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Integrated Planning for Enhanced Water, Energy and Food Security in Africa:

Lessons from Kenya

FIELD OF A RIPE WHEAT WITH ACACIA TREES, Kenya:
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Summary

Africa's water, energy and food systems are increasingly under pressure from growing populations and economies with climate change further exacerbating the challenges. The IPCC has noted that Africa is the continent at greatest risk from the impacts of climate change due to poorly developed infrastructure, weak institutional arrangements and already vulnerable populations. It is becoming increasingly unsustainable to manage water, energy and food systems through the long-held single sector approach as practiced across the world. A more integrated approach across the three sectors is increasingly being acknowledged as global best practice. This involves moving away from the conventional policy and decision-making in separate 'silos' toward a water-energy-food (WEF) 'nexus approach' that identifies and addresses trade-offs resulting from the demands of the three sectors on limited natural resources. (Hoff, 2011).

Integrated planning, introduced systematically into national and local government planning for water, energy and food, offers a significant opportunity for improving resilience to anticipated climate change shocks. For this to happen there needs to be a structured process of mainstreaming integrated WEF planning into government planning systems, through, for example:

i) awareness raising on the importance of the WEF nexus and the benefits of integrated planning among relevant institutions;

ii) capacity building of government

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officials to undertake integrated planning across the three sectors;

iii) **investing in learning and engagement platforms at implementation level to promote coordination and learning between government, civil society and the private sector; and**

iv) **revising existing government planning processes to take an integrated WEF approach.**

Introduction

Across Africa, the natural systems that provide water, energy and food are under increasing pressure from growth in populations and economies. In addition, studies indicate that Africa, whose people are largely dependent on agriculture, is the most vulnerable continent to the impacts of climate change and climate variability. Governments across Africa carry the responsibility for water management, food security and energy provision in the face of this increasing competition and climate change.

Globally a move towards more integrated approaches to water-energy-food (WEF) planning is being introduced, bringing better use of limited resources and building resilience in the face of climate change. There is, to date, however, little practical experience of how to implement this approach and what the challenges might be. Work recently conducted in Kenya, however, gave rise to some lessons, addressed in this Policy Brief, that may have wider resonance across the continent.

Climate Change Impacts on Water, Energy and Food Security in Africa

Climate change impacts are already being experienced across Africa, and all indications are that it will, in many regions of the continent, have severe impacts on the natural systems that provide water, energy and food.

Potential economic growth, long-term prosperity, and the survival of already vulnerable populations are increasingly threatened by the risks of climate change. Projections for Africa point to an annual loss equivalent in GDP of nearly 2% to 4% due to climate change by 2040[1]. Average temperatures in Africa are predicted to increase by 1.5 to 3°C by 2050 and it is estimated that, by the 2080's, the proportion of arid and semi-arid lands in Africa will increase by 5-8%[2]. In addition, droughts have become increasingly common since the 1970s, and the number of weather-related disasters, such as floods and droughts, has doubled over the past 25 years[3].

African huts in rural Kenya during dry season
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By 2020 and 2050, increased water stress due to climate change is projected to affect a population of between 75 and 250 million and 350-600 million respectively. Furthermore, major changes are anticipated in annual and seasonal rainfall trends, as well as extreme floods. Reductions of up to 50% in yields from rain-fed agriculture are expected in some countries by 2020 and agricultural production and food security in many African countries are likely to be severely compromised. By 2100, IPCC further predicts a fall in net crop revenues by nearly 90%, severely impacting agri-based economies, with small-scale farmers being the most affected. These predictions point to severe food insecurity and widespread malnutrition across vulnerable populations. In Senegal for example, extreme

[1]IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability
[2]UNEP fact sheet
[3]http://350africa.org/8-ways-climate-change-is-already-affecting-africa/

Common scenario across Africa in the wake of droughts. The burden to collect water over long distances for household uses rests heavily on women and girls

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weather events including droughts and heavy rainfall have impacted on agricultural yields severely affecting the country's food security[4]. Kenya, Ethiopia and Somalia, have also been severely impacted by prolonged droughts[5] resulting in severe food insecurity that impacted most severely on the livelihoods and health of the poor. The risks to food security are likely to be further worsened by the combination of climate change and rapid population growth[6].

Sub-Saharan Africa faces severe constraints in access to energy, with the IPCC reporting an estimated 51% of urban populations and only about 8% of rural populations having access to electricity. Extreme poverty and the lack of access to other fuels mean that 80% of the overall population relies primarily on biomass to meet its domestic needs, with this fuel source supplying more than 80%of the energy consumed in sub-Saharan Africa. Further challenges from urbanisation, rising energy demands and volatile oil prices further compound energy issues in Africa.

Kenya's WEF security and climate change

Kenya, like the rest of East Africa, is extremely vulnerable to climate change, the impacts of which are already being felt. The region is currently reported to be experiencing the worst food crisis of the 21st century[7]. It is a water scarce country with total renewable water resources accounting for 692 m^3/year per capita (or 30,700 million m^3/year) in 2014[8] . Nearly 85% of the landmass is characterised as arid and semi-arid lands (ASALs). Kenya experiences significant water, food and energy security challenges due to its climate and geographical situation.

[4]IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability.
[5]https://www.oxfam.org/sites/www.oxfam.org/files/bn-east-africa-food-crisis-200711-en.pdf Oxfam Briefing Note- East Africa Food Crisis, 20 July 2011 Issue.
[6]IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability.
[7]http://350africa.org/8-ways-climate-change-is-already-affecting-africa/ Bhavna Deonarain, December 12, 2014
[8] http://www.fao.org/nr/water/aquastat/countries_regions/ken/index.stm

Dusty plains during a severe drought, Kenya
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An Oxfam briefing note9 reported that severe droughts due to poor rains in 2011 had left nearly 3.5 million people in Kenya in dire need of food. Rainfall had been lower than average, with 2010/2011 being the driest years since 1950/1951. A UK Met 2011 report further indicated evidence of decreasing rainfall between 1960 and 2003 for Kenya. This is a significant concern for a continent that depends largely on rainfed agriculture.

As a result of all of these factors, there is stiff competition over scarce water resources in Kenya, both between different sectors of the economy and between communities.

The greatest water demand in Kenya, as in most African countries, comes from the agricultural sector, followed by domestic demand, and then other sectors including hydropower generation. Increasing population growth, poor management of water supply across sectors, forest degradation and pollution all place great pressure on Kenya's limited water resources.

Agriculture accounts for upwards of 25% of Kenya's GDP. In 2013, Kenya's GDP was US$ 44 101 million, to which agriculture contributed 30 percent[10]. As performance in agriculture is highly dependent on rainfall, the sectors' productivity was considerably reduced during the 2009 drought.

Nearly 98% of Kenyan agriculture is rain-fed and shortfalls in rainfall result in devastating impacts on the rural population[11]. Below average rains in 2011/2012 in the East African region resulted in reduced crop and livestock yields leading to severe food shortages. To address the country's food shortage challenge the National Economic Program of the National Irrigation Board intended to put one million acres of land under irrigated agriculture within five years[12]. This enormous irrigation plan has received prominence despite the already constrained water resources in Kenya, thus increasing competition over water. The undertaking is also likely to involve the development of more dams to improve water availability, requiring massive state funding or loans, either of which could result in competition over fund allocations between sectors.

Kenya has a critical energy challenge around the extensive use of charcoal and wood fuel for household uses (especially cooking) due to the lack of other available and affordable energy alternatives. The use of biomass for energy accounts for 68% of primary energy consumption with about 80% of the

[9]https://www.oxfam.org/sites/www.oxfam.org/files/bn-east-africa-food-crisis-200711-en.pdf Oxfam Briefing Note- East Africa Food Crisis, 20 July 2011 Issue.

[10]http://www.fao.org/nr/water/aquastat/countries_regions/ken/index.stm
[11]Bassi et al., 2011
[12]https://www.nib.or.ke/who-we-are/historical-background National Irrigation Board -Kenya.

population dependent on wood fuel for domestic energy consumption[13]. This demand has spawned a huge charcoal industry in Kenya which has led to widespread deforestation. Government efforts against the charcoal industry are frustrated by the lack of a viable of viable alternatives to replace the demand for charcoal and the difficulties of controlling illegal charcoal production, particularly in the complex two-tier institutional environment introduced under the 2010 Constitution.

Meeting the water, energy and food challenges in Kenya cannot be addressed by a single sector approach from individually acting government entities – only an integrated approach between a range of entities at national and county level will succeed in addressing these ongoing challenges.

BOX 1: The charcoal Industry and integrated planning

There is significant fragmentation in the Kenyan energy sector, with different energy types being regulated and generated in separate entities. In addition, there has been a failure to deliver affordable energy solutions to households, with the result that nearly 80% of Kenya's population depend on charcoal and wood fuel for domestic energy consumption. The charcoal industry employs around 200,000 people directly (Bailis, 2011). Production of charcoal however has significant detrimental environmental impacts on both land and water resources. Both Narok and Laikipia counties face challenges regarding charcoal production to supply local communities and to meet demand in Nairobi. Narok is currently the source of around 44% of the charcoal for Nairobi, with Laikipia contributing 10% (Bailis, 2011).

The failure by the national government to provide adequate and affordable solutions to meet household energy demands has increased charcoal demand. Despite the strong linkages between household energy demand and electricity generation and distribution through hydropower, these are addressed separately by different entities resulting in a negative cycle of land and water degradation that impacts on the sustainability of hydropower generation.

[13]KIPPRA, 2010

The inter-sectoral County Environmental Committee in Narok county recently placed a ban on the production, sale and transportation of charcoal, with various departments collaborating in implementing the ban, thus showing the potential for collaboration around regulatory activities at the county level. However, the high demand for charcoal in Nairobi and the livelihoods it provides for rural families has made implementing the ban challenging, and it has met with a high level of resistance.

The case of the illegal charcoal industry reveals the clear linkages across sectors which would be addressed through an integrated approach, as well as the opportunities arising from an integrated approach. The regulation of charcoal production will help improve land and forest protection and reduce degradation. This, in turn will protect water resources availability and water quality, which are negatively affected by land degradation, and improve food security by maintaining and restoring the productivity of land. However, the production of charcoal will not be brought under control by enforcement alone. It is critical that affordable sources of energy are made available to households, in order to reduce the charcoal and woodfuel demand. This requires a major effort by the energy sector, particularly in areas where charcoal and woodfuel demand is particularly high, and should include government actors, non-governmental organisations and private players in the energy sector.

A further critical element of an integrated approach would be the development of alternative sources of livelihoods for smallholder farmers to disincentivise their participation in the lucrative charcoal production trade.

Lessons from Kenya

In recent years, there has been an increasing focus on the interactions between water, energy and food systems. As these resources come under increasing pressure, the traditional single sector approach to planning and management is inadequate, and a more integrated approach is required. The integrated 'nexus approach' is a process that involves moving away from conventional, fragmented policy and decision-making in separate 'silos' toward an approach that reduces trade-offs and builds synergies across sectors[14].

In Kenya, however, a range of factors impede the implementation of this integrated approach, many of which are relevant in other countries as well. These include:

- Structures and systems that encourage siloed sectoral approaches to managing water, energy and food challenges;
- limited knowledge of WEF nexus interactions and a lack of awareness of the benefits that integrated planning could bring in relation to use of scarce natural resources and enhancing climate resilience; and
- a lack of skills and practical tools for conducting integrated planning.

On the other hand, in Kenya, as in many other countries, platforms exist which can easily be adapted to support a more integrated approach to WEF planning.

Introducing integrated planning approaches requires both awareness raising about the value of the WEF nexus in managing scarce natural resources and building climate change resilience, building the capacity of actors in government to implement integrated planning, and providing the tools and incentives to support implementation.

One of the key challenges in implementing a more integrated approach in Kenya relates to the lack of understanding of decision makers of the value inherent in integrated planning approaches. Our work in Kenya revealed that the WEF nexus concept was new to many decision-makers. A three-day capacity building workshop significantly changed this, and instigated an intention from participants to implement a more integrated approach, particularly at county level.

A number of Kenya's challenges surrounding WEF security are linked to the poor and often fragmented sectoral planning both within government and with other actors. It is typical to find several WEF actors from county and national levels operating in the same geographical space, often duplicating functions, with little co-ordination.

An integrated planning approach would address many these challenges, resulting in improved planning within one sector, such as water, as well as across sectors. In doing so, the transition to integrated planning is most effective if it can build on existing systems and procedures. In Kenya, for example, the County Integrated Development Plans (CIDPs) provide such an opportunity. These are five-year, county-level planning documents that incorporate the plans of the various county departments. A shift in approach to require an integrated submission from players responsible for food, energy and water planning can transform the CIDP to address the needs of the WEF nexus effectively.

In addition, it became clear from our work in Kenya that building a community of actors across sectors and including non-governmental actors, with a common understanding of the WEF nexus approach, provides the support to take forward this new approach into practice. In Kenya, at the county level, actors from different government sectors and non-governmental organisations were brought together in a series of workshops, including a training workshop. The result was a spontaneous creation of teams intending to introduce integrated planning approaches at the county level.

Recommendations

A structured process of mainstreaming an integrated WEF approach into government planning systems requires at least three key elements:

[14]Hoff (2011)

Baby elephant bathing in the mud

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i) awareness raising on the benefits of an integrated WEF approach and building the capacity of officials to undertake integrated WEF planning;

ii) investing in learning and engagement platforms at implementation level to promote coordination and learning between government, civil society and the private sector; and

iii) revising existing government planning processes to take an integrated WEF approach.

Awareness raising and capacity building

There is an opportunity for governments in Africa to strengthen their adaptation strategies by developing and implement both awareness raising programmes and capacity building around the WEF nexus and integrated planning. The lack of relevant knowledge and awareness of the critical interconnectedness of the WEF sectors is a key challenge that hinders the implementation of integrated planning. Creating awareness of the immense implications of climate change on WEF resources is also critical.

Invest in learning and engagement platforms

Investment in the establishment and support of platforms and forums for convening the different players regularly can powerfully support engagement across sectors and across levels of government. Governments can take the initiative to host such platforms or they can be hosted by third parties, such as international NGOs. Sustaining these engagements requires incorporating them systematically into government programmes and creating appropriate incentives, through, for

example, performance management systems that ensure participation by relevant state decision makers.

Use of existing plans

In Kenya, the County Integrated Development Plans (CIDP) provide an excellent opportunity to implement integrated planning approaches. Building on and amending existing planning procedures provides a smoother transition to more integrated approaches than the disruption of entirely new planning procedures. Since planning is different in each country, the introduction of integrated planning would require the identification of critical planning systems into which to insert the integrated approach, such as national development plan, poverty reduction strategies, and climate adaptation strategies.

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Publications from the project, available on the Pegasys Institute website, include:

- Policy Brief 1/16: Integrating Water, Energy and Food Planning for Climate Resilience in Kenyan Counties
- Policy Brief 2/16: The water-energy-food nexus and poverty eradication in Kenya
- Policy Brief 3/16: Gender-responsive planning for the water-energy-food nexus in the context of devolution - Reflections and lessons from Laikipia and Machakos in Kenya
- Policy Brief 4/16: Integrated Planning for Enhanced Water, Energy and Food Security in Africa - Lessons from Kenya
- Water, Energy and Food Security: A Literature Review of Water-Energy-Food Nexus approaches for Sustainability in the Context of Climate Change
- Managing the water, energy and food nexus in a decentralised system: the case of Kenya

These documents are available on the Pegasys Institute website: www.pegasysinstitute.org

An online training course in WEF planning in the context of climate change is available on https://versal.com/c/e7nipl/integrated-water-energy-food-nexus-planning-in-the-context-of-climate-change

Zebras drink from a waterhole: Wildlife is also exposed to stiff competition over scarce water recourses, especially during droughts. *Copyright: paula french / Shutterstock, Inc.*

"Ugali", a staple meal in Kenya, is made from corn
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