

“Smart Climate Change” for Professional Societies Workshop

Theme: Is a Climate Smart Kenya Possible?

WORKSHOP REPORT

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“Smart Climate Change” for Professional Societies Workshop

BACKGROUND

Climate change is a reality we have to live with. The frequency of climate phenomena like drought and flooding has shortened. As soon as we come out of one climate related disaster do we enter into another. With no prospect of reaching a global agreement on the stabilization of greenhouse gases in sight it is now very apparent that we have to adapt to the evolving climate scenarios.

The mission of the workshop was to facilitate the sharing of experiences and analysis of best practices in climate proofing mechanisms, designing policy

measures for the promotion of climate smart living, innovations and adaptation actions for each sector of our economy and life.

Organizers: The workshop was organized by the Institute for Climate Change and Adaptation in collaboration with Maseno University and the Office of the Prime Minister, Environment and Climate Change Unit.

Facilitators: The Institute for Climate Change and Adaptation at the University of Nairobi facilitated the workshop. The Institute, established in 2011, has the mission to build human capacity necessary to address the unique climate change and adaptation needs of vulnerable communities through teaching, action-oriented research, development of innovative technologies and community participation and to provide expert advice for national and regional policy formulation and implementation.

Structure of the Workshop: The workshop consisted of short 20 minutes presentations followed by group and panel discussions. The paper presenters highlighted the major concerns of climate change for professionals. The following questions were addressed at the Workshop:

- How can we inject climate smart solutions into our professional activities?
- How can we create climate smart synergies amongst ourselves?
- How can we create climate smart sustainable business?
- How can we move towards a green economy?

1. OPENING OF THE WORKSHOP

1.1 Introductions, Workshop Objectives, Expectations (Prof. Shem Wandiga, ICCA)

The main aim of the workshop was to help participants internalize climate change issues and green growth.

The objectives of the workshop were three fold:

- Create climate change awareness;
- Outline present climate change challenges and opportunities; and
- Map out existing resources that can be used to implement actions.

Climate manifests itself in different ways e.g. floods, droughts, tropical storms and typhoons. Climate controls our lives and hence must be taken seriously. Our climate is now changing, and this is evident through the extreme weather patterns and events that we are experiencing on the planet, and their associated flood and drought disasters. The impacts of the extreme weather patterns and events depend on the magnitude of the event and the vulnerability and exposure of the affected communities. However, some of the disasters aren't even caused by extreme events, for example; in 2009 a climate non-extreme event in Zimbabwe caused a cholera outbreak that affected 90,000 people and resulted in 4000 deaths. The vulnerability of the community and the exposure to climate risk made the outbreak severe.

Climate change impacts are felt in different sectors (e.g. agriculture, energy, water, public health, tourism and transport) at local, regional and global scales. The cost of disasters is increasing year to year and insurance is not paying for all the cost so the affected community bears the brunt of the costs of recovery and rehabilitation. This retards the economic growth of most countries. The cost of disasters is higher in developed countries than in developing countries because developed countries have expensive life and infrastructure; however, the fatalities are higher in developing countries.

Normally extreme events used to have a 20 year frequency but now climate models show that in East Africa the frequency of hot years is 1-2 year and 1 year for wet years. This will affect socioeconomic development because countries will always be in a recovery mode. Some examples of disasters from which we can draw lessons include; the heat waves in Europe; hurricane Katrina in the USA; localised flash floods in Nairobi as a result of rapid growth, settlements near rivers and blocked drainages; sea level rise in tropical small islands; and droughts in west Africa that are coupled with high populations, variable rainfall and ecosystem degradation.

It is, therefore, important to monitor, evaluate, plan for climate change, manage climate risks and adapt to climate change. This will involve:

- Improving forecasting and early warning systems;
- Reducing GHGs emission;
- Poverty reduction;

- Better education and awareness;
- Sustainable development; and
- Asset relocation.

Short term actions are not solutions for long term risk reduction: for example, the Kenya for Kenyans initiative that collected money from Kenyans to buy relief food for the starving Kenyans in the North was just a solution for the 2010/2011 drought. But with climate change these short term actions will not help, thus we need to think outside the box for long term solutions. The climate disasters aren't country bound but are global. This workshop thus offers us a platform to share experiences and chart a way forward.

1.2 Opening Address (Dr. Alexander Alusa, for Permanent Secretary Office of the Prime Minister, Dr. Mohammed Isahakia)

Dr. Alusa commented that he was happy with the representation of the various sectors invited to the workshop as this meant that climate change is receiving the attention it ought to receive in Kenya. The impact of climate change is great because Kenya depends on rain-fed systems. He noted that there is need for the Government to readjust the finance to match the forecasts made for Kenya.

There is need to readjust development to incorporate climate change, as the costs related to climate change impacts are rising and it is estimated that it will be at about 3% of the National GDP by 2030. It must now be recognized as a threat which also has the potential to delay the achievement of the Millennium Development Goals (MDGs).

Kenya is required to limit carbon emissions as per agreements arrived at during the COP 17 meeting that was held in Durban, South Africa. Kenya must therefore begin decarbonizing its economy. Kenya's electrical power is hydro-based, so whenever the rainfall varies, the economy is impacted as the industrial sector is highly dependent on the erratic power supply. The private sector is called upon to help trickle down the zero rating advantage to the user (e.g. on lowering the cost of solar panels).

Whereas climate change has risks, it creates opportunities which we should discuss as well.

2. PRESENTATIONS

2.1 Climate Smart Development: the Role of ICPAC & National Weather Services (Dr. Christopher Oludhe)

“Climate is blamed for everything yet it gives everything”. Climate is organized, in that in some months it gives too much rain (March-May and October-December) and some too little (January and February), similarly in some years it gives little and others a lot. We have to develop strategies to deal with it. Floods and droughts are recurrent, and human pressure on the climate is aggravating these extremes. Human pressure on the climate includes desertification and GHG emissions.

For climate smart development, all the climate resources in an area should be taken advantage of, for example, when there is too much, store for lean periods (water harvesting). Being climate smart starts with the individual.

Considerations for smart climate development include the following:

- Learn how the climate behaves, master it and take advantage of it;
- Stop sticking to what we know, for example wanting to plant maize in Lodwar just like it's done in Kitale;
- Know and map climate hazards - when they occur, where, and how often;
- Develop multi-hazard strategies;
- Learn the characteristics of climate hazards. For example, drought has a slow onset and floods have a rapid onset;
- Know the status of the communities, poverty levels and vulnerability; and
- Have tomorrow's climate in mind when planning as the future climate may be different, with more floods and droughts.

Tomorrow's climate is affected by:

- Population growth.
- Economic development.
- Land use.
- Energy production and consumption.
- Science and technology

Climate cannot be blamed for everything, instead, there is need to learn to cope with the current climate and adapt to tomorrow's climate. We need to adapt to climate extremes as well as maximize the resources (e.g. water harvesting). Meteorological professionals should determine tomorrow's climate for different regions so that it can be integrated in future planning.

To determine the way forward for climate smart development, some questions should be addressed:

- Does climate pose a threat to development?
- What are the current known impacts of climate?
- Have we integrated climate in development?

- Is there evidence of climate change locally?
- What are the potential impacts on climate change?

2.2 Is Kenya's Legislation Climate Smart? (Dr. Robert Kibugi)

There are 3 options that Kenya has in terms of enacting climate smart legislation:

- Dedicated framework legislation - this provides obligations for sectors to perform;
- Dedicated substantive legislation - this creates hardcore standards most of which take long to fulfill, for example emission targets;
- Sector provisions; these are sector-based legislations - the danger in these is that there is no connection among sectors for example the Environment Management Coordination Act does not connect with climate change issues.

The legislation will need to address some key issues such as mitigation, adaptation, finance and technology, and institutional arrangements. The finance aspect will need to consider who will finance mitigation and adaptation. Since most financing is from public funds, how much can we borrow without burdening future generations?

There are distinct Kenyan characteristics that must be considered in legislation, these include: poverty and vulnerability; centralized government system and decision making; the role of business/industries/SMEs; the role of technology (which requires finance and intellectual property policies/legislation for securing innovations), and; climate finance. Kenya also now needs to prepare for devolution. The constitution: does not refer to climate change but sets the tone: e.g. Sustainable Development Article 10 provides that the national value of sustainable development must be binding when making policy decisions, Chapter Five on land and environment management, and the Fourth Schedule on the System of Devolution that clearly demarcates the functions of national and county governments. Since climate change is not included – how will this play out? The climate change issues could be under the national government, but implementation e.g. adaptation, will fall to local/county governments.

Legislative approaches that can be taken up in Kenya include:

- Infrastructure
 - Climate proofing should be done for basic/key infrastructure. Kenya Roads Act needs to be changed to include climate proofing. The Energy Act of 2004 provides for buildings to have renewable technologies but it was not synchronised with the building code. Buildings codes which were last revised in 1967 need to be revised to include green concepts.
- Agriculture
 - Agriculture has the distinction that mitigation and/or adaptation activities could be deleterious so it needs careful planning. High nitrogen fertilizer use has degraded some lands and this requires mitigation. The agricultural act doesn't uphold agronomic practices. There are some projects to develop e.g. drought-resistant seed varieties, but these are largely at project level with uncertain national scope. Irrigation has mitigation and adaptation roles – it increases resilience. There is a draft irrigation bill giving guidelines on support of small scale irrigation schemes. Social

equity financing is needed and should be encouraged, for example, low tech irrigation (such as gravity) for poor farmers/families, but there is need for a policy to be used to identify those who really need the funds and so that programmes meet the targets. Agricultural extension is very important and there is need for more extension workers. There is a draft bill that aims at collapsing all agricultural research institutions into one, hence have directed and targeted research.

- Business law
 - There are some proposed changes in the draft Companies Bill which will require companies to submit reports with environmental information. This is an opportunity for climate change issues to be integrated in business.
 - Directors of companies should submit environmental report regularly. What effects do foreign investments have on the climate?
 - The Investment Promotions Act is quiet on, for example, climate change implications of foreign investments coming into the country such as the current Vision 2030 projects which are very large and fall under ambit of Strategic Environmental Assessments. They are, however, key because of money and technology influx.
 -
- Devolution
 - Counties will be important because they will be in charge of most resources and have specific functions in relation to agriculture, forests, infrastructure, etc., so a framework climate change legislation should reflect or be mindful of devolution.
 -
- Public health with respect to climate-related diseases such as malaria.
- Disaster risk reduction
 - There are no laws on this in Kenya. There is need for a national framework on how various sectors should mitigate and manage disasters.
- Transport
 - To reduce emissions.
- Access to information.
 - The constitution provides for this, so the legislation needs to incorporate it.
- The Climate Change Authority Bill.
 - This is a framework law that will likely provide a basis for the National Climate Change Response Strategy (NCCRS) and Action Plan but is facing the challenge of accommodating devolution.

In conclusion, we need to ask ourselves whether or not we are on a smart trajectory. The country's reaction to extreme event is indicative, as currently we are not managing disasters well enough. In order to align our legislation with climate smart thinking, we need to have: targeted legal and policy research; collaborative and interdisciplinary research, and; link climate change responses to the country's overall sustainable development objectives.

2.3 Climate Smart Engineering (Prof. Madara Ogot)

The key to smart engineering is in:

- Smart, clean energy production;

- Reduction of energy use;
- Adapting technologies to climate change.

Wind energy is one of the energies that is produced in a smart and clean way. Currently in Kenya, there are 6 wind turbines that were installed on Ngong hills in 2009 that produce 5.9MW of energy. By 2014, the government is planning to put up the largest wind farm in sub-Saharan Africa. The farm will be in Turkana and will have 365 turbines, producing 300MW of energy, which will provide 20% of the energy needed in the country. Geothermal power currently produces 225MW, or 15% of Kenya's energy requirements. Current efforts in expansion of geothermal power exploitation will in future provide 800MW, or 53% of the country's energy needs. The country has potential for over 10,000MW from geothermal energy. Kenya has the potential to produce clean, smart energy to cater for all its energy needs.

The government has opened up the energy sector to private investors; this means more investors will be able to go into clean energy production instead of waiting on the government to do all the energy projects.

Energy use reduction starts with individuals. An example of South African low housing units in Cape Town was given. The houses were retrofitted with rooftop solar water heating systems, insulated ceiling and energy saving bulbs. This led to a 56% reduction in electricity costs, and is significant in that most electricity in South Africa is generated by coal-fired plants (not green energy). The use of paraffin lamps also decreased drastically. These modifications thus not only saved on energy used but also reduced respiratory diseases brought about by inhalation of gases from coal and paraffin, and also from breathing damp air because of the insulated ceilings eliminated water condensation that occurs particularly during the winter months.

Governments have a role to play in smart energy, by doing renewable energy projects or creating a conducive environment for investors who want to do the same. We all as individual have a role to play in smart energy. Are we ready to take up the challenge by using energy saving electronics and embracing new technologies?

2.4 What Obligations do Professionals have as regards Climate Change (Mr. Alex Alusa)

Architects: Constructions can't continue to be built under business as usual conditions; buildings must be built with systems like solar water heating. Solar heating should be encapsulated in the Building Code. The cost of building should not be used as an excuse; people always find money to do things. Buildings that aren't climate smart end up losing more for the client in the long run. There is need to change building codes to take into consideration climate smart buildings. Building owners should also carry out energy audits (e.g. hotels).

Structural engineers: They should inspect buildings at all stages to ensure the right building materials are being used; this will prevent buildings from collapsing during extreme weather events.

Government officers: They should be professional about what's right especially in doing procurement. The Procurement Act has raised costs of doing business, because the issue it focuses on is following the rule, not how much it costs, while if one went to the open market, the unit costs of items/materials tendered for may be considerably lower than what the tenderers put in as their minimum price. They should also create an enabling environment for the private sector, because climate change creates business opportunities.

All professions should be able to “see across professions”, that is, integrate issues for better and sustainable management and climate smart development. For example, cement companies can use the heat that is produced during processing to produce electricity. Professionals should generate ideas, not copy ideas from other regions that will not necessarily work in our context. A Climate Innovation Centre will be set up soon in Nairobi to help people with climate ideas to develop them into viable businesses. The key to great innovations is simple ideas, so people with such should not shy off.

2.5 Impacts of Climate Change on Natural Resources (Dr. Adan Ali)

Rural areas are the most vulnerable to climate change because the communities there depend on natural resources. The challenges faced in addressing climate change issues include:

- Limited data;
- Finances - most funding comes from donors who do not address national issues;
- Incoherent policy structures;
- High poverty levels;
- Weak institutions ;
- Professionals acting as closed groups instead of being integrated.

There are a number of important climate changes and related issues that need to be addressed particularly with respect to pastoral production systems in the semi-arid to arid regions of Kenya. These include:

- Water scarcity;
- Siltation in ponds;
- Food insecurity;
- Heritage sites that are endangered because climate change may cause loss of indigenous plants which have medicinal and other values;
- Communities that are becoming climate refugees, especially in Northeastern Kenya, where nomadic families have to camp outside chiefs camps to wait for relief food;
- Shanties in unserviced areas – use of plastic instead of grass (dujus) for roofing due to grass shortage;
- Reduction of natural resources, particularly water and biodiversity resources, which the country is heavily reliant upon;
- Human-wildlife conflict, especially on wildlife migration routes, is increasing as a result of reducing resources (water and pasture);
- Increased vulnerability of pastoral production systems to climate;

- Emergence of new infectious livestock diseases;
- Environmental degradation and soil infertility;
- Appropriate shelter; and
- Bioenergy for domestic use.

Some suggestions for smart climate solutions are as follows:

- Climate smart solutions must respond to local systems, and then they can be up scaled. Carry out strong case studies which can be used to upscale solutions to national level. Such case studies can also be used to seek funding from policy makers;
- Formulate policies that aim at minimizing the impacts of climate change and maximizing the opportunities that it presents;
- Solutions must be participatory and relevant;
- Give the beef production/livestock keeping industry strong policy attention;
- Encourage strong climate change science, and benchmark it with solutions that are applicable elsewhere;
- Regulate consumptive and commercial interests;
- Devise ways of protecting the 75% of natural biodiversity resources that lie outside of protected areas;
- Capacity for resilience should be strengthened among communities.

The way forward would include:

- Building partnerships;
- Basing decision-making on sound scientific knowledge;
- Developing benchmarks with other successful actions; and
- Development of decision support tools to monitor and evaluate natural resource management.

2.6 Finance and Carbon Markets (Mr. Obadiah Mungai)

The key milestones in the evolution of climate change negotiations are: adoption of the UNFCCC in 1992 and its ratification in 1994; the adoption of the Kyoto Protocol (KP) in 1997 and its ratification in 2005; the end of the Kyoto first commitment period in 2012. The KP introduced three flexible mechanisms:

- Carbon Trading (Article 17) => ETS for Annex 1 countries;
- Clean Development Mechanism (Article 12); and
- Joint Implementation (Article 6).

During COP 17 that was held in Durban, South Africa in December 2011, Governments adopted a comprehensive package of decisions—including:

- An agreement to initiate a second commitment period for the Kyoto Protocol;
- The “Durban Platform” to negotiate a long-term, all inclusive future mitigation regime that includes a process to address the “ambition gap” for stabilizing average global temperature increases at 2°C over pre-industrial levels;
- Adopting a range of decisions designed to implement the 2010 Cancun Agreements, including launching a new Green Climate Fund and developing

stronger requirements for the reporting and review of countries' mitigation efforts;

- An agreement on rules for activities to reduce emissions from deforestation and degradation (REDD), as well as standards for verifying national performance in mitigating emissions; the rules for “carbon capture & storage” projects under the CDM; a process to further consider the loss and damage faced by the most vulnerable countries; and
- A work programme on unintended consequences of climate change policies.

In 2010 the global carbon market value declined to 142 billion USD due to uncertainties associated to the Kyoto Protocol. The bulk of trade took place within the EU ETS followed by CDM. There are 7 CDM Projects registered and Trading in Kenya (details on NEMA website), with 1,236,469 reductions traded as of March 2012. The CDM activities in Kenya are:

- “35 MW Bagasse Based Cogeneration Project” by Mumias Sugar Company Limited (MSCL);
- Olkaria II Geothermal Expansion Project;
- Olkaria III Phase 2 Geothermal Expansion Project;
- Aberdare Range and Mt. Kenya Small Scale Reforestation Initiative Kirimara-Kithithina Small Scale A/R Project;
- Aberdare Range and Mt. Kenya Small Scale Reforestation Initiative Kamae-Kipipiri Small Scale A/R Project;
- Lake Turkana 310 MW Wind Power Project; and
- Redevelopment of Tana Hydro Power Station Project.

There are currently 17 CDM Projects under Validation, with 698,945 reductions expected as of March 2012.

The “Climate Finance” is a leveraging fund. The so-called “Fast Start Finance” allocated \$30 billion for the period 2010 to 2012, but so far only \$6 billion has been disbursed as the process is very rigorous. The goal is to raise the fund to \$100 billion per year by 2020. Funding for adaptation will flow through the Green Climate Fund. Public sector climate funds are scarce and there is need to leverage with the private sector. The African Development Bank under Scaling up Renewable Energy Program (SREP) has been awarded 50M USD for developing the Menengai Geothermal project. In addition to these 60M USD is in the reserve.

To effectively tackle climate change, more than half of the additional global investment and financial flows would be needed in developing countries. The Ministry of Finance is formulating a policy for climate financing and emission trading in order to establish a climate change fund and carbon trading platform (to be completed by June 2012). It has also established a Carbon Finance Desk and has increased communication campaigns on climate change and related risks and opportunities. It is also enforcing regulatory instruments and fiscal incentives for making climate related investment relatively more attractive.

To which extent climate finance can catalyze a transition to a low-carbon economy, will, among others, depend on the existence of national-level institutions that are able to deliver emission reductions as well as adaptation benefits and in effective, efficient, and equitable ways. While international support may help to induce policy

changes in developing countries and to enable accurate monitoring and reporting of the results achieved, it is essential that low-carbon development strategies be country driven and nationally specific in order to duly account for the particular needs and priorities of each country.

2.7 Climate Smart Infrastructure (Dr. Simeon Dulo)

Climate change will modify rainfall, temperature, sea level, and extreme events. The climate impact pathways can be: direct, short term or long term. There are added pressures from external factors e.g. demography, migration etc. For example, safe water supply has reduced at the same time that demand for water has gone up in urban areas.

There are a number of potential economic opportunities when developing climate smart infrastructure, for example:

- Seek to develop innovative approaches to adaptation, e.g. developing dual use and smart infrastructure and using the natural environment;
- Develop new technologies, skills and expertise on climate change adaptation for infrastructure to be used domestically and exported;
- Develop innovative approaches to climate risk, climate modelling and financing.

The focus should be on identifying: the potential impact areas and reducing vulnerability; improved information sharing and disclosure of risk evidence, and; evaluating risks of climate change to infrastructure.

Some strategies that can be applied to reduce vulnerability include:

- Protection through structural measures for property/land from sea level rise and floods;
- Access to good quality information, and early warning system that can help to mitigate disaster impacts;
- Reducing vulnerability of resource base to climate change, variability and extreme events (e.g. embankment to protect from floods, cyclone centre, etc).

Green and climate resilient infrastructure are necessary for sustainable adaptation to climate change, and specific measures will be needed. With respect to water supply, irrigation and drainage systems, for example, one can target: technologies and management methods to increase irrigation efficiency and reduce problems of soil degradation; economic incentives to reduce wasteful practices; increase use of drainage systems to avoid flooding and water-logging of soils; and improve drainage allowing for increases in rainfall intensity. New drainage standards for new works and renewals have to be introduced to spur adaptation. Other more generic examples would include:

- Enhancing adaptation expertise and skills;
- Integrate adaptation into infrastructure investment decisions, in particular assets with a 20 year+ lifetime;
- Look at innovative financial approaches to incentivise adaptation in long-life assets;

- Work with infrastructure owners to increase climate resilience to reduce exposure risk;
- What we can do - Adaptation and mitigation?
- Develop infrastructure so that it can perform two or more functions, such as: using reservoirs for flood control as well as water storage, and road/rail embankments as flood defences;
- Make use of near-term climate predictions, e.g. accurate six-month to one-year forecasts could possibly reduce losses due to weather variability. For example, predictions of El Niño events have proven useful in regions where El Niño strongly affects weather.
- Make management adjustments:
 - Virtually all components of the infrastructure system from planning to development to maintenance should be modified to adjust to climate
 - Holistic approach to natural and development infrastructure/ resources management and climate change
 - Address governance and political economy issues
 - Scaling-up support to reach the MDGs
 - Enhance coordination of donors
 - Improve quality of fiscal spending
 - Develop technical capacity to absorb incremental resources
- On technologies, for example in water engineering, energy, and transport, smart decisions from lessons learnt elsewhere are needed.

New infrastructure can be climate resilient by ensuring that an asset is located, designed, built and operated with the current and future climate in mind., while existing infrastructure can be climate resilient by ensuring that maintenance regimes incorporate resilience to the impacts of climate change over an asset’s lifetime. One should also ensure that investment decisions take account of changing patterns of consumer demand as a result of climate change, as well as build in flexibility so that infrastructure assets can be modified in the future without incurring excessive cost. The result will be a more resilient and robust infrastructure network able to cope with projected climate impacts e.g. increased flexibility to cope with uncertainty without massive failure and economic cost.

2.8 Question and Answer Sessions

Questions	Response	Comments
Kibugi Presentation		
Is there harmony in the legislations that exist? Or do we just have an implementation problem?	<p>Yes. Policies/laws are there but we aren’t good in implementing them. We do things contrary to the laws because we can get away with it (impunity).</p> <p>The existing policies need to be harmonized for example what the water bill policy says about how far one should cultivate away from the river is different from what is in the agriculture</p>	<p>We need to change the way policies are done in Kenya. We start with Acts of Parliament then realize there is no policy nor strategy so these are done later. The correct way should be to formulate a policy then a strategy and the Act of Parliament act should come last. Scientific outputs should be taken up when formulating policies, and scientists need to</p>

	<p>policy.</p> <p>Climate change, however, should not be put in the environment policy because by doing so the other sectors that have a link to climate change will be left out.</p>	<p>share their research results with policy makers for them to factor them in policies.</p>
Ogot Presentation		
<p>There is the issue of dirty energy versus development. – Kenya has insufficient energy to process minerals e.g. titanium which requires 400MW of dedicated power.</p>	<p>It will be some time before we can get away from fossil fuels.</p>	
<p>Is Turkana oil going to blow the green energy concept out of the water?</p>	<p>Coal can be used in a clean way, but the technology to enable this is very expensive. Thus it must be financed by the countries causing climate change. However, Kenya is not considered as a least developed country hence it can't be funded.</p>	
<p>There is talk that energy saving bulbs have negative medical effects, is this true?</p>	<p>The mercury levels in the earlier bulbs was significantly higher compared to the current bulbs. The high mercury levels led to health concerns. However, we have had fluorescent tubes for a much longer time and these have more mercury than the energy-saving bulbs. Essentially the discussion is between the new technology that has the potential to wipe out earlier technology</p>	
<p>The energy saving bulbs blow up because of unstable power supply and end up costing more, what can be done about this?</p>	<p>Power supply just needs to be stabilized.</p>	
Alusa Presentation		
<p>We have discovered coal in Mui and oil in Turkana. What are the implications for the green economy?</p>	<p>There is technology for using coal in clean way but challenge is that the technology is very expensive. Kenya in COP has argued that we must be financed if we are to go for green technology by countries responsible for the current problem. China is generating more GHG than US today, and they are saying that for them to take action, China must take action. They will only finance LDCs and Kenya is excluded from this group.</p>	

Why do we not implement existing policies?	Kenyans are not good at enforcement thus resulting in impunity. Another challenge is the tendency to start with an Act of Parliament then realise there was no policy, then do a strategy, i.e. we have been putting the cart before the horse.	The Environment Policy was ready by 2008 but the Minister did not implement it. It is now being revised to be consistent with the new constitution and should be ready by end of June.
	The Climate Change Policy – climate is not just an environmental challenge, it is a development challenge so the policy must be cross-cutting. The Climate Act (Climate Change Authority Act) - Panarec (Parliamentary Network on Renewable Energy and Climate Change) has been working with KCCWG and OPM to evolve a private members bill. The DMA (Drought Management Authority) should be a part of wider CC framework.	
	Harmonisation – many policies are not harmonised e.g. the Ministry of Agriculture defines the riparian buffer zone differently from the Ministry of Water and Irrigation. Also, eucalyptus trees are being sold by KEFRI yet the Minister had directed that all such trees should be cut as a result of higher water use. However, experts indicate that water use is not higher than that of the indigenous trees. Scientists should not be afraid of confronting Ministers on policies that are not based on evidence.	
Mungai Presentation		
There was a report in Parliament that Kenya had received Ksh. 54 billion from its carbon sinks e.g. the Mau forest; how will the local communities benefit?	The amount was not Ksh. 54 billion. The Ministry is developing a policy that will address this gap of how communities will benefit.	
NEMA was accredited to access carbon credit funds, so can people present project proposals so that they can access funds?	Yes NEMA was accredited and people with project proposals can apply for funds.	
How is carbon trading retarding industrial development in our country?	If we can benefit from carbon credits as a country no matter how much we are emitting, why not go ahead and trade. However, this is a controversial issue hence the reason why we should engage to come up with smart solutions for developing	

	smartly, i.e., having development that is emission-free.	
The projects we have for carbon trading are based on forests, and most of our land (80%) is not arable meaning we don't have forests?	There are other projects beside forests, for example Geothermal projects and Mumias sugar project where they use molasses to produce energy.	
Is it that African countries are presenting projects that don't meet standards, and that is why we are lagging behind in mitigation and adaptation?	There is low motivation for donors to fund adaptation because it is long term. Most of the funds go to mitigation.	
Are we creating very high expectations for carbon credit while little gets to the communities?	Most of the money goes to certifiers, because they have to come from outside the country, we need to have more certifiers locally and this will lower the certification cost. Also the compliance market has high thresholds, it requires big projects. The cost for these projects is also high but at least the credits are guaranteed.	
How much is the price of carbon actually? 4 EUROS?	4 euros is for the compliance market. In the voluntary market the price is much lower.	
Dulo Presentation		
How can people in areas such as Budalangi be resilient to floods given the resources they have?	These people are on a flood plain thus structural and non-structural approaches can be considered. In structural systems are put in place upstream e.g. dams, and these provide water for irrigation and house hold use. For non-structural the communities are comfortable with the climate situation like in Bangladesh. But for non-structural people need to respect laws, for example, when people are told floods are coming they should move.	
Most of our infrastructure is in vulnerable areas and we keep on building in such places. We know its wrong but we do it anyway.	Most of our infrastructure on vulnerable areas and we keep building in such places. We know its wrong but we do it anyway.	

3. GROUP DISCUSSIONS

3.1 Background to Group Discussions

The Workshop facilitator, Dr. Maggie Opondo, presented to the participants in a Plenary Session the following future scenario of a smart climate Kenya in 2030, with a view to stimulating thinking about the questions (see below) that were to be considered by the Groups during the discussion.

Future Scenario: Smart Climate Kenya in 2023

Good morning Kenya. It is six o'clock. It is a sunny, wet and cloudy day in Nairobi. Northern Kenya will be hot and dry, Western Kenya will be cool and wet while the rest of Kenya will receive intermittent rains in some places and hot in many places. As Jim Onsongo wakes up with the forecast weather in mind he thinks of what he will do. He is in Nairobi and he knows he needs to have an umbrella, dress in light clothes and wear shoes that will not make his feet soak. He has had several messages like this before and he knows he has to weather proof his actions.

Thanks to climate proofing awareness campaigns that have been done in Kenya by various organizations, Jim is not worried about the weather forecast because he has learnt to cope with all types of weather. He is assured that his fellow Kenyans have had the same training and have adapted to changed climate in their coping strategies. For example, those who are practicing agriculture have learned to do precision agriculture which incorporates the weather forecast into ploughing the field, choosing the types of seeds to be planted based on the weather seasonal forecast, For each seed they plant they know the nutrient requirements and plan in advance for their purchase.

Jim Onsongo uses a rapid transport system that is eco friendly. He rarely drives his car into town to avoid traffic jam. He uses recycled water in precise quantities and his green building uses natural cooling system that requires less electricity. The manufacturing factories no longer emit noxious gases that make people sick. In the country side and in towns there are open green spaces with trees and benches for leisure walk and resting. There are playgrounds for all ages.

The climate smart Kenya is starkly different from the era of Jim's parents which had no planned transport system, people were often dying from preventable diseases, water and air were polluted and workplaces had no environmental quality standards. A climate smart Kenya extends lifespan of inhabitants, gives comfort to rural and town dwellers and keeps cost down.

Today, with good crop yields, higher income and life comforts, cooperative community environment, and better health for his family, Jim sees a bright future. It is a beautiful day.

Following the presentation of the scenario, the Provocateur, Mr. Michael Obara, gave a short consideration of the potential challenges and obstacles that we would face as Kenyans on our way to reaching the desired future state by the year 2030 in order to further spur critical debate of the questions posed for the group discussions. The challenges and obstacles to the climate smart pathway included changing extreme events as well as trends in disaster losses and their impacts on various sectors and communities within Kenya. He weighed in these challenges against some potential, climate resilient risk management options (holistic and sectoral) and their potential benefits such as improved livelihoods, protected biodiversity, and improved human well-being.

The participants then broke out into five groups to consider the following two questions:

1. How can we inject climate smart solutions in our professions? and
2. How can we create climate smart synergies amongst ourselves?

The outcomes of these discussions are presented below.

3.2 How can we inject climate smart solutions in our academic and research activities?

Proposed Actions	G1	G2	G3	G4	G5
<ul style="list-style-type: none"> • Engage policy makers and multi-stakeholders in research. There is need for interaction between those that produce the technologies and the end users to ensure acceptability of products and proposals. 					
<ul style="list-style-type: none"> • There is need for a common understanding of the basics of climate change through awareness creation among colleagues and peers. 					
<ul style="list-style-type: none"> • There should be a multidisciplinary approach where climate change is included in all curriculum offered from primary to university level – public attitude change and strengthening of courses at institutions of higher learning is needed. 					
<ul style="list-style-type: none"> • Go for science and innovation, not science only, and link with industrial problems. We need to be in the forefront in marketing the products; and promote the knowledge and consumption of devices related to clean energy. 					
<ul style="list-style-type: none"> • We need to promote publications that cuts across all professions but targeting issues of climate change or joint proposals aimed at solving climate change problems. 					
<ul style="list-style-type: none"> • It is would be important to undertake climate risk mapping at local, national and regional levels which should be followed by evidence-based research. 					
<ul style="list-style-type: none"> • We need to identify the key climate related hazards in each sector and propose solutions through a transdisciplinary / multidisciplinary research design. 					
<ul style="list-style-type: none"> • Mainstreaming of climate smart activities in learning institutions through introduction of common courses in climate change, short courses, awareness raising, and best practices modeling. 					

• Funding for research, outreach programmes, and financing/cost implications must be considered in climate change smart solutions.					
• We need to review research policies to address emerging issues such as climate change.					
• There is need for baseline studies – both socioeconomic and biophysical – with gap identification in each sector.					
• Communicate results and findings of research work to stakeholders and integrate information for functional uses.					
• We need to be role models of the knowledge that we have – demonstrate by action.					
• Formulate plans and strategies to plug implementation gaps.					
• There are good research papers out there, but implementation is the biggest challenge so that's where academicians and researchers should begin.					
• The climate smart solutions should be sustainable, measurable realistic and time bound.					
• Understand existing knowledge (especially Indigenous Knowledge) before bringing in new knowledge, document it and incorporate it in research - combine indigenous and exotic knowledge.					
• Have policies that address research activities.					
• Academic research should focus on the rural masses that are being affected and localize solutions. NGOs are the ones in touch with the rural masses so they should share the information with academic staff.					
• Ownership; solutions must begin with us – patenting and training on the culture of communal ownership.					
• Establish linkages with all universities to jointly research as well as share research findings (basic, applied and social sciences) and avoid duplication.					
• Ensure grassroots community participation in research and disseminate research findings to them – can also use GIS mapping technology.					
• Communities outreach activities to also address religious and cultural aspects.					
• Address coping mechanisms to climate change dynamics.					
• Pioneer clubs, societies, congresses that learners can get outlets to discuss and model solutions to climate change problems.					
• Building capacity to handle climate change problems.					

3.3 How can we create synergies amongst ourselves?

Proposed Actions	G1	G2	G3	G4	G5
• There should be collaboration rather than competition among institutions – share information, and establish networks amongst universities/institutions with climate change knowledge.					
• We need to build on what others have done in solving climate change problems rather than replicate or copy.					
• We need to make use of the climate change strategy document as a basis for identifying climate change issues.					

• Implement climate smart solutions in institutions/organisations					
• We need to rally for finances for climate change activities (including documentation of knowledge, research and outreach), from the line ministries.					
• Improve information dissemination amongst ourselves as researchers, and to the communities; publish (particularly in free journals) and implement new findings.					
• Encourage participation of communities that are targeted by our research activities to develop ownership of the solutions and also participate in developing solutions.					
• Have a multidisciplinary approach.					
• Have a national body to coordinate institutions researching on and implementing climate change activities to avoid duplication of information in different forums. Can be hosted by e.g. the National Council for Science and Technology.					
• Create a monitoring and evaluation unit for research at the National Council for Science and Technology.					
• Have a focal point to take care of research issues at national and devolve the focal points to counties.					
• Researchers should have forums from national to local levels; to share results for implementation at national, regional and local levels.					
• Organise regular workshops, seminars, conferences and short courses for sharing new research results, brainstorming, capacity building and empowering the community.					
• Develop a platform/portals and a resource centre/database for information and sharing on climate issues: the material should not be for sale.					
• We need more focus on actors and action not the structures and processes; who needs to do implement the strategies.					
• Encourage linkages with all levels of governance.					
• The country to declare the climate change problems a national disaster.					

4. PLENARY DISCUSSIONS

4.1 How can we inspire climate smart innovations for a green economy?

The panel discussions highlighted the following issues:

- Implement;
- For communities show them the benefits of green projects, mostly monetary;
- Have policies and legal framework and if we do we should walk the talk;
- We need to be aggressive when it comes to climate issues;

- There should be incentives for people to move to green economy because it is expensive;
- Plough back into our ecosystems; and
- Compile the research that has been done and channel it towards green economy.

Other views that were submitted by individual participants:

- Plant more trees;
- Zero-rate importations geared towards climate smart innovations;
- Give awards/recognition (including Presidential Awards) for climate smart innovations;
- Begin valuing existing knowledge – modern/scientific and indigenous. Indigenous knowledge has a lot to offer – the traditional practices, taboos and norms have got to contribute to the green economy;
- Use the media – produce documentaries that target country specific problems and also show green solutions from other countries;
- Set implementation targets for problems with known solutions without much feasibility study requirements;
- Develop a green economy philosophy which can drive and inspire the country to be more committed to making things work for the betterment of our people;
- Forums such as the sensitization workshop can be used to develop methods of getting Kenyans to love and respect their country;
- Participatory processes should be adopted to facilitate integration of various sub-groups (e.g. disabled) in the community/country;
- Paradigm shift is necessary – we need to change the way we think and act;
- Academic and research institutions to take the lead in nurturing and developing talent;
- A strong STI policy that is proactive is required;
- Develop our urban irrigation systems and make them effective;
- Re-plan our cities to allow greening;
- Ensure that communities directly benefit from the proceeds of carbon markets;
- Creation of awareness;
- Relooking into policies and legislation to ensure a green economy;
- Organise annual competitions on climate change risk management innovations in schools at various levels, i.e. primary, secondary and tertiary;
- Tap and promote innovations on climate change risk mitigation and adaptation in the schools Science Congress competitions;
- Put in place incentive mechanisms for those carrying out green economy business in form of payment for ecosystem services, tax rebates/exceptions;
- Invest in agricultural and other demand-driven sectors;
- When involving the community, shift the focus to economic incentives for the community rather than drumming the need for environmental conservation – a good example is in agro-forestry where farmers still carry out crop growing while experiencing gains from the trees, e.g. bark harvesting, fodder;
- Develop robust policies, legal framework and institutions. Where these are already in place, then there is need to review them and make them relevant;

4.2 Do we have capacity to develop climate smart research projects?

The participants agreed that, yes, we have the capacity, but:

- Involve the public: have to get the public's interest and the projects should have monetary value;
- What we lack is funding. ICCA and National Council for Science and Technology (NCST) should look into research funding;
- We need good networking and collaboration among stakeholders; and
- Focus our research on demand areas.

Other views that were submitted by individual participants:

- We have a huge pool of well trained personnel;
- Kenya as a country has a strong network of regional and international partners;
- We have the capacity to develop climate smart research projects but we must insist on each research project having an item of climate change;
- Relook at research policies;
- Enhance funding towards research which is currently extremely limiting;
- Call for proposals on climate smart innovations; and
- We need coordination and focus on priority areas.

4.3 Top Challenges/Opportunities, Resources and Required Mechanisms

Challenges/Opportunities Kenya Needs To Take (C – Challenge; O - Opportunity)	Existing Resources	Required Mechanisms that should be used
Use of bottom up approach (O)	Communities	Use of indigenous knowledge
Energy and water (C/O)	Data	Energy
Duplication of efforts (C)	Learn the history of Europe as regards climate change that has been well documented	Collaboration of experts
Cause of climate change not well known (C)		
Partnership and networking of stakeholders (C/O)		

5. CLOSING REMARKS – Patrick Chabeda, OPM

The OPM supported this workshop because the role of researchers in the country's development needs to be recognized.

It was mentioned that green economy doesn't really mean planting trees but involves a lot other aspects including, what to do for cities where trees can't be planted. The hope is that the research community will look into these other aspects of going green. There is need to sensitize people on specific climate change issues, for example, climate finance and carbon trading.

Holding interdisciplinary workshops such as this one will help people know where climate change opportunities lie. The OPM will continue supporting such forums where cross cutting sectors are brought on board.

Vote of Thanks.

ACKNOWLEDGEMENTS

We thank the Office of the Prime Minister of Kenya for having the foresight to recognize the importance of sensitizing professionals in various key sectors to climate change issues and climate smart thinking, as well as for funding and organizing the Workshop. Those involved in the organization included: Dr. Alexander Alusa and Mr. Patrick Chabeda. We also thank the Institute for Climate Change and Adaptation (ICCA), University of Nairobi, for facilitating the Workshop and producing the Workshop Report. This team comprised of Prof. Shem Wandiga (Acting Director), Dr. Maggie Opondo, Dr. Gilbert Ouma, and Dr. Daniel Olago. Special thanks go to the Provocateur, Mr. Michael Obora (Ministry of Agriculture) and to the speakers: Prof. Laban Ogallo (IGAD Climate Prediction and Application Centre - ICPAC) Prof. Madara Ogot (University of Maseno and ICCA), Mr. Obadiah Mungai (Ministry of Finance), Dr. Simeon Dulo (University of Nairobi and ICCA), Dr. Ali Adan Ali (National Museums of Kenya), and Mr. Alexander Alusa (Office of the Prime Minister). We would also like to acknowledge the very good efforts of the Group Chairs and Rapporteurs, as follows: Group Chairs – Prof. Isaac Kosgey, Dr. Marianne Maghenda, Prof. Reuben Mosi, Mr. Charles Tonui, Dr. Kipkorir Chumo; and Rapporteurs - Dr. Lydia Olaka, Dr. Alfred Opere, Mr. Nicholas Mwenda, Ms. Christine Omuombo, Ms. Emmah Mwangi, Ms. Parita Shah, and Mr. Godfrey Makokha. We also acknowledge the workshop secretariat staff, Ms. Elizabeth Maweu and Ms. Mary Mugo from the Office of the Prime Minister, and, Ms. Rita Muriuki and Ms. Marianne Mulinge from University of Nairobi Enterprises and Services (UNES) for their sterling support in ensuring that the workshop logistics went smoothly and that participants were well taken care of. Last but not least we applaud all the participants for availing the time to attend the workshop and for their contributions to the very focused, spirited and fruitful deliberations whose outputs are contained in this report.

PARTICIPANTS EVALUATION OF WORKSHOP

Evaluation analysis for the Smart climate change workshop for Academic and Research Institutions held on 11th May 2012 at the Silver Springs Hotel

Fifty one (51) responses were analyzed. An overall satisfaction of 3.2 was attained. **A summary of the analysis is in Table 1.** Additional comments and suggestions for the open headed survey questions have been listed.

The level of satisfaction has been ranked from one to four as follows:

- 4 – Exceeded my expectation
- 3 – Met my expectation
- 2 – Needs improvement
- 1 – Below expectation

Table 1: Summary of analysis.

Workshop Evaluation	Mean Score	Level of satisfaction			
		4(%)	3(%)	2(%)	1(%)
Workshop organization	3.4	39	56.9	3.9	0
Activities and involvement	3.2	25	68.6	5.9	0.0
Presentations	3.2	30.6	60	8.8	0
Presentation style	3.2	27.5	64.7	6	2.0
Level of presentation	3.2	28.6	65.3	6	0
Quality and relevance of presentation	3.2	32.7	59.2	8	0
Facilitator's knowledge of the subject	3.4	48.0	46.0	6	0
Clarity of message	3.2	30.0	64.0	6	0
Response to questions raised	3.0	16.7	62.5	20.8	0
Service Delivery	3.2	34	56	8.9	1.0
Convenience of the venue	3.2	38.5	48.1	10	3.8
Quality of accommodation	3.4	41	55	5	0
Cleanliness and hygiene	3.3	34.6	65.4	0	0.0
Customer care/customer relation	3.4	35.3	64.7	0.0	0
Time management	2.8	16	47.1	35	2.0
Meals	3.4	39.2	57	3.9	0

How soon do you think you will be using or applying the knowledge and skill gained in this workshop?

- Immediately
- In my next lecture series
- Immediately especially in involving the community
- In formulating projects geared towards climate change adaptation and mitigation

In what areas or issues would you like an improvement to be effected upon?

- Workshop day – the time was not enough for all that was covered. Two days would have been appropriate

- Time management by presenters
- Fundamental understanding of the causes of climate change including moral –philosophical viewpoints
- Information sharing
- More hands-on (participatory) activities on the subject
- Energy saving
- In areas of agriculture
- Detailed coverage through the proposed trainings
- Travel reimbursement
- More clarity on finance and carbon market
- Energy generation, water and sanitation
- Community participation
- Soil management
- Rural development

Would you recommend this workshop to another person or institution(s)/organization(s)? If so, please write below the particulars or the name of the person, institution(s) or organization(s).

- Cascading to institutions like teachers and students in secondary schools, primary schools and nursery
- All Museum of Kenya research scientists
- KIPPR – they are handling some aspect of climate change under PANFARM Initiative
- Principal Nyeri Technical
- C.E.O Yana water board
- Dr. Urbanas Mutwiwa – JKUAT
- Pwai University College – Prof. M. Tole
- Taita Taveta University College – Prof. Bogo
- Bondo University college – Dr. Samuel Okuro
- UON Department of Geography and Environmental Studies
- Kenya climate change working group (KCCWG)
- KEFRI
- Kenya Institute of Education
- Ramani Geo-systems
- County governor and leaders especially in hot spot areas
- Research scientists from KIRDI
- Chuka, Karatina and Meru Universities
- Afya kwa community
- Kenya Forest Service
- Ministry of Environment and mial studies
- KARI
- Managers in the tea industry
- UN-Habitat
- World bank – Fredrick Wamalwa
- Ministry of gender and youth affairs
- NGOs, CBOs and Teachers
- Centre for youth development – Gerald Kimeu
- Tea research foundation of Kenya – Dr. John Bore

- School of Pharmacy - UON (Dr. Shitae Malu, Dr, Faith Okalebo)
- Lake Victoria Environment Management Authority and IGADD
- Centre for community devt. – James Kumenya
- Inclusion of NEMA and a parliamentary representative
- World Agroforestry Centre - Anne Kuria
- Rise Kenya, Mwingi District

What other subject areas would you be keen to be seen that they are discussed, whether or not related to the current workshop?

- How organic solvents depleting ozone layer
- Carbon marketing
- Sector specific climate smart innovations workshops
- Negotiation skills as regards climate change meetings (natural, regional and international)
- Climate finance
- Environment impact assessment
- Climate change solutions
- CC adaptation and entrepreneurship
- Synergy and difference between adaptation and mitigation to climate change
- Green city
- Tools for assessing impact of CC, adaptation and vulnerability
- Water/rainfall and forest change in more details
- Wildlife
- Global climate simulation and modelling – is it really realistic?
- Legislation
- Risk assessment and disaster risk reduction
- Role of communities
- Resource management
- CDM
- REDD
- Biodiversity
- Climate Smart agriculture, food security practises
- Adaptability and variability on agriculture and food security in ASAL
- Climate change adaptation mechanisms
- Agriculture, Environment and forestry
- Science of climate change models
- Mapping climate change hotspots
- Discuss the role if impunity in destabilizing smart solutions, smart planning
- Dissipation of information
- Renewable sources of energy
- Disability Vs climate change
- Culture and technology
- Participatory research especially entry into communities and challenges associated with it
- Funding on climate change

Do you wish to make any other comment(s)? Please use the space below:

- The workshop was very well organized and a great platform for information sharing on complex multi-faceted issue - climate change. A presentation of research funding on climate change would be useful particularly to the communities
- Publicize ICCA and its mandate. Create linkages with other institutions to deal with climate change
- Politicians to be in the frontline
- Focus on harnessing indigenous knowledge to enhance community adaptive and resilience capacity
- Integrate gender issues in the research process
- There is need for further training on the same
- All courses or subjects must have a fibre of climate change
- Congratulations for organizing the workshop
- Establish networks
- have regulation workshops of this nature
- presentations should have time limited in order to have more time to share ideas
- A venue in town would be more convenient
- Follow through on the recommendations

How we can inspire climate smart innovation for a green economy

- Through expounding and articulating the benefits of green economy
- Providing incentives for initiating and implementing green economy strategies
- Legal and policy framework at national level
- Encourage community participation to ensure localized solutions to climate change
- Harmonize all climate change projects and have them centralized for reference

Do we have the capacity to develop climate smart research projects?

- Yes. This has been proven by the many research projects that have been won grants locally regionally and internationally. The required manpower and knowledge is available
- Yes but we need to improve to infrastructure and financial capacity

Top Challenges/Opportunities

- a) Governance
- b) Legislation, policies etc be reviewed
- c) Fundamental terms and their definitions
- d) Food security
- e) Health
- f) Energy
- g) Deforestation
- h) Lack of knowledge by small communities
- i) Infrastructure
- j) Linking industry and research
- k) Duplication of climate change projects and self-seeking proposals receiving funds on CC mitigation in any way possible without any control or coordination

- l) Resources – the government to centralize funding (doors) of CC projects to ensure build up of knowledge on CC

Top existing resources

- a) Human resources – increasing and aggressive population to implement mega- and micro-projects
- b) Natural resources – new resources being discovered
- c) Skills required are available
- d) Data is available
- e) Use of small communities
- f) Proper communication and dissemination of smart climate knowledge
- g) Science and innovation
- h) Solving problems in the industry through research/academic approach
- i) Tax
- j) Carbon trading
- k) Patents – copyrighting innovations

Top required mechanisms

- a) Climate networks
- b) Integrated documentation of evidences, weather behaviors, adaptation and mitigation measures.
- c) Awareness creation
- d) Incentives for implementation
- e) The government could establish an accounting unit and do inventory of already running CC projects and control further funding

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