10th SADC Multi-Stakeholder Dialogue

Keynote Address by

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Bouncing back – building SADC's resilience in changing times: The nexus approach to water–energy–food security

1.0 Background

The SADC region countries face a growing demand for food, water, and energy compounded by climate change. Effective adaptation in these changing times requires efficient use of land, water, energy, and other vital resources including coordinated efforts to minimize trade-offs and maximize synergies. In the legacy situation, for most member countries, the policy process generally follows a sectoral approach oblivious of the interconnections and interdependence among the three nexus sectors. Arguably, the concept of a water–energy–food nexus is gaining currency, and adaptation to climate change is an acknowledged urgent need. However, little effort has been made so far to understand the linkages between the nexus perspective and adaptation to climate change. This Multi-Stakeholder Dialogue seeks to increase understanding of the interlinkages in the water, energy, and food nexus and I wish to unpack this nexus in the context of adaptation responses. I will argue that focusing on trade-offs and synergies using a nexus approach could facilitate greater climate change adaptation and help ensure food, water, and energy security by enhancing resource use efficiency and encouraging greater policy coherence. I will conclude that a nexus-based adaption approach, integrating a nexus perspective into climate change adaptation plans and an adaptation perspective into development plans, is crucial for effective adaptation. I will unpack a conceptual framework for considering the nexus approach in relation to climate change adaptation, discuss the potential synergies, trade-offs, and offer a broader framework for making adaptation responses more effective in the SADC region.

2.0 Emerging Regional Challenges

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The SADC community seeks new approaches and solutions for adaptation to climate change and development challenges such as water, energy, and food security. The Rio + 20 Declaration 'The Future We Want' (Rasul and Sharma, 2016)[1] stresses the need for a balanced integration of economic, social, and environmental concerns into economic development, and highlights the need to address food, water and energy security in such a manner as to reduce the adverse impacts on nature (on water, biodiversity, air, and climate). The SADC region is projected to be a hot spot of climate change impacts hence its greatest challenge is how to manage global warming and mitigate its adverse effects on human and natural systems. Thus, meeting this challenge is a top priority in the SADC where large numbers of people depend on climate-sensitive sectors such as agriculture, forestry, and fisheries, have limited resources and capacity, and live in climate-vulnerable settings such as mountains and coastal areas. The goal of regional adaptation and resilience programs is to reduce vulnerability to both climatic and non-climatic changes. This is closely linked to achieving the sustainable use and management of water, energy, and food, which are vital for sustainable development, by harmoniously addressing water, energy, and food security challenges.

3.0 Evolving Approaches to Adaptation and Resilience

Adaptation is an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, 2007)[2]. However, the concept continues to evolve and is gradually changing from just responding to resilience to the impacts of climate change into addressing the underlying factors that cause vulnerability and addressing development challenges (Kok et al., 2008)[3]. More specifically, approaches to adaptation have evolved from the initial infrastructure-based interventions to a more development-oriented approach based on building a broader resilience to climate hazards by addressing the underlying causes of vulnerability rather than simply responding to the symptoms (Calow et al., 2011[4]; Davies et al.,

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[1] Rasul G. and B. Sharma. 2016. The nexus approach to water–energy–food security: an option for adaptation to climate change. Climate Policy 16 (6):682-702. DOI: 10.1080/14693062.2015.1029865

[2] IPCC. 2007. Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group 2 to the 4th Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.

[3] Kok, M., B. Metz, J. Verhagen and S. Van Rooijen. 2008. Integrating development and climate policies: National and international benefits. Climate Policy 8:103–118.

[4] Calow, R., H. Bonsor, L. Jones, S. O'Meally, A. MacDonald, and N. Kaur. 2011. Climate change, water resources and WASH. A scoping study (ODI Working Paper 337). London: Overseas Development Institute.

2013[5]). In the 1990s the focus was on the assessment of climate risks and aimed at reducing climate impacts using a locally specific sectoral approach. In the 2000s the concept of adaptation, including the notion of mainstreaming, gained momentum *al beit* faster than policy and practice, although the sector-based approach still dominated in mainstreaming. In the current decade the emphasis has shifted, with adaptation linked more to sustainable development with a shift away from sectoral approaches and an emerging emphasis on cross-sectoral and transboundary approaches e.g focusing on river basins. Broadly, there are two distinct perspectives on how to approach adaptation in developing-country contexts. The first focuses on reducing climate change impacts, and the second on reducing vulnerability and building resilience by addressing not only climate change but also other drivers of vulnerability and poverty such as gender and social equity, as well as other structural factors hindering long-term sustainable development. In practice, most interventions fall somewhere between these two extremes. The development-oriented approach emerged based on the underlying premise that people are vulnerable not only to climate change but also to a range of other stresses, depending on access to resources and other socio-environmental circumstances shaped by political and economic processes (O'Brien et al., 2004)[6]. Technological measures designed to adapt to specific changes in climate have too often failed to address that issues local people consider most urgent, such as access to water, food, and energy and livelihood security. Hence successful adaptation requires interventions that address the full spectrum of challenges, including the underlying causes of vulnerability, managing climate risks, and building response capacity, in the context of other theories of risk and development. Experience shows that adaptation will not be effective unless it is integrated into development policy, and development processes have been aligned to create the necessary enabling conditions.

Eriksen et al. (2011) define sustainable adaptation as a set of actions that contribute to socially and environmentally sustainable development pathways, including social justice and environmental integrity. It considers the wider effects of adaptive responses on other groups, places, and socio-ecological systems, both in the present and in the future. The following key principles are a first approximation:

i) Adaptation entails measures that reduce poverty and vulnerability and enhance long-term resilience in a changing climate.

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[5] Davies, M., C. Be´ne´, A. Arnall, T. Tanner, A. Newsham and C. Coirolo. 2013. Promoting resilient livelihoods through adaptive social protection: Lessons from 124 programmes in South Asia. Development Policy Review 31(1):27–58.

[6] O'Brien, K., Leichenko, R., Kelkar, U., Venema, H., Aandahl, G., Tompkins, H., ... West, J. (2004). Mapping vulnerability to multiple stressors: Climate change and globalization in India. Global Environmental Change, 14, 303–313.

ii) Adaptation comprises actions that strengthen the adaptive capacities of the poor, including the management of the natural resources on which their livelihoods depend; manages risks; and uses resources in an efficient and sustainable manner to meet the needs of present and future generations.

iii) Adaptation in one sector or by one community does not undermine the resilience of others.

iv) Adaptation responses and mechanisms do not undermine long-term sustainability

4.0 Interlinking actions: concept of the food, water, and energy nexus

In the SADC region, the discourse on food, water, and energy security is driven by growing pressure on natural resources. The demand for food, water, and energy is growing steadily, but the resources required to generate them are limited and dwindling (Rockstro¨m et al., 2009)[7] The interdependencies among water, energy, and food are numerous and multidimensional, and their relationship is often called the food, water, and energy nexus (Fig. 1).

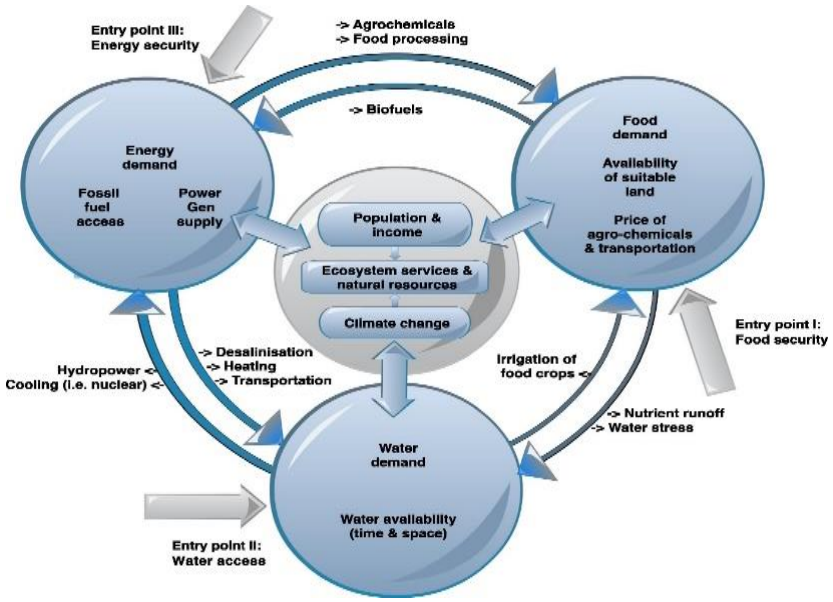

Fig. 1. The energy–water–food Nexus. Source: Smajgl et al (2015)

The Nexus approach aims for cross-sector coordination instead of sector specific optima to avoid unintended side-effects and negative sectoral trade-offs. In this approach, three discrete entry points

[7] Rockstro¨m, J., W. Steffen, K. Noone, A. Persson, F.S. Chapin, E.F. Lambin, and J.A. Foley. 2009. A safe operating space for humanity. Nature 461:472–475.

i.e. food security, water access and energy security introduce sector specific interests. Application of a sectorally balanced nexus approach acts as a device to stimulate debate to improve sectoral coordination – potentially to reconcile investments that would be treated as sub-optimal by individual sectors, but that ultimately improve overall system outcomes. Analysis reveals three possible classes of interventions: those targeted at single sectors; at inter-sectoral links manifest as critical nodes, and at altering the status of core nexus drivers. While the discourse on this nexus has been gaining currency (Hussey and Pittock, 2012)[8], it is not yet clearly understood how the concept can be applied to ensure food, water, and energy security, although, going forward, understanding the different interfaces in the food, water, and energy nexus will be critical for acting. Three interfaces are relevant in the discourse. First, the water with food and energy interface where water plays a vital role in both food and energy production, and in sustaining the ecosystems that support agriculture and other economic activities critical for achieving food security (Hellegers et al., 2008)[9]. Secondly, the energy with food and water. Energy is required for food production (especially irrigation) and for water supply, including the extraction, purification, and distribution of water (Bach et al., 2012)[10]. Finally, the food production interface as a consumer of land, energy, and water. Agriculture as a domain for growing food, is a major user of water (more than 70% of all water use globally) and energy. Agriculture and food production further affect the water sector through land degradation, changes in runoff, and disruption of groundwater discharge (Alauddin and Quiggin, 2008)[11]. Sustainable agricultural practices, such as those designed to prevent land degradation, save water and energy by increasing water storage in the soil and groundwater recharge and by reducing the use of energy-intensive production practices.

The foregoing relationships among food, energy, and water are dynamic. Actions in one area usually have impacts in one or both others, with profound economic, environmental, and social implications. Indeed, the security of one sector often cannot be achieved without undermining another sector (Lele et al., 2013)[12]. The environmental footprints associated with increased water and energy use for food

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8 Hussey, K. and J. Pittock. 2012. The energy–water nexus: Managing the links between energy and water for a sustainable future. Ecology and Society 17(1): 31–39.

9 Hellegers, P. J. G. J., D. Zilberman, P. Steduto, P., and P. McCornick. 2008. Interactions among water, energy, food and environment: Evolving perspectives and policy issues. Water Policy, 10(Suppl. 1), 1–10.

10 Bach, H., J. Bird, T.J. Clausen, K.M. Jensen, R.B. Lange, R. Taylor, and A. Wolf. 2012. Transboundary river basin management: Addressing water, energy and food security. Lao PDR: Mekong River Commission.

11 Alauddin, M., and J. Quiggin. 2008. Agricultural intensification, irrigation and environment in South Asia: Issues and policy options. Ecological Economics, 65(1):111–124.

12 Lele, U., M. Klousia-Marquis and S. Goswami. 2013. Good governance for food, water and energy security. Aquatic Procedia, 1, 44–63.

production impose external costs to water and ecosystems, thus threatening the sustainability and resilience of global water and food systems and demonstrates the need for integrated solutions.

5.0 Key Principles of the Nexus Approach

The nexus approach can be summarized as follows:

a) Understand the interdependence of subsystems within a system across space and time and focus on system efficiency rather than the productivity of individual sectors to provide integrated solutions that contribute to water, energy, and food policy objectives.
b) Recognize the interdependence between water, energy, and food and promote economically rational decision making and efficient use of these resources in an environmentally responsible manner.
c) Identify integrated policy solutions to minimize trade-offs and maximize synergies across sectors, and encourage mutually beneficial responses that enhance the potential for cooperation between and among all sectors, and public–private partnership at multiple scales. B Ensure policy coherence and coordination across sectors and stakeholders to build synergies and generate co-benefits to produce more with less and contribute to long-term sustainability with limited environmental impact.
d) Value the natural capital of land, water, energy, and ecosystems and encourage business to support the transition to sustainability.

The foregoing principles derive from the water, energy, and food nexus and adaptation responses are interlinked in numerous ways (Fig. 2).

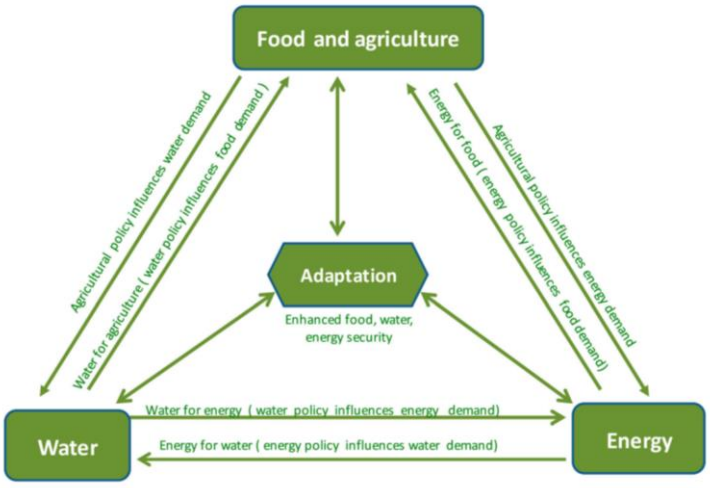

Fig. 2. The interfaces among water, energy, food, and adaptation. Source:Raul and Sharma (2016).

It is critically important for policy makers in the region to understand the linkages between the water, energy, and food nexus and adaptation when devising sustainable adaptation strategies. The SADC region is dynamic in terms of population growth, economic progress, urbanization, and industrialization. The demographic, economic, and environmental changes in in the region have increased the demand for resources, including food, water, and energy, and intensified their use, which has serious implications for adaptation strategies to ensure food, water, and energy security. Southern Africa is particularly vulnerable to climate change impact, with most of the population increasingly exposed to growing physical, social, and economic risks and vulnerability in the face of looming water, food, and energy security challenges. The following are amongst the most critical challenges: increasing population and declining agricultural land; stagnating and declining food production; and increasingly water- and energy-intensive food production in the face of water and energy scarcity.

Despite the complex interdependency of food, water, and energy among competing uses, each country in the region has put forward a NAPA to address the adverse impacts of climate change using a sectoral adaptation approach, with little or no attention being paid to a nexus-based system wise adaptation approach to deal with the vulnerability to climatic and non-climatic changes. Considering that water, energy, and food are vital resources for poverty and vulnerability reduction, it is critically important to prioritize and devise an integrated adaptation option based on a nexus assessment that reduces vulnerability to both climate and non-climate changes.

To move from a sectoral approach to a holistic approach an appropriate framework is required. For illustration, a generic framework for a nexus-based approach to sustainable adaptation is outlined here (Fig. 3).

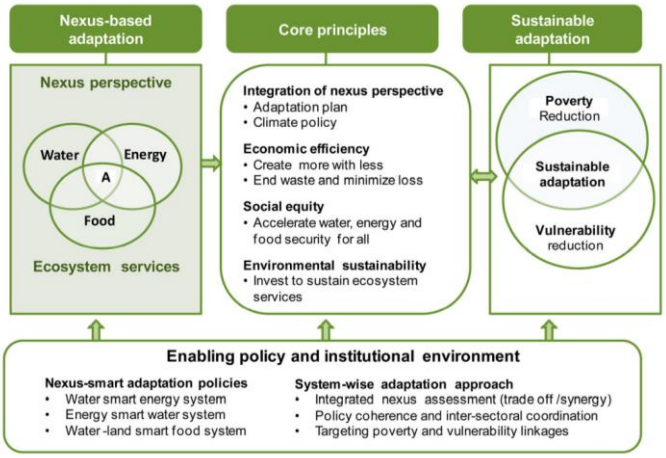

Fig. 3. Outline for a nexus-based adaptation framework. Source: Rasul and Sharma (2016)

Area A in the Venn diagram represents the situation of an integrated nexus-based response strategy for sustainable adaptation to ensure the security of all three sectors. The central area represents the core principles of a nexus smart policy and the associated outcomes that underpin the three sustainability dimensions: economic (increasing resource efficiency), social (accelerating access for all), and environmental (investing to sustain ecosystem services). This presupposes a climate smart adaptation policy that not only improves the efficiency of resource use among the nexus sectors, but also takes a broader view of the impact of resource use on the overall environment and societal well-being. Finally, the third area stresses the need to target the vulnerability–poverty linkages (overlap between poverty eradication and vulnerability reduction) to reduce poverty and vulnerability concurrently, rather than treating them separately, in order to ensure that adaptation solutions are sustainable. All three areas must be underpinned by an enabling environment.

Since the adaptive capacity of those affected by climate change ultimately depends on their access to poverty reducing opportunities, adaptation plans can only be effective if they are built into the wider development agenda. This is necessary to ensure that adaptation policies do not work counter to development efforts – so-called 'maladaptation'. The framework illustrates the need to understand how the context of vulnerability to both climate and non-climate change influences the development of poverty and how people adjust their adaptation strategies, before devising a nexus-based response strategy. It stresses the need to improve cross-sector and cross-border cooperation and coherence of efforts to properly tackle the nexus-based adaptation challenge.

I find the following broad recommendations (Rasul and Sharma, 2016)[13] timely and urgent in the SADC region:

a) Integrate the nexus perspective into adaptation plans and the adaptation perspective into development plans for better policy integration. For effective integration, it is critical to recognize the importance of the nexus perspective and to integrate multiple policy objectives and increase stakeholder collaboration in sustainable adaptation and development planning and decision making.
b) Deepen the nexus knowledge base and internalize it into development and adaptation plans. Knowledge and understanding of the interlinkages between the nexus perspective and adaptation plans and responses are limited, so deepening the nexus knowledge base and developing mechanisms to strengthen institutions and internalize this knowledge in the planning process through nexus-based assessment and prioritization will be critical for effective adaptation.
c) Promote a system-wise adaptation approach. Move from a sectoral to a trans-sectoral approach so that different adaptation responses and measures support each other, synergy is enhanced, and trade-offs are minimized.
d) Promote win–win options for nexus security and adaptation to climate change. Enhance the efficiency and productivity of resource use and increase multiple uses of resources through economic incentives, governance, institutional and policy coherence, and the promotion of public–private partnerships to increase the benefit from productive ecosystems.
e) Create and support an enabling environment. Strengthen policy integration between nexus and adaptation mechanisms across sectors at different scales and among the major actors (public–private–civil society partnerships) and strengthen institutional capacity for coordinating the water, energy, and food nexus and adaptation in a holistic way.

Invest in nexus smart infrastructure, multifunctional ecosystems, and innovative technologies and institutions. Provide policy and institutional support for attracting investment in green infrastructure and design mechanisms to internalize externalities (environmental and social costs) into decision making by introducing appropriate

[13] Rasul G. and B. Sharma. 2016. The nexus approach to water–energy–food security: an option for adaptation to climate change. Climate Policy 16 (6):682-702. DOI: 10.1080/14693062.2015.1029865