Finance for Innovation Systems Building

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Rapporteur's Report



Table of Contents

1.	Introduction	4
2.	Aim and objectives	5
3.	Opening remarks: Reframing the Approaches to Africa’s Sustainable Development	6
4.	Unpacking the CRIBs Approach to Innovation Systems in Leveraging Climate Finance in East Africa	7
5.	Exploring NDCs and National Priority Sectors	10
6.	Identifying Trade – offs and opportunities between NDCs and other National and Regional Priorities: Understanding the opportunities for Regional Integration of NDCs in Key Sectors Energy, Water, Agriculture & Transport	13
7.	Integrating CRIBS into NDC Implementation and Identifying Priority Action at National and Regional Level	19
8.	The Role of Knowledge networks and Partnerships in Supporting Priority National and Regional Actions: The Case of Low Carbon Energy for The workshop achieved some key learning outputs in line with the set objectives:	26
9.	Conclusion	27
10.	Acknowledgements	29
	Appendix	29
	A. Workshop Evaluation Statistics	29

Executive Summary

This workshop was a critical stakeholder's discourse that was organized by the African Sustainability Hub, STEPS Centre and the African Centre for Technology Studies (ACTS) on making climate finance work for Africa, using NDCs to leverage climate finance for innovation systems building. Noting that past international climate finance mechanisms such as the Clean Development Mechanism, CDM failed low and middle income countries, focusing only on hardware financing which reinforced the comparative advantages of large developing countries such as Brazil, China & India with existing innovation systems around climate technologies, national innovation systems have been proven to explain the economic development of a wide range of countries. Using international climate finance to nurture innovation systems around climate technologies in low and middle income countries would begin to address the problem that hardware financing mechanisms like the CDM can't fix. It will underpin more sustained and widespread transfer and development of climate technologies. If done in the right way, engaged with the right actors, it can also be achieved in ways that directly respond to the needs of poor and marginalised women and men. As such, innovation system building provides a powerful new focus for policy and one that low and middle income countries could benefit from significantly were they to champion the use of international climate finance for innovation system building. The workshop comprised of several substantive sections each covering an important facet of transformational development and climate action via innovation systems, applying the CRIBs approach to building the same. Participants in the dialogue, who came from various sectors including private sector, civil society, national government and regional entities, the fourth estate, research and academia actively discussed innovation systems building and CRIBs as institutions that can be established in developing countries to act as key platforms for developing innovation systems around nationally appropriate climate technologies thus enabling the delivery of NDCs. The deliberations looked at (i) Reframing the Approaches to Africa's Sustainable Development (ii) Unpacking the CRIBs Approach to Innovation Systems in Leveraging Climate Finance in East Africa (iii) Exploring NDCs and National Priority Sectors (iv) Identifying Trade – offs and opportunities between NDCs and other National and Regional Priorities: Understanding the opportunities for Regional Integration of NDCs in Key Sectors Energy, Water, Agriculture & Transport (v) Integrating CRIBS into NDC Implementation and Identifying Priority Action at National and Regional Level. The discussions around each sub-theme were lively with contributions from a wide range of participants. The purpose of this report is to summarize the main points made during the dialogue.

1. Introduction

Climate change finance mechanisms such as the Clean Development Mechanism (CDM) were previously designed in ways that would only benefit large developing countries like China and India that have enhanced technological capacity and capabilities, providing attractive environments for state and non-state actors seeking to leverage climate finance to support their international investments. Africa in its entirety, including South Africa and North African countries, has received only 3% of accumulated international investment under the CDM.

Noting the potential and opportunities to unlock trillions of dollars new and additional climate funding, via the framework of the new global Paris Climate Agreement adopted in Marrakech last year, African policy makers are presented with an ample opportunity to effect change. Utilizing nationally devolved, more bottom-up structure espoused by the Paris Climate Agreement and acting as a coordinated block of countries, East African nations could coordinate implementation of their Nationally Designated Commitments (NDCs) in ways that leverage funding to build new innovation systems around low-carbon energy technologies. Research has demonstrated this will underpin long term economic growth and poverty alleviation, but only if pursued via a policy approach firmly rooted in supporting East African countries in defining their own, context-specific needs, upon which climate finance will then be leveraged to support.

Building on the workshop on innovation systems held in March 2016, the African Centre for Technology Studies (ACTS) and the University of Sussex cordially invites all of the East African climate policymakers who attended the abovementioned session (from Ethiopia, Kenya, Rwanda, Tanzania and Uganda) to a 2 day training and capacity building workshop on designing NDCs to leverage climate finance for building innovation systems within East African nations.



Fig:1 Participants at the Making Climate Finance Work for Africa: Using NDCs to Leverage Climate Finance for Innovation Systems Building workshop

2. Aim and objectives

The intended outcome of the workshop was that:

“Participants return home with concrete plans for implementing CRIBs to leverage international finance and deliver against their NDCs”

In this regard, the training event sought to; provide climate policy makers in East Africa with the knowledge and capabilities necessary to leverage climate finance via their NDCs and use this to build innovation systems, significantly increasing flows of climate technologies to East Africa.

The workshop had 5 specific objectives:

1. *Implement their country's NDC (or INDC) in ways that will leverage maximum international climate finance to build innovation systems around new and existing climate technologies. By the end of the event, the participants will have identified priority actions for immediate implementation after the workshop.*
2. *Understand the value of and how to implement, “Climate Relevant Innovation-system Builders” (CRIBs) as the key mechanism through which the NDCs are to be implemented. CRIBs are proposed networks of institutions based in low and middle income countries facilitating activities that build and strengthen innovation systems around locally appropriate low-carbon technologies. They mirror best practices in other nations that have been successful in harnessing science and technology to deliver significant economic development.*
3. *Access follow-on resources via a dedicated web page.*
4. *Access monthly expert support for 12 months following the training event from climate policy experts at ACTS and the University of Sussex, who will assist in the design and implementation under the NDCs.*
5. *Provide a platform for knowledge and experience sharing with other East African policy makers, learning from best practice and taking advantage of regional learning and implementation opportunities.*

Activities of the workshop

The workshop took 2 days and integrated two sets of objectives and specific activities.

The first day of the workshop involved exploring innovations systems and more specifically CRIBS (Climate Relevant Innovation-system Builders) as a pathway to enhancing implementation and delivery of NDCs) in ways that leverage funding to build new innovation systems around low-carbon energy technologies. The main aim of this first day event was to help participants understand the various perspectives of innovation systems within the context of CRIBs and link these to their policy contexts particularly implementation and delivery of NDCs. This training was attended by participants drawn from the East African region; Kenya, Uganda, Tanzania, Rwanda, Ethiopia. The participants included key government technocrats tasked with designing and implementing NDCs. Additionally, participants included representations from key stakeholder groups including private sector, civil society and institutions of higher learning tasked with knowledge dissemination. The training tackled key issues including;-

- i. The basis of innovations systems and particularly CRIBs in terms of leveraging climate finance to enhance delivery and implementation of NDCs and its relevance to African development
- ii. Integrating the CRIBs as a key mechanism into implementation of NDCs at national and regional level

- iii. Enabling frameworks and opportunities for enhancing the application of innovation systems, particularly via the CRIBs mechanism to enhance NDC implementation, identifying and optimizing on priority actions at national and regional level.

The second day of the workshop entailed group discussions involving all the attending stakeholders from across the region. These discussions built on the discussions conducted on the first day. The participants explored CRIBs as a mechanism in the context of utilizing NDCs to build innovation systems and leveraging climate finance in the region. Further discussions on the first day had also explored national and regional priorities in so far as the NDCs were concerned in addition to discussions around identifying trade-offs and opportunities as regards NDCs and other national priorities. This also factored in exploring the opportunities for regional integration of the same with respect to key sectors including Energy, Agriculture and Water.

- i. The discussions on day two therefore aimed to explore integration of CRIBs into NDC implementation and delivery, identifying priority actions at national and regional level in addition to looking into the role of knowledge networks and partnerships in supporting priority national and regional actions. The case of Low Carbon Energy for development Network was illuminated in this regard. Deliberations over the two days first involved presentations from key speakers drawn from institutions including ACTS, University of Sussex, NETFUND, SEI and the University of Loughborough. The discussions were then opened to all participants who provided insights on from their own experiences and activities. The discussions focussed on key issues including:
 - ii. Identifying national and regional priorities for NDCs
 - iii. Illuminating on the trade-offs and opportunities between NDCs and other national and regional priorities in addition to exploring the opportunities for regional integration with respect to NDCs
 - iv. Integrating CRIBs into implementation and delivery of NDCs, taking into account priority actions at national and regional level.
 - v. Exploring the role of knowledge networks and partnerships in supporting priority national and regional actions. This included highlighting opportunities that exist for supporting regional platforms for innovation such as the Africa Sustainability Hub

3. Opening remarks: Reframing the Approaches to Africa's Sustainable Development

The workshop commenced with a keynote address from Dr George Mwaniki Director NETFUND, who in addition to illuminating the role of the Africa Sustainability Hub, also elaborated on the need to re-examine our economic model in order to be able to confront the challenges wrought forth by climate change. It was noted the business as usual (BAU) approach would not be able to adequately respond to the rigors of climate change. Towards this end, it was noted that this presented an opportunity for incubating innovation systems into responding to climate change particularly with regard to transitioning from brown economies into climate compatible low carbon economies. It was also noted that there was a very strong “profits motive” which was forestalling enhanced traction with regard to developments in environmental health and the transition into low carbon climate compatible economies. Recent drought spells in Kenya highlighted key costs appurtenant to climate change, with the same having enormous economic implications to the country's economy as a result of significant reductions in productivity. It was however noted that this presented an opportunity for especially African countries to rethink not only their development strategies but also

re-position themselves so as to tap into new and additional climate related finance in order to drive climate compatible development. Further, it was also highlighted that most NDCs looked into both adaptation and mitigation to climate change with Kenya's NDC focusing on key sectors including energy and climate smart agriculture. This was while also noting the fact that adaptation was also a climactic component in so far as Kenya's and African countries' NDCs were concerned.

The address was echoed by Dr Joanes Atela from the African Centre for Technology Studies (ACTS) and the African Sustainability Hub (ASH) who also elaborated on the role and mandate of the Africa Sustainability Hub where the discussions commenced with a broad inquiry of the reasons why transformative and sustainable development and thus enhanced the quality of life in Africa remained an elusive goal. The theme thus revolved around the question why Africa has not done well in terms of sustainable development and the transformative agenda despite significant investment that has been pumped into the continent. Africa still lagged far behind in terms of realizing the Millennium Development Goals (MDGs) especially with regard to key areas including food security, energy and poverty alleviation despite massive investments in the continent in addition to contributing the least to global carbon emissions. In that context therefore, it was necessary to rethink and re-frame the approaches to sustainability and sustainable development in order to construct and realize the transformative agenda. These would facilitate interrogation of the hindrances and barriers to transformative resource utilization. This required niche specific engagements and open discourses around the issues including inequality in resource use and development. Further, it was noted that the discourse was also set in the broader context of the African Sustainability Hub which builds on a community of practice to look into ways of transforming the development agenda in Kenya and in Africa through among others building on innovation systems and knowledge networks as a catalyst for real transformation. Towards this end, the Hub encompasses a myriad of development issues and sectors and is also part of a global consortium established with the support and collaboration of STEPS Centre in the University of Sussex. Key institutions make up the Hub including ACTS, SEI and ATPS. The Hub is unique due to the fact that it leverages north – south and south – south symbiotic collaboration in addition to looking at sustainable development from the crucible of transformation, illuminating on the pathways approach to pursuing sustainable development while highlighting and unpacking diverse narratives and challenges to the same. As such, the workshop designed by the Africa Sustainability Hub is timely and important for the Kenyan government and indeed other African countries facing the challenge of climate change.

4. Unpacking the CRIBs Approach to Innovation Systems in Leveraging Climate Finance in East Africa

Dr Rob Byrne from SPRU, University of Sussex unpacked the CRIBs approach to implementing and delivering on innovation systems. The discourse touched on linking NDCs to innovation systems and innovation systems building. It was noted that part of the reason why climate finance has not fully delivered especially as regards low and middle income countries was that there wasn't enough focus on innovation systems and mechanisms through which the same could be premised. Instead, the focus was only on hardware financing such as the CDM (Common development Mechanism) which shored up comparative advantages of countries including Brazil, China & India with existing innovation systems around climate technologies. This was in addition to the same being premised on market-based instruments to enhance innovation and technology transfer. As a result, large developing economies like Brazil, China and India were the largest beneficiaries of not only climate fi-

nance but also climate change technologies. As a consequence, the more mainstream frameworks for innovation finance and technology have not been successful in catalysing Africa's response to climate change in addition to transforming the continent's development trajectory. It was also noted that the outcomes of mechanisms including CDM thus have resulted in acute asymmetry the result of which Africa performed poorly compared to other regions. It was also highlighted that countries which had been disadvantaged as a result were also encumbered by weak innovation systems



Fig 2: Dr Rob Byrne from the University of Sussex presenting on CRIBs and using NDCs to build innovation systems and leverage climate finance

It is in this context that it was also noted that as climate negotiations increasingly focused on how to implement and realize the goals and targets set forth, the devolved nature of the Paris Agreement epitomized by the NDCs in addition to the enhanced recognition of innovation systems within the UNFCCC's Technology Executive Committee (TEC) presents a climactic opportunity for low and middle income countries to respond to this imbalance. In this regard, the spotlight was on the seemingly bottom-up approach to enhancing climate action which could spur innovative approaches to enhancing mitigation and adaptation across Africa. Further there was an opportunity to factor in the nuances and contextual issues that are appurtenant to climate action including climate finance delivery and effectiveness. It is therefore on this basis that innovation systems become one of the ways to addressing these contextual challenges vide providing the incubation space for markets and other delivery modes to succeed. It was additionally emphasized that there were a myriad of ideas around innovation systems which were anchored at different levels including the international, national and sub-national. However the emphasis for the purpose of the workshop was going to be at the national level.

Dr Rob also noted that innovation systems referred to the systemic context within which there was innovation, coordination, adoption of technology and innovative techniques and economic development. Towards this end, national innovation systems were bounded nationally and encompassed a myriad of actors who are catalysts of innovation as a result of the interactions between various types of actors and actions in a bid to respond to key issues. In this regard it was therefore critical to appreciate not only the elements of innovation systems but also how to build these systems and embed them in the development process.

The 4 Basic Categories

It was illuminated that there were 4 basic categories with regard to innovation systems which include;-

- Actors of all kinds
- Relations and interactions
- Capabilities and capacities as a result of both individual and collective skills and knowledge
- Institutions in terms of policies, regulations, standards, models, practice and norms

A point of emphasis was that building innovation systems for Africa was not one off and linear involving a radical invention that can solve particular problem but interactive, incremental processes with a variety of different actors and actor needs, maturing over a long period of time through political systems. These could be sources of innovation as capacities and capabilities continue to be enhanced. In is in this regard that national systems need to be strengthened especially in light of climate change challenges and governance architecture. Two most relevant parts of the governance architecture that were identified included the

1. Technology mechanism which comprised of two parts
Technology Executive Committee (TEC)
Climate Technology Centre and Network (CTCN)
2. Finance mechanism including institutions such as the Global Climate Fund (GCF)

One of the major issues that was noted as a hindrance to development and embedding of innovation systems was the dearth in terms of linkage between technology and finance mechanisms as regards the architectural structure of governance of the two realms. It is in this regard that there was need to look into ways of improving the architecture with regard to the two components. CRIBs thus provide an avenue to seek ways of addressing the same. In this sense, NDCs could be an avenue to facilitate crucial linkages including technology and finance in addition to providing a platform within which to key aspects including enhancing strategies and implementation plans and coordinating actors could be canvassed. CRIBs was thus identified as a potential mechanism which could address these issues. Towards this end, CRIBs could be located nationally and linked internationally, spurring action through projects and facilitating information flows amongst various stakeholders. Further, CRIBs could be conveners of different actors to map out climate change action vide projects and programs relevant to stakeholders, encouraging active participation in the actions identified. As a result, a network of multi-stakeholder actors with relevant multi-stakeholder relations is thus established. Further, it was noted that a s a result of incorporating CRIBS into NDC

implementation, there were four 4 main emergent attributes including;-

- Merging of Technologies and innovations
- Internalization and better management of risks and uncertainties
- Development of diverse and different world views and perspectives with regard to projects over and above standard project management criteria
- A broader appreciation of the long view which entails a transition from simpler innovation interventions to more complex innovation systems

It follows that the CRIBs mechanism has been distilled into four 4 broad goals which include

- Building networks of diverse stakeholders
- Foster and share learning
- Promote development of shared values
- Support diverse experimentation of ideas, techniques, technologies and mechanisms

5. Exploring NDCs and National Priority Sectors

Ms Winnie Asiti from the African Centre for Technology Studies (ACTS) illuminated on NDCs in the context of national priorities. These were critical in guiding the process of developing innovation systems which were to facilitate the implementation of NDCs. It was noted that the Paris Agreement has fostered broad participation with regard to the countries party to the UNFCCC. Further attention was brought to the [NDC explorer \(http://klimalog.die-gdi.de/ndc/#NDCExplorer/worldMap?INDC??income???catIncome\)](http://klimalog.die-gdi.de/ndc/#NDCExplorer/worldMap?INDC??income???catIncome) – an exploratory tool showing different elements that were extracted from the analysis of country NDCs. It is worth noting that the tool was developed by ACTS in partnership with the German Development Institute (DIE) Spotlight was also placed on African NDCs which were noted to have highlighted focus areas where climate contributions were to be made. Towards this end, agriculture was identified as one of the key sectors identified as priority areas. Others included water, health biodiversity, forestry, early warning systems among others. Further, it was noted that adaptation was noted as the key focus area, noting the cross-linkages with mitigation actions. Attaching to the African NDCs were massive financial and resource investment needs. This was further highlighted by the observation that most African countries made conditional contributions pegged on the availability of finance. With the shortage of the same it was noted that there was an opportunity to optimize on innovation systems in order that cut across sectors in order to leverage climate finance for implementation and delivery of NDCs. In this regard, it was further emphasized that innovation systems ought to be aligned to the goals identified vide the NDCs including finance for implementation of NDC priorities.

Open Discussions

Discussions were opened up to the participants to share more with regard to national priorities where country representatives discussed their national priorities and looking into how the CRIBs mechanism can apply to the various national NDCs with regard to implementation of the same. With Ms Susy Wandera from SUSWATCH facilitating the open discussions, different priorities and issues emerged from the open forum where stakeholders from all the countries represented made contributions towards the discourse centred on identifying national priority actions.

It was noted in the discussion that Rwanda had not prepared its NDC but also focused the same on adaptation. The key focus areas were agriculture and food security, energy access and efficiency. Disaster preparedness was also an area of focus in so far as their NDC was concerned. Similarly, it was highlighted that adaptation was the main focus area with agriculture, food security and disaster preparedness being areas of priority with regard to Ethiopia's NDC. Uganda on the other hand prioritized both adaptation and mitigation. The key sectors highlighted under adaptation include agriculture, forestry, water, infrastructure, energy and health. It was further noted that risk management was also an important area of focus under adaptation. Under mitigation, the focus areas include energy, forestry, wetlands and agriculture with the country setting a target of reducing emissions by 22% by the year 2030. It was further identified that elaborating on the issue of conditional and non-conditional targets was important with regard to engaging different stakeholders on the NDCs. In Tanzania's case, the NDC touched on both mitigation and adaptation. However, it was emphasized that adaptation was the key priority area with key sectors such as agriculture, forestry, energy, coastal marine and fisheries, water resource use, tourism, human settlement and health. Mitigation looked into sectors including transport, energy, waste management and forestry among others. Kenya on the other hand had a conditional NDC whose target was 30% emissions reduction by the year 2030. The NDC touched on both mitigation and adaptation with a priority on adaptation. In terms of mitigation a sectorial approach was deployed focusing on 6 key sectors that had the highest mitigation potential as identified by the UNFCCC including transport, energy, agriculture, industry and waste management. On adaptation, the national adaptation plan which has already been deposited with the UNFCCC was identified as being the premise upon which adaptation actions were anchored in so far as the NDC is concerned. The National Adaptation Plan has been integrated with the Mid-term Plans and the Mid-term Expenditure Plans which are from Kenya's development blueprint, Vision 2030 thus NDCs have been interlinked with the key development blueprints. The NDC is anchored into national established policies including the National Climate Change Action Plan (NCCAP) and the National Climate Change Response Strategy (NCCRS) and the Climate Change Act of 2016.



Fig 3: Participants engaged in one of the group sessions

At the regional level, energy was noted as being a key priority area with a focus around energy efficiency and looking into techniques and technologies that can enhance energy efficiency including looking at conversion technologies among others. These have implications in sectors including forestry. Towards this end, it was noted that at the regional level there was on-going work on developing a regional policy and strategy framework to deal with energy efficiency, working in conjunction with the East African Community. Further, energy access was a key area with countries setting very ambitious targets, and the regional policy agenda also being an area of focus. Renewable energy was also an area of focus, looking at ways of enhancing access and adoption to technologies around renewable energy. The issue of energy security in a broad perspective was also mentioned with there being an energy security policy framework in the African context of which the EAC is developing the first of its kind on the continent. Further, energy trade was also identified as a key area in terms of looking into developing a framework for facilitating and regulating trade in clean energy between different countries in order to support what countries are trying to achieve in so far their NDCs are concerned.

Contributions were also made from the private sector particularly from the perspective of energy where it was noted that there was a huge gap that the private sector can help plug in realizing clean energy access. It was identified that while there were measures made which were designed to help the private sector engage even further in clean energy production, some of the measures were counterproductive hence there was need to have deeper interaction between the private sector and policy makers to look into the most effective and efficient policy frameworks to spur private sector engagement given that the private sector has the potential to unleash clean energy technologies into closing the energy policy gap.

Discussions also focused CRIBs as a concept that can be deployed in leveraging implementation and delivery of NDCs including climate finance. One of the areas of questioning regarded the feasibility of the mechanism especially pertaining to among others how to incorporate multiple stakeholders especially in arenas where market mechanisms were the most preferred interventions. Further, there was also a query regarding the target groups with regard to the channels of climate finance and how CRIBs plug into the system of climate financing.

Additionally there was an intervention regarding governance, premised on Kenya's experience, which touched on the policy landscape and decision making which facilitated broad-based representation. Additionally, there were interventions around whether CRIBs involved links with indigenous knowledge and how the appurtenant benefits are linked with local indigenous knowledge in addition to how CRIBs can link to policies and frameworks in order to facilitate climate action and help countries access best practices and adopting the same to local contexts. Further there were questions around the viability of adoption including CRIBs especially with regard to multi-stakeholder engagement, noting the challenge of bringing on board not only all stakeholders involved but also assurances as to the feasibility of the same and reconciling different priority targets and the resources attaching therein. In this regard, there was also an issue around operationalization of CRIBs as a mechanism for implementation of NDCs.

Another issue that emerged concerned devolved innovation clusters and how they would fit into the CRIB framework noting the different levels within which innovations systems can exist. Further, another issue concerned how key aspects of innovation including social acceptance are factored in with regard to implementation of NDCs via innovation systems especially as concerning operationalization of initiatives including CRIBs, noting the concern that often critical stakeholders are normally left out of the engagement process.

It was noted that while CRIBs provided an opportunity to look into implementation of NDCs from a different perspective, it was noteworthy that political capital was also crucial to the success of CRIBs and thus without the same, it would be an uphill task to implement the same. CRIBs thus presented an attractive framework within which to reconcile the different targets towards a shared vision or goal in addition to encouraging innovation through the decision making processes as a result of creating the space for the same. Further, it was also noted that innovation systems can also be devolved across different levels and enshrined in a broader framework in order to facilitate the necessary flows of information and input amongst different stakeholders in different levels.

6. Identifying Trade – offs and opportunities between NDCs and other National and Regional Priorities: Understanding the opportunities for Regional Integration of NDCs in Key Sectors Energy, Water, Agriculture & Transport

This session was facilitated by Mr Mbeo Ogeya who, while making reference to the Kenyan case, noted that there were 3 pillars which formed the basis of the county's growth priorities. These were:

- Social
- Economic
- Political

It was also noted that the enablers to the above included sectors such as technology, human resources, infrastructure among others. Further, there were interactions between different sectors, key to not only national development priorities but also NDCs across spaces including governance. Toward this end, African countries had mostly focused on four 4 key sectors in so far as their NDCs and national development agenda were concerned including:

- **Transport**
- **Energy**
- **Agriculture**
- **Water**

Additionally it was emphasized that these sectors were the most cross cutting and identified as critical to African countries in terms of both national development priorities and NDCs. IN this regard, participants were then invited to groups based on the key sectorial areas and explore not only national priorities but also the space for innovation, trade-offs concerned and the opportunities for regional integration noting the differentiated but common country priorities that were to be shared within the different groups.

The small group discussions aimed to create space for more insights from the experiences of all participants attending the workshop. The small group session was handled by Mr Mbeo Ogeya from the Stockholm Environment Institute (SEI). Participants were divided into three groups aligned to some of the key issues arising from the discussions. Specifically, the groups discussed the key priority areas that East African countries could target in building innovation systems at the national, local and sectorial levels. The eventual groups that were formed were ***Energy, Water and Agriculture***

Group Presentations

Agriculture and Water Groups

The deliberations took the approach of mapping out the myriad of actors that were deemed to be relevant to the sector. Mapping of the actors was informed by their mandates and functions especially in the context of climate change actions. Some of the actors identified included agricultural communities including livestock keepers and crop growers, line state agencies and public institutions, academia and research institutions, international institutions, finance institutions, civil society, private sector.

Some of the technologies identified included hydroponic farming, ICT applications that farmers and livestock keepers can be able to use, improved animal and crop varieties, innovations in financial products available in the agricultural sector were also explored in terms of animal and crop insurance, early warning system technologies

In terms of trade – offs, the competing nutritional needs vs commercialization of the agricultural sector was discussed where it was elaborated that there was a focus on commercial production in exchange for nutritional needs. Further there were cultural trade – offs especially with regard to lack of compatibility between the interventions and technologies introduced to the society on one hand and the cultural sensitivities and nuances existent within the various communities with which the technologies are being introduced. Further the issue of seed sovereignty where the farmers

are less dependent on the variety of needs they produce and more on varieties that are market sourced hence become more vulnerable to market turbulences and inconsistencies as a result. Further, another trade – off identified entailed the competing interests as regards cash crops vis a vis food crops where food security needs were being substituted for more lucrative cash crops. Another trade- off involved looking at circumstances where there were competing and complementary interests especially at the macro-level, hence some of the key interventions in the sector might be pushed down the pecking order in terms of critical aspects including resource allocation as opposed to other more pressing sectors of the economy which might have been accorded a higher priority status

In terms of regional integration opportunities, there was focus on looking at the option of a regional approach with regard to key agricultural services including extension workers. The other opportunity entailed optimization of the East African market for agricultural goods and services. Further the issue of enhancing regional cooperation especially among non-state actors including civil society and the private sector was identified as an area which could be maximized upon.

Water Group

These discussions took a similar approach and indeed focus with the agriculture group with a focus on water use and efficiency. Some of the actors that were identified included the line state agencies and public institutions with some overlapping into key sectors including agriculture and energy, other included civil society, research institutions, private sector players, weather specialists development partners, local grassroots communities, players in the agricultural sector including farmers and livestock keepers

In terms of technologies, there was focus on some including irrigation technologies, water harvesting techniques, mechanized irrigation, technologies to minimize water wastage in addition to biotechnology were also discussed. Additionally recycling water technologies and support programmes including public awareness interventions and integration of these technologies with local practices were also discussed.

In terms of trade – offs, there the deliberations looked into the competing interests and demands for water resources in relation to utilization the same for energy vis a vis for agricultural production and household use. Further, there were issues raised as regards the utility of competing water efficiency technologies especially in water intensive sectors including agriculture. Along the same wavelength, the competing needs for water use extended to utilization of water for livestock vis a vis water usage for crop production. Further in terms of farming practice, there were trade – offs present while looking into water efficient agricultural practices with competing interests between small scale and large scale agricultural production.

In terms of regional integration, the EAC secretariat was stressed as one of the most critical organs where a myriad of issues could be canvassed including trans boundary water resource management and governance, regional opportunities in water use and water conservation including downstream and upstream cooperation in the same in addition to looking at regional mechanism that can be used for mapping and monitoring natural water resources taking into account the opportunities for regional research collaborations.



Fig 4: Presentations from one of the groups being made during the plenary session

Energy Group

The deliberation noted in the energy group noted that some NDCs had prioritized energy actions within their agriculture, transportation, forestry, industrial process & waste management targets. Some of the potential areas of focus in each of these interlinked sectors were identified included:

- Energy generation and/or demand
- Energy and agriculture
- Energy and transport
- Waste management
- Energy and industrial processes

Energy generation and/or demand

Under energy generation and/or demand, some of the trade – offs and issues identified included defining energy access where it was noted that there was a need to have a relook at how progress is measured vis a vis the incentives with regard to broad targets that have to be met. An example was given of a situation where everyone in a village has access to electricity when the grid has been extended to one building allowing households to theoretically connect. Another issue involved energy efficiency and energy conservation. There was an issue of renewable energy vis a vis conventional energy mix in addition to looking into storage of variable renewable energy. Further the

deliberations unearthed the issue of least cost power development as against emissions mitigation & energy security. Towards this end, the issue of the quickest means to realize the energy goals as against the most sustainable path becomes critical. Another trade – off that was identified entailed the use of reliable and proven technology vis a vis experimentation and building on innovation with regard to pathways to enhance energy generation.

Some of the technologies identified included renewable energy platforms including solar, wind, biomass, biogas and geothermal. Further fossil fuel technologies were also identified include LPG, CHP and improved cook stoves (ICS). Additionally, some actors that were deemed to be relevant include power generators, relevant state agencies, jua kali (informal manufacturing) sector, households - lighting, cooking, etc, industry, commercial

In terms of regional integration opportunities, some potential avenues for exploration included regional carbon reduction agreements, regional power trading, enabling lowest cost options based on regionally available renewable resources, bilateral agreements happening, but trilateral much more complicated

Energy & agriculture

Under energy and agriculture, some of the trade – offs and issues identified included land use – especially with regard to food security needs as against energy production. Additionally the issue of the application of appropriate technologies between mechanical, electrical or even thermal power was identified as critical. Further the issue of utility came out of the deliberations particularly concerning issues including storage, transportation and/or distribution of agricultural products. There was also the issue of renewable vs conventional energy. Along this wavelength, another trade – off concerns commercially viable vs. environmentally sustainable energy utility. There was also an issue of bio – residue and food security.

In terms of technologies, some of the relevant applications included water pumping and/or irrigation technologies drawing energy from sources including solar, fossil fuel, wind. Further, technologies that came out of the deliberations include crop drying interventions, CHP and bio – fuels Some of the actors involved include local farmers, agro processing industries, agro – traders, relevant state agencies, research institutions and manufacturers of agro – equipment.

In terms of regional integration opportunities including the opportunity to realize the EAC target for 100% access to mechanical power for agricultural sector. This is in addition to opportunities for experience sharing.

Energy & forests

Under energy and forests, some of the trades – off issues that emerged include deforestation as against affordable charcoal supply for household needs to cook. Additionally, issues of market instability and the effects in terms of forest cover also came into the fore particularly as expensive sources of energy have the potential to lead to an increase in deforestation. Tied to the above, the issue of trans – boundary demand in charcoal was also identified as key issues especially in the context of forest cover. The issue of appreciating cultural nuances with regard to household energy applications including cooking vis a vis adoption of more energy efficient techniques such as LPGs was also deliberated on. Land use especially with regard to utilization of forest products for uses

such as construction as against energy especially taking into account traditional forest and the conservation thereof.

In terms of technologies, some of the key interventions include biomass, improved charcoal production, improved cook stoves, charcoal briquettes. Some of the actors identified in the deliberations include: state agencies at different levels, local communities, harvesters including households and the lumber industry

The opportunities for regional integration opportunities that were identified in the deliberation include looking into opportunities for target setting with regard to forestry coverage and regulate the use of wood fuel and deforestation. There were also opportunities of resource pooling with regard areas including safeguarding and governing the region's forests.

Energy & transportation

Some of the trade – off issues identified includes fuel standards taking into account the compatibility of vehicles, quality of vehicles, and the quality of roads was also identified as an issue during the discussions. The deliberations also identified the debate between the preferences of public vs individual transportation. Towards this end matters including the balance between systemic efficiency and comfort were also discussed

In terms of technologies, some that were discussed included Biofuels, Fuel cells, hybrid vehicles public transport systems. Some of the actors identified included line state agencies, vehicle manufacturers, enforcement agencies, fuel supplier, research and innovation centres among others.. In terms of regional integration, opportunities discussed included regional approaches to vehicle standards and fuel mixing mandates

Energy & industrial processing

Interns of trade – offs, some of the issues raised in the deliberations include balancing between production cost and environmental impact. The technologies identified in the discussions constituted cleaner/greener production technologies, lean manufacturing and harvesting waste energy. The actors identified included regulatory authorities, line state agencies, manufacturers and processing and academia. In terms of regional integration, opportunities include exploring regional interventions around industrial audits for energy efficiency and energy efficiency standards, export and import cooperation including looking at national and regional policies that promote green industries.

Waste management

Some of the trade – offs discussed included issues dealing with the competing needs to recycling vs. energy from waste. This was in addition to looking into diverse competing waste management options and the energy potential of each. Some of the technologies identified included techniques such as industrial symbiosis, optimizing on processes that maximize energy production from waste: Some of the actors involved were identified as line public entities at national and sub – national level, the residents of a particular area, private sector players, and research institutions among others. Regional integration opportunities were discussed and identified in among others regional approaches to handle unregulated waste disposal, and exploring the viability of creating a regional market for waste products maximizing on processes such as industrial symbiosis.

Plenary Discussions

Discussions focused around the presentations of different groups highlighted issues including looking into regional harmonization pertaining to target setting with regard to key sectors including forestry and the issues appurtenant therein in addition to regulation of trans-boundary trade in among others including charcoal trade. This would also take into account the national country needs amongst the different East African countries. Further there questions around the issue of energy access vis a vis energy efficiency and how to inter-link the two aspects in developing national priorities. Another key issue that came out was the balance between local household energy needs and climate change goals and targets. Another issue that arose was related to agriculture and water use efficiency as a trade-off in addition to integration of technology including ICT technology in water use efficiency and distribution. Further the need to ratchet up the promotion of cleaner technologies, taking into account the cultural nuances and contexts would be useful in addressing the issue of managing household energy needs and climate goals and targets with a critical focus on the nuances including cultural practices as institutions that are critical to developing innovation systems and solutions. The issue of biotechnology and biosafety issue especially relating to GMOs also came up, with interventions focused on looking into ways to respond to the same especially at the regional level which could help in coordinating the actions of various countries in the region. Further, the issue of taxation amongst different countries was also raised as a potential facilitator or hindrance to regional cooperation especially along the lines of technology sharing and trans – boundary technology sharing. It was also noted that the definition of energy access needs to be relooked at especially in the context of energy use, which would be critical in goal and target setting with regard to innovation solutions. There was also an issue of enhancing regional trade in terms of energy especially with regard to natural resources including natural gas thus enhance regional efforts to address energy poverty.

The discussions of the day concluded with remarks from Dr Joanes Atela who noted the appreciation of the complexities that had been brought up during the deliberations especially with regard to transforming the sustainable development trajectory especially in light of the innovation systems. The discussions had been opened up and a lot of issues had been raised and the participants were encouraged to close down the discussion in the context of innovation systems looking into ways of framing the issues that were raised in the frame of innovative systems and CRIBs.

Overall, the sessions of day one revealed how different countries view innovation systems. The sessions also revealed the different governmental approaches to fostering innovation in various countries. In this mix of perception, it was evident that there is little understanding about the various innovative actions taking place in different places by various actors particularly around the framing of the same in the context of CRIBs. This was as a result of less than adequate cross-sectorial partnerships and lack of information sharing platforms. Ultimately, participants and experts felt the need for a strong national innovation system with designated innovation system builder. This would help build more integrated innovation systems that motivate cross-sectorial learning and actions.

7. Integrating CRIBS into NDC Implementation and Identifying Priority Action at National and Regional Level

The discussions were carried onto the second day of the workshop where a detailed planning session was held with participants looking into integrating CRIBs within NDC implementation and priority actions. These were focused on national and regional level.

Discussions were led by Dr Rob Byrne from the University of Sussex, building on the work done on the first day of the training. Organized into a planning session in the aftermath of the participants having identified the various actors, technologies, trade-offs and opportunities for regional integration, the session entailed a more closed down and detailed discourse around examining detailed interventions that had been selected with regard to the key sectors that had been focused on i.e agriculture, water and energy. Further the session also entailed exploring how these interventions could contribute to innovation system building in the context of CRIBs.

It was emphasized that key pointers including the specificity of the intervention or project, the technology or techniques that was to be applied in the intervention or project, the nature of the actors to be involved and how this would fit in the broader context of innovation system building were critical in terms of the presentations that were to be made following the discussions. Additionally, it was also noted that no single intervention could address every aspect of innovation system building, hence the need to recognize and factor in the same, noting that there are many dimensions and challenges to innovation system building.

Participants were encouraged to focus on interventions that would be useful in terms of meeting their respective countries NDCs, optimizing on the diversity wrought forth by the different country policy priorities and experiences to further elaborate on the specific interventions that have been identified. In this case, there may be opportunities to harness regional level opportunities or synergies that may be useful to country projects, programs or interventions. This was to be done however within the context of CRIBs where the overarching goals were;-

- Building networks of diverse stakeholders
- Foster and share learning
- Promote the development of shared visions
- Support diverse experimentation

Towards this end, the session was to be further guided by five main elements of innovation systems. These touched on;-

Technology

This entailed examining the nature of technologies, projects and/or programmes that were already in existence in addition to looking into opportunities to introduce new innovative interventions in terms of projects technologies, techniques and or programmes

Actors

This involved looking at the actors' interactions with the technique, technology, project or programme and examining their roles in the same in addition to looking into ways of optimizing their contribution

Relations

This entailed examining existent networks and the kind or interactions that take place within the networks in addition to looking into spaces and ways of enhancing these networks including building new relations where they did not exist or were not adequately developed.

Capabilities

The state of knowledge, skills and application with regard to the specific intervention, technology, technique, project and/or programme was the point of focus. This also entailed looking at the opportunities for capacity and capability building, including examining knowledge gaps and ways of filling these knowledge gaps.

Institutions

This involved looking into what institutions including among others policy, regulatory and cultural existed in order to facilitate or frustrate progress with regard to the intervention, technology, technique, project and/ or programme. Further this also involved examining which institutions needed to be changed and the nature of these changes.

Once again, building on the first day's work, the small group discussions aimed to create space for more insights from the experiences of all participants attending the workshop within the context of closing down the discussions of day 1 into the framework that Dr Rob had elaborated. The small group sessions was handled by Dr Rob Byrne from the University of Sussex and Dr Anne Kingiri from the African Centre for Technology Studies (ACTS). Participants were divided into the same groups that had been formed on day 1. Specifically, the groups discussed integrating CRIBS into NDC Implementation and Identifying Priority Action at National and Regional Level with respect to the various sectors they were involved in and the technologies that they had identified in the previous day's discussions. This was done keeping in mind the broader goal of building innovation systems at the national, local and sectorial levels.



Fig 5: Participants engaged on one of the group discussions on the second day of the workshop

Group Presentations

Agriculture and Water Group

The water group looked into three main areas, water access, water efficiency and water purification. The group focused on access to water where different technologies were explored including aqua – culture techniques, sand river dams and rehabilitation of rivers. The group decided to settle on boreholes and more specifically looking at a community led approach to the same. There would be different steps involved including hydrological surveys, looking into compliance and funding issues. It was noted that the need for boreholes was not only regional but also cross cutting in terms of not only arid areas but also agriculturally viable areas. The innovative idea revolved around enhancing community ownership and management of the borehole taking into account the cost elements of the same and finding ways to fit the same into the ownership and management framework. The actors who would be critical to realization of the same were identified as national and sub – national state entities, private sector entities, development partners, media, local grassroots communities, regional water governance entities farming and livestock communities. In terms of the steps to be taken to develop these community boreholes, it was noted that it would be critical to build on existing governance regimes where structures and processes of dissemination based on diverse needs assessments need to be entrenched so as to enhance the integration of long – term goals in governance of these resources. Further, it was noted that it was critical to mainstream such programmes, shoring up the institutional, policy and legal premise of the same. Further, the discussions highlighted the need to identify the actors and clearly set out their responsibilities, noting the shared vision. This is addition to having a clear design and execution framework which would be important in establishing a concise project or programme which brings all the actors on board.

The agriculture group on the other hand focused their deliberations on agricultural irrigation and in particular, drip irrigation. It was noted that agriculture across the region was rain dependent. Additionally, the group interestingly noted that extension services were also not up to scratch. Different country perspectives emerged from the discussions concerning irrigation governance across the region. It was recognized for instance that Uganda had an on-going irrigation policy process that was focused on large scale irrigation at the expense of small scale application of irrigation. It was also noted that there was an issue of financing with regard to adequate resource allocation for irrigation, which presented a challenge in terms of scaling the uptake of irrigation techniques. The group interestingly also addressed the issue of soil management with respect to soil acidity changes due to the introduction of drip irrigation. Towards this end, it was noted that soil testing was not adequately covered in the policy process. In Tanzania's case, it was noted that the existing irrigation policy was focused on horticulture and high value crops, thus prejudicing the farmers who do not deal with such products.. Further, it was emphasized that small scale irrigation was also being encouraged and practised with the caveat that this was urban based hence up – country farmers did not sufficiently benefit from such processes. Among the practices that were highlighted included rice intensification and open field irrigation which was combined with drip irrigation. In Kenya's case, it was mentioned that not only was there an irrigation policy in place but also a dedicated state ministry in charge of irrigation governance. However it was noted that the policy as detached from practice hence bringing about the challenge of implementation. Further it was noted that the private sector were also involved in the irrigation sector via avenues including cooperative societies. However it was noted that those who did not have access to such institutions and groupings

were often left out in terms of irrigation practice. In terms of actors, there was focus on how innovation manifests itself via different actors and their roles. It was noted that farmer associations, including the East African Farmers Association were avenues where optimization of networks and stakeholder engagement could occur. This could be achieved through convening of multi – stakeholder forums geared towards the same. It is through such processes that shared visions could be realized, identifying opportunities for even closer engagement. Researchers and academia were also identified as key players, who would among others explore different scenarios for the practice and governance of irrigation techniques and technologies, sharing the practices that respond to the local needs. It was also noted that policy makers including legislators and the executive were critical particularly concerning allocation of resources in addition to framing policy that responds to local needs. Towards this end, it was noted that there was need to emphasize the update and review of key regional policy instruments including the East African Policy on Irrigation, engaging policy makers and other actors on the same. Financial institutions were also identified as key players and there was a need to enhance engagement with these institutions. This engagement could among others look into exploring financial products that enhance innovation around irrigation. Civil society was also identified as a key segment of engagement especially pertaining to linking grassroots actions to other process including financing and policy making in addition to helping scale innovation in the sector. The role of civil society also extended to awareness raising and facilitation of feedback in terms of informing policy. Towards this end, the group interestingly noted that constituting a regional civil society coordinating platform would be critical in terms of among others information and best practices sharing in addition to enhancing engagement in regional and national policy making processes. Further, the media was also identified as critical especially in terms of awareness raising and spotlighting key issues in the sector in addition to facilitating engagement and informing public opinion. International institutions and development partners were also identified as being critical in terms of spearheading work on the innovative techniques, programmes, projects and/ or technologies in addition to being important in supporting policy formulation and implementation.

Energy Group

The group deliberated on various issues including the supply and demand of oil and gas, electricity, biomass for cooking and heating. Further deliberations also looked into issues including energy efficiency, reducing the cost of grid energy, clean energy and household energy demand. The group opted to focus on energy access for cooking and heating.

The group looked at the entire value chain for biomass production, in addition to different thermal treatments including carbonization processes, exploring the efficiencies of different alternatives to biomass. These included liquefaction, gasification of biomass, biological treatment, alcohol fermentation, methanol/ethanol, biogas digestion, oil processing (jatropha, sunflower oil, conventional oil & gas),

There was also focus on the use of biomass itself with specific regard to cooking and other alternatives that can perform the same function including electricity.

In terms of the project ideas, deliberations were focused on climate change mitigation through sustainable biomass solutions, where the issue of whether countries ought to look at biomass because they want emissions reduction or a more sustainable energy supply was raised and discussed. It

was noted that in order to attract climate funds, a strong emissions reduction component ought to be apparent, thus raising a potential trade – off question. The group looked at the current status with regard to the application of energy technologies of different kinds to particularly household and cooking utility. Further the Impact of biomass on climate emissions was also discussed in addition to emissions from reduction of carbon captured by trees and burning of wood/charcoal. Potential solutions and benefits were also looked at such as potential emissions reductions, cost implications, the ability to link to development priorities at EAC level noting the EAC Vision 2050, the scalability of particularly biomass technology in specific local contexts and suitability of innovations to local context where compatibility with cultural practices was also explored. Some of the key actors that were identified as being involved in building innovation systems around this technology included, local communities, households, wood/charcoal value chain participants, forestry authorities, research institutions, energy institutions, key line state agencies including cross – sectorial engagement, climate change DNAs (Designated National Authorities), private sector and international organizations and development partners, media, civil society

With regard to the contribution to CRIBs the overall objectives of deploying this technology was the point of departure. The discussions thus centred on Increasing efficiency, reduction in emissions, Increasing affordability of biomass fuel.. To do this , enhancing stakeholder collaboration was critical particularly building on existing links with regard to all above actors and existing biomass and biogas associations, **convening** key players in enabling environment, making the case for the private sector to get involved, public-private partnerships, local community participation/engagement, building on indigenous knowledge, intra-regional technology transfer and convening institutions from neighbouring countries to transfer knowledge on more efficient charcoal production processes. In terms of capacity building, it was recognized that there was a need to increase capacity on renewable technologies, enhance knowledge & skills development, enhance and project awareness of improved techniques and follow up on post-adoption monitoring. In terms of institutions, it was noted that these could play a key role in terms of building on existing Certification & standardization, this was in addition to Linking existing energy policies and strategies to climate change and Regional/global development priorities including, SDGs, African Union Development Agenda and AEC Vision 2050

8. The Role of Knowledge networks and Partnerships in Supporting Priority National and Regional Actions: The Case of Low Carbon Energy for Development Network

Dr Jon Summanik – Leary from Loughborough University led the session, highlighting the experience of the Low Carbon Energy for Development Network. (LCEDN) and the work the network has been involved in. This was a case study of the role knowledge networks could play in enhancing the implementation and delivery of NDCs in the context of national and regional priority actions.

It is noteworthy that the LCEDN mainly focuses on renewable energy technology in addition to the social impact of renewable energy technologies especially in developing countries. Towards this end, the LCEDN builds community around the core thematic areas of energy and development. It was emphasized that the network also focuses on research that catalyses and builds research collaborations hence taking a multi-disciplinary and multi-sectorial approach to build multi-disciplinary and multi-sectorial networks. Additionally, it was shown that the network also developed a portal which was designed to be an interactive platform wherein which information relating to energy

and development can be found. Further, it was elaborated that the network's commencement year was 2012 with initial support coming from the UK's Department of Energy and Climate Change. In terms of liaison with different line departments of the UK governments, the LCEDN's management committee has the mandate to coordinate the same, noting that this liaison extend to non – state actors including civil society and private sector players. This is I addition to the LCEDN having a database of experts and organizing monthly webinars concerning initiatives including the Smart Village Initiative. One of the projects that was highlighted was the Understanding Sustainable Energy Solutions (USES) project which was focused on capacity building around renewable energy solutions and development in addition to research. It was emphasized that the initiative comprises of a series of 13 projects in various countries across different sectors and disciplines. The initiative is funded by the UK Energy and Physical Sciences research Council. An example of one of the projects under initiative is the SUN project which is a Solar Nano grid project based in Kenya and Bangladesh. It was elaborated that this looked into the transition into solar home systems, examining whether it was more productive to pool into Nano – grid systems as opposed to individual home systems which have had limited impact. The project has thus gone on to establish two 2 solar hubs in Nakuru county. However in a broader sense, it was noted that all the East African countries had been represented in the USES programme which closes in December. Towards this end, it was noted that there is to be a closing workshop that will be organised in Nakuru county. Further, other programmes that were highlighted include the Transforming Energy Access (TEA) which is a 5 year 65 million pound programme The LCEDN has a role in the TEA programme vide a networking and partnership for skills component. Towars this end, there are eight 8 main thematic areas of focus including;-

- Gender
- Governance
- Value chains
- Innovative energy finance and delivery
- Waste and sustainability
- North – South relations
- Impact assessment methods
- Trans – disciplinary and cross – work

There are 2 work streams comprising of both networking and community building outcomes. These are geared towards enhancing effectiveness of development assistance and partnerships.

The concluding session, facilitated by Dr Joanes Atela from ACTS, where it was emphasized that this was a platform where ideas could be turned into action.. In that sense, it was critical to interrogate the concept of CRIBs and look into bridging the gaps between ideas and realities on the ground. In this sense, innovation systems present an interesting complimentary approach that attempts to synergize ways to enhance collaborative work. It was noted that the CRIBs has been published widely thus giving it more traction in terms of veracity and premise within which African proposals, projects, programmes and interventions can be even more competitive. In this sense, the innovation systems approach can provide a competitive edge in enhancing the approaches to

interventions, projects, programmes, techniques and technologies which feed into NDCs. In this end the process of exploring CRIBs was going to be continuous, engaging the participants throughout in constant interaction and development of a portal through which more interaction could be facilitated.

Overall, discussions on the second day revealed that the concept of Innovation Systems (ISs) is a nuanced one, with varying interpretations, especially with practitioners and policy makers. Despite this, there was an overall agreement among stakeholders that strong innovation systems entailing technological innovations, institutional innovations, and policy innovations were critical for effective climate action and climate compatible development. In this regard CRIBs could be a useful approach to building such innovation systems.

Outcomes of the workshop

The workshop achieved some key learning outputs in line with the set objectives:

- i. A learning of the relevance of innovation systems to the implementation of NDCs and in a broader context sustainable economic development of Africa
- ii. Deep contact with the CRIBs approach to building innovation systems, relating the same to various country experiences in so far as implementation of NDCs is concerned
- iii. Looking into the application of the CRIBs approach to building innovation systems and how this increase competitiveness in terms of implementation of NDCs, leveraging climate finance
- iv. Engagement on where innovation systems are nested within the UNFCCC technology and finance frameworks and the relevance of enhancing the same to enhance implementation and delivery of NDCs.
- iv. Insights on the need and opportunities for cross-sectorial learning/integration in climate change technology design and implementation exploring innovative approaches such as CRIBs.
- v. Networking opportunities regional networks that can move the deliberations forward and contribute to fostering learning on building innovation systems.



Fig 6: Group photo of some of the participants after the workshop

9. Conclusion

Overall the workshop revealed that innovation systems remains key to Africa's pursuit of climate compatible development. However, East African countries are yet to establish functioning well-developed national innovation systems. What currently exist are policy frameworks that are rather vague about innovation systems. These broad policy perspectives leave room for various actors to speculate what innovation mean to their contexts. Nonetheless, the different opinions, perceptions or experiences are important in their own contexts and in one way or another, represent the different pathways to building innovation systems. This is to say the workshop's target was not to generate solutions with regard to innovation concerns but rather provide a platform for actors in this region to begin thinking seriously about building innovation systems and tapping into financial and technological opportunities associated with it. To do so, there exist opportunities to leverage on regional experiences and to first understand the pathways to building sustainable innovation systems and specifically identify which ones could generate optimal benefits and in what contexts.

The discussions explored the idea of using innovation systems to enhance implementation and delivery of NDCs, leveraging climate finance to realize Africa's development potential. Towards this end, Climate Relevant Innovation System Builders (CRIBs) were explored as an approach to implement NDCs, noting the diverse insights and perceptions about opportunities associated with innovation systems. While much focus has been placed on research and innovation, participants deeply

engaged on the subject of operationalization of knowledge systems to propagate and diffuse the currently available knowledge on innovation systems including CRIBs. Furthermore participants also focused on the linkages (or lack thereof) of different national, regional, state and non – state actors in addition to looking at how these can plug into the application of CRIBs in implementation of NDCs. The case for devolving innovation systems to community levels where action is needed most was also strongly made.

The private sector and civil society also weighed in on the deliberations, echoing some of the aforementioned perspectives. The issue of integrating indigenous knowledge into innovation systems came up quite strongly, since it was recognised and appreciated that this type of knowledge is an integral part of local communities in East Africa. The private sector on the other hand focused their interventions on ‘catalysts’ for scaling up innovation systems, such as incubation centres and coherent policy frameworks.

While the deliberations revealed that there was a need to elaborate and interrogate further the idea of innovations systems and approached to the same including CRIBs, there were areas of consensus with regard to the follow – up action points in order to bolster the diffusion and scaling up of innovation systems, taking into account the application of the CRIBs approach to implementing NDCs and leveraging climate finance for innovation systems building:

- i. Enhancing continuous engagement around exploring the CRIBs approach and its applicability was identified as key to mainstreaming the same in national and regional action plans
- ii. Fostering indigenous innovation: There was an agreement that African countries have to foster indigenous technological innovations and not just focus exclusively on ‘exotic’ technologies taking into account local contexts and nuances.
- iii. Enhancing policy innovation: It was suggested that policies need to be framed in a manner that they are dynamic and responsive to emerging challenges and opportunities. It was noted that CRIBs could be a useful approach to realizing the same
- iv. Creating platforms to foster knowledge exchange and collaboration among players: was also crucial. Participants noted that this was an area where more progress could be made. There is need to increase collaboration between different actors including government agencies through regional clearinghouse (website), communities of practice, and forums to share best practices.
- v. De-risking innovation also came out strongly especially with regard to looking into deploying innovation system approaches such as CRIBs: There was a need to change perceptions to innovation and innovation systems, mainstreaming the same in national priority actions in order to facilitate effective and efficient implementation of NDCs, national and regional development goals
- vi. Building consortium was also identified as being important to building innovation systems, and in particular utilizing the CRIBs approach to feed into implementation of NDCs, national and regional development goals in addition to increasing project and/or programme longevity.

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Appendix

A. Workshop Evaluation Statistics

Figure 1a: Showing the level of experience of participants

Figure 2a: Showing the overall rating of the workshop

Figure 3a: Showing the statistics of various components of the workshop