

**PROMOTING THE WATER, ENERGY AND FOOD NEXUS APPROACH  
AND YOUTH EMPOWERMENT FOR SUSTAINABLE DEVELOPMENT**

*BACKGROUND PAPER PRESENTED AT THE 9<sup>TH</sup> SADC MULTI-STAKEHOLDER WATER  
DIALOGUE*

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## LIST OF ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
AYA	Advancing Youth Activity
CAADP	Comprehensive Africa Agriculture Development Programme
DRC	Democratic Republic of Congo
ESA	Eastern and Southern Africa
ESP	Energy Sector Plan
EU	European Union
FANRPAN	Food, Agriculture and Natural Resources Policy Analysis Network
FAO	Food and Agricultural Organization
HIV	Human Immunodeficiency Virus
IFPRI	International Food Policy Research Institute
IWRM	Integrated Water Resources Management
MAPP	Multi-Country Agricultural Productivity Programme
OECD	Organisation for Economic Co-operation and Development ();
PoSW	Protocol on Shared Watercourses
RAIP	Regional Agricultural Investment Plan
RAP	Regional Agricultural Policy
REASAP	Regional Energy Access Strategic Action Plan
RIDMP	Regional Infrastructure Development Master Plan
RISDP	Regional Indicative Strategic Development Plan
RSAP	Regional Strategic Action Plans
RWS	Regional Water Strategy
SADC	Southern African Development Community
SANE	Strengthening Agricultural and Nutrition Extension
SAPP	Southern African Power Pool
SDGs	Sustainable Development Goals
SEI	Stockholm Environment Institute
SELF	Solar Electric Light Fund
SIWI	Stockholm International Water Institute
SNV	Netherlands Development Organisation
STIs	Sexually Transmitted Infections
TERI	The Energy and Resources Institute
TVET	Technical and Vocational Education and Training
USAID	U.S. Agency for International Development
WEF	Water-Energy-Food
WESSA	Water and Energy programme of Wildlife & Environment Society of South Africa
YEE	Youth Economic Empowerment
YEPs	Youth Empowerment Programs

## 1 INTRODUCTION

### 1.1 Brief introduction to the SADC and its objectives

The Southern African Development Community (SADC) is a Regional Economic Community comprising 16 Member States; Angola, Botswana, Comoros, Democratic Republic of Congo (DRC), Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia and Zimbabwe. Established in 1992, SADC is committed to Regional Integration and poverty eradication within Southern Africa through economic development and ensuring peace and security. The main objectives of SADC are to achieve development, peace and security, and economic growth, to alleviate poverty, enhance the standard and quality of life of the peoples of Southern Africa, and support the socially disadvantaged through regional integration, built on democratic principles and equitable and sustainable development (SADC, 1993). The Vision of SADC is to build a region in which there will be a high degree of harmonisation and rationalisation, to enable the pooling of resources to achieve collective self-reliance in order to improve the living standards of the people of the region. The mission of SADC is to promote sustainable and equitable economic growth and socio-economic development through efficient, productive systems, deeper co-operation and integration, good governance, and durable peace and security; so that the region emerges as a competitive and effective player in international relations and the world economy (SADC, 1993).

### 1.2 The SADC Multi-stakeholder Water Dialogue

The SADC Multi-Stakeholder Water Dialogue is a biennial event organised by the SADC Directorate of Infrastructure. It provides a forum for practitioners for water using and water influencing sectors to have a dialogue on pertinent issues that need to be addressed to deepen regional integration and address poverty in the region. The underlying objective is to ensure that the region unlocks the potential of sustainable water resources development in contributing to regional integration poverty eradication and socio-economic development. The Multi-Stakeholder Water Dialogue has been held since 2007 under the broad theme of: *Watering Development in SADC* and has been premised on raising the awareness and understanding of Integrated Water Resources Management (IWRM) approaches. Through interactive sessions stakeholders at the dialogue provide solutions and recommendations and these outcomes from the dialogue are taken forward into programmes and responses at different levels.

Through the subsidiarity principle of SADC, Global Water Partnership Southern Africa has been mandated to facilitate this process on behalf SADC Secretariat's Water Division since 2007. Regional cooperating partners in the water sector through the framework of the Water Strategy Reference Group (WSRG) contribute to the implementation of the Dialogue. For the 2019 Dialogue the base funding will come from the European Union (EU) supported SADC Nexus Dialogue Project which builds up from the 2013 Dialogue on Nexus Approaches. Over the past ten years, 8 Dialogues have been held with various themes.

### 1.3 The 9<sup>th</sup> Multi-stakeholder Water Dialogue

#### 1.3.1 Background to the 9<sup>th</sup> Dialogue

The SADC region has a young population, with an estimated 60% of its population under 24 years of age according to the 2015 SADC Statistical Yearbook<sup>1</sup>. Children aged 0–14 years constitute 39%, and youth aged between 15 and 35 (as defined by the African Youth Charter and the SADC Declaration on Youth Development and Empowerment) constitute 35% of an estimated population of 305 million. This constitutes a window of opportunity for investing in “a demographic dividend” whilst addressing gender inequalities and social exclusion. The SADC Heads of States and Government at the 38<sup>th</sup> SADC Summit endorsed the theme of “*Promoting Infrastructure Development and Youth Empowerment for Sustainable Development*” for the 2018/19. The Theme will take forward the SADC industrialization agenda, while focusing on infrastructure development, youth empowerment and sustainable development. SADC Heads of State and Government at the 38<sup>th</sup> SADC Summit, affirmed that promoting youth participation in the socio-economic and political agenda at regional and national levels would ensure their ownership and commitment to sustain development gains, with a sense of responsibility, patriotism and unity.

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<sup>1</sup> SADC Statistical Yearbook 2015

[https://www.sadc.int/files/6314/9727/7686/SADC\\_SYB\\_2015\\_Print\\_Version\\_final.pdf](https://www.sadc.int/files/6314/9727/7686/SADC_SYB_2015_Print_Version_final.pdf)

The 35<sup>th</sup> Summit of SADC Heads of State and Government held in August 2015 adopted the SADC Declaration on Youth Empowerment and Development as a high-level commitment to address youth issues with renewed determination. The declaration recognises that children and youth are the greatest resource available to address many challenges facing SADC and that investing in their development will empower them to be responsible and productive citizens.

The SADC Industrialisation Strategy and Roadmap (2015-2063) was approved in April 2015. This framework is aimed at driving industrial development and has been placed at the core of the developmental integration agenda of SADC. Inherent in this policy is recognition from SADC Member States that industrial development is central to diversification of their economies; development of productive capacity; and the creation of employment to reduce poverty and set their economies on a more sustainable growth path. Key to this is how in the region our youth are prepared for the Fourth Industrial Revolution.

### 1.3.2 Objectives of the 9<sup>th</sup> Dialogue

Based on the background described above which shows the need to promote youth empowerment at the same time the need to drive sustainable development in the region through the WEF security nexus – the overall objective to the 9<sup>th</sup> SADC Multi-Stakeholder Water Dialogue is **to promote the involvement and empowerment of youth in enhancing water security, energy security and food security in the SADC region**. The specific objectives of the Dialogue are:

1. To increase the understanding of the importance of youth engagement in promoting sustainable development;
2. To discuss and develop strategies that will ensure the role of youth in achieving WEF security in the SADC region;
3. To develop recommendations and actions that will be taken up by SADC, member states and key partners that will address the interrelated challenges and vulnerabilities facing the youth; and
4. To discuss the regional nexus framework for governance and investment, which will guide WEF security, with SADC stakeholders.

### 1.3.3 Expected outcomes of the 9<sup>th</sup> Dialogue

The expected outcomes of the 9<sup>th</sup> Dialogue are:

1. Increased understanding of youth involvement in driving the WEF security
2. Strategies aimed at ensuring the role of youth in WEF security is well defined
3. Recommendations and clear actions addressing identified challenges facing the youth supporting the implementation of the SADC Youth Strategy
4. Contributions from stakeholders to the regional WEF nexus operational framework

## 1.4 The purpose of the background paper

The overall goal of the background paper is to inform and guide the dialogue by providing the conceptual thinking, assessing the status of youth involvement, opportunities, barriers and proposing actions to move the agenda forward. The specific objectives of the paper are:

- To introduce the theme of the 9<sup>th</sup> SADC Multi-Stakeholder Water Dialogue
- To provide an in depth and critical analysis of the current situation based on experiences from around the world and
- To provide options and recommendations for SADC which will guide the discussions at the Dialogue.

## 2 THE WATER-ENERGY-FOOD NEXUS APPROACH: GLOBAL PERSPECTIVE

### 2.1 Global resources under pressure

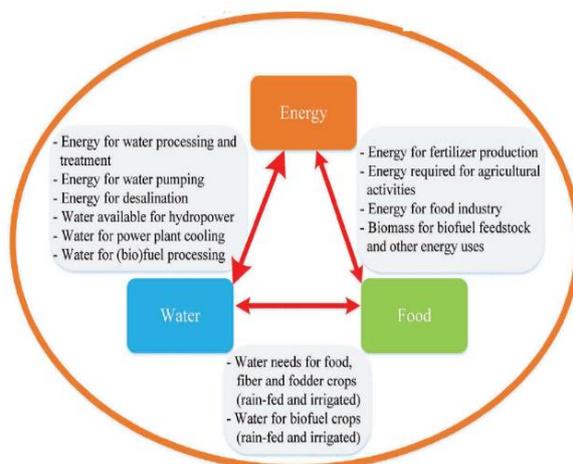
Agriculture accounts for about 70% of global water withdrawal (FAO, 2012). Roughly 75% of all industrial water withdrawals are used for energy production (WWAP, 2014). The food production and supply chain accounts for about 30% of total global energy consumption (WWAP, 2012) and 90% of global power generation is water-intensive (WWAP, 2014). Currently, 1.4bn people do not have sufficient electricity, and it is estimated that in 2030 1.2bn people will still lack access to electricity (Water Nexus Solutions, 2015). It is reported that global

water demand (in terms of water withdrawals) is projected to increase by 55% by 2050, mainly because of growing demands from manufacturing (400% increase) (WWAP, 2014). More than 40% of the global population is projected to be living in areas of severe water stress by 2050 (WWAP, 2014) and by 2035, water withdrawals for energy production could increase by 20% and consumption by 85% (WWAP, 2014). These projections indicate that the demand for food, water, and energy is growing steadily, but the resources required to generate them are limited and in many cases dwindling (State of the Planet Declaration, 2012).

It is estimated that 925 million people go hungry and that around 1 billion people suffer from the ‘hidden hunger’ (Water Nexus Solutions, 2015). World population is increasing by 6 million per month and an extra billion tonnes of cereals will be needed by 2030 (WWAP, 2014).

## 2.2 WEF nexus: interlinking actions

The interdependencies among water, energy, and food are numerous and multidimensional, and their relationship is often called the food, water, and energy nexus (Rasul and Sharma, 2016). One of the important interfaces in this nexus is that water plays a vital role in both food and energy production, and in sustaining the ecosystems that support agriculture and other economic activities that are critical for achieving food security (Fig. 1).



**Figure 1: The WEF inter-linkages**  
(Source: Liu et al., 2017)

The second important interface is that energy is required for food production (especially irrigation) and for water supply, including the extraction, purification, and distribution of water. Food production as a consumer of land, energy, and water is the third interface in the nexus. Agriculture, responsible for growing food, is a major user of water (more than 70% of all water use globally) and energy (Rasul and Sharma, 2016). Agriculture and food production further affect the water sector through land degradation, changes in runoff, and disruption of groundwater discharge. 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 fertilizers.

The nexus approach aims to systematize the interconnections and provide tools to assess the use of all resources. It is a system-wise approach, and recognizes the inherent interdependencies of the food, water, and energy sectors for resource use, seeks to optimize trade-offs and synergies, and recognizes social and environmental consequences. Understanding the linkages within the food, energy, and water nexus can provide opportunities to increase resource use efficiency and enhance cooperation and policy coherence among the three sectors (Rasul and Sharma, 2016).

In order to advance the notion of the WEF nexus, a number of global and regional conferences, workshops and meetings were held in 2011–2012, during the preparation phase for Rio+20 in June 2012 (Bizikova et al., 2013). An overview of these initiatives is listed in Table 1. Conferences and workshops that focused on elements of the WEF nexus at the global level included: 6th World Water Forum, Bonn 2011 Nexus Conference, World Congress on Water, Climate and Energy, and Water–Energy–Food Security: New Challenges and New Solutions for Water Management (Bizikova et al, 2013). At the regional level, gatherings included: the Mekong2Rio International Conference on Transboundary River Basin Management; Asian Irrigation Forum; South African Water, Energy and Food Forum: Managing the Mega-Nexus; and 10th Gulf Water Conference in Doha. The key focus of these initiatives was to promote the WEF nexus by raising awareness, emphasizing the urgency of challenges related to WEF, providing forums for international dialogue, and suggesting policy and investment recommendations.

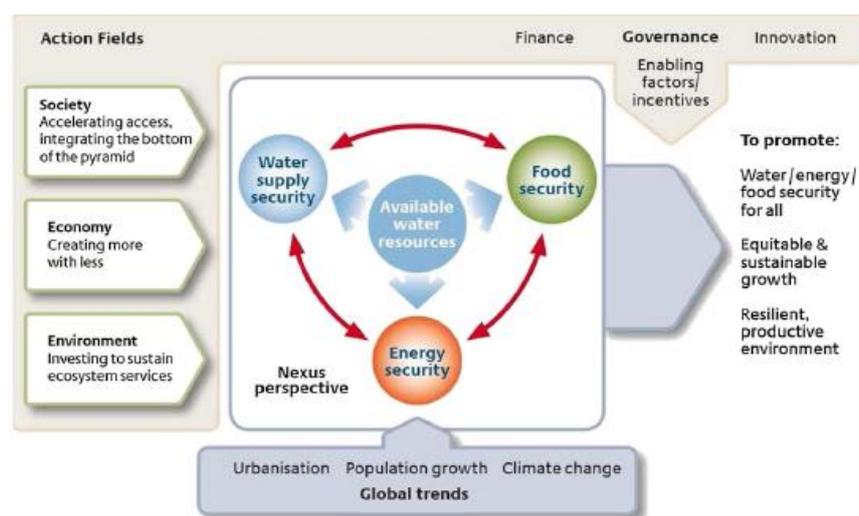
**Table 1: Examples of events on the WEF nexus held during 2011–2012**

Title/Name of the Conference/Workshop	Location
Bonn2011 Nexus Conference	Bonn
Mekong2Rio International Conference on Transboundary River Basin Management	Vientiane
6th World Water Forum (water, energy and food are all included in the conference's priorities)	Marseille
Water–Energy–Food Security: New challenges and new solutions for water management	Winnipeg
Water, Energy, Environment and Food Nexus: Solutions and adaptation under changing climate	Lahore
South African Water, Energy and Food Forum: “Managing the mega-nexus	Sandton
Powering Progress Together: Forum on Energy, Water and Food <sup>8</sup> Forum sponsored by Shell and the City of Rotterdam	Rotterdam
Corporate Sustainability in Africa 2012: “Living in the water, food and energy nexus”	Johannesburg
Water Food Energy Nexus—Blue aquaculture as an integrative part to minimize use of resources for animal and plant production	Berlin
“Food Energy Water (for all)” (organized by ReSource)	Oxford
Managing Water, Energy, & Food in an Uncertain World (Universities Council on Water Resources UCOWR)	Santa Fe
World Water Week (theme for 2012 was water and food security)	Stockholm
10th Gulf Water conference	Doha

(Source: Bizikova et al., 2013)

### 2.3 WEF nexus frameworks

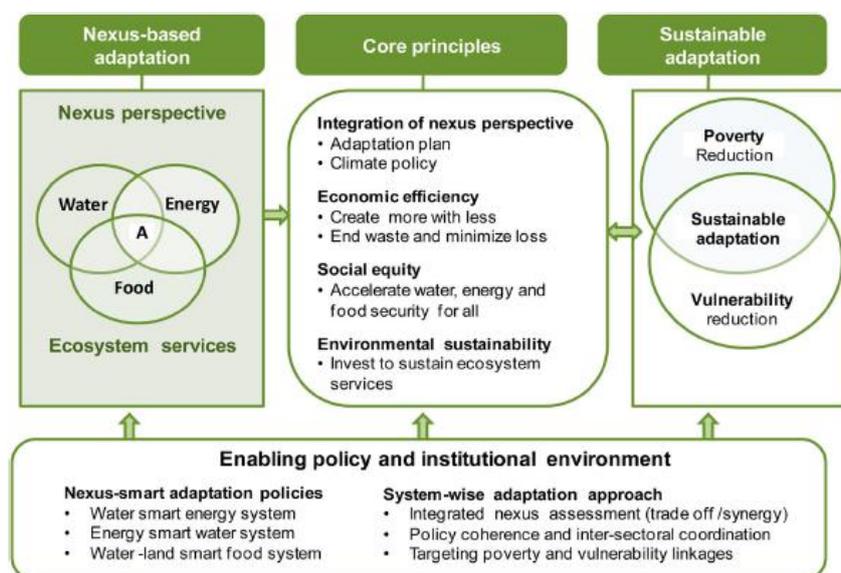
Since the issue of WEF nexus became a global concern, a number of frameworks that define the relationships between the WEF elements and the character of potential responses within the WEF nexus have been developed. These include those by Hoff (2011) (Fig. 2), Rasul in 2012 and the World Economic Forum in 2011. Many of the current frameworks have been developed by academic institutions such as the Stockholm Environment Institute (SEI); International Food Policy Research Institute (IFPRI); University of Pennsylvania; University of Montreal; Stockholm International Water Institute (SIWI) and The Energy and Resources Institute (TERI); international organizations, including United Nations agencies, the World Bank and Organisation for Economic Co-operation and Development (OECD); World Economic Forum (WEF); and private entities such as the Swiss Reinsurance Company (Bizikova et al., 2013).



**Figure 2: The WEF security nexus framework suggested for the bonn2011 nexus conference**  
(Source: Source: Hoff, 2011)

Figure 2 depicts Hoff's (2011) nexus framework that integrates global trends (drivers) with fields of action (e.g. finance) with available water resources at the centre. This framework was developed at the time when the water sector was driving the nexus debate.

Another global trend on the nexus has been the development of a WEF nexus-based framework for sustainable adaptation. As developing countries face a difficult challenge in meeting the growing demands of the population for food, water, and energy, and the problem is further compounded by climate change (Rasul and Sharma, 2016), understanding the role of the water, energy, and food nexus in adaptation is one of keys to designing effective adaptation policies and strategies. This involves moving from a sectoral approach to a holistic approach. To this end, a framework for a nexus-based approach to sustainable adaptation was developed (Fig. 3).

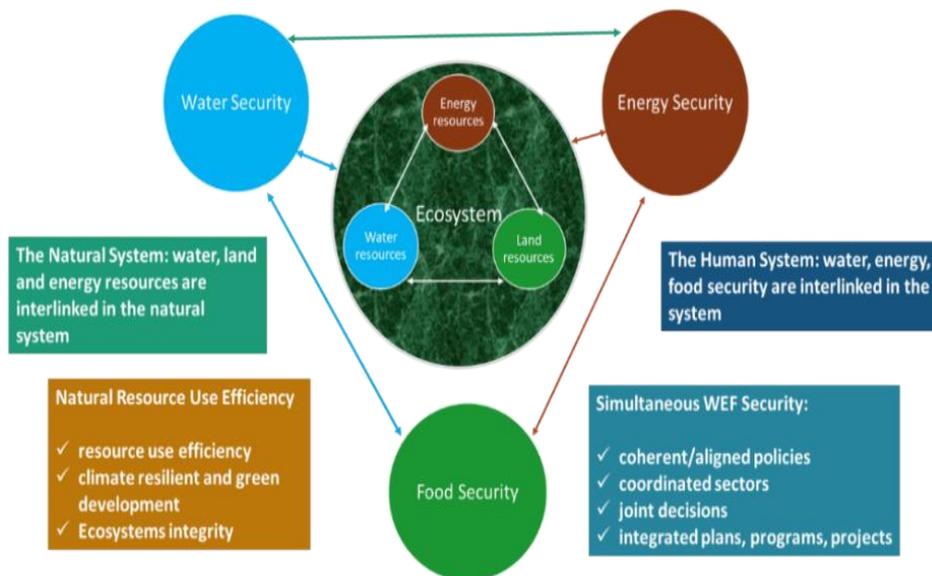


**Figure 3: A WEF nexus-based adaptation framework**  
(Source: Rasul and Sharma, 2016)

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) (Rasul and Sharma, 2016). This means that we should devise 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.

## 2.4 The SADC WEF nexus framework

Water, energy and food (WEF) security are key priority areas for SADC as noted in 2018 by the Ministers in charge of food security, water security and energy security in their reports to the SADC Council of Ministers. Integrated planning of water, food and energy sectors and promoting regional cooperation has been considered as a strategy to simultaneously meet water, energy and food security targets, and to improve natural resource use efficiencies in the region. WEF security nexus acknowledges that water security, food security and energy security are inextricably linked and that actions in any one area usually have impacts in the others. As the population increases, with increasing demands for basic services, and growing desires for higher living standards, the need for a more efficient utilization of the vital resources (water, land, energy) is required. At the middle of all this are the youth – who need jobs and will be impacted by the decisions made now. SADC is now driving a process to develop a framework for nexus governance and investments – and this is critical in guiding planning in the region going forward. This framework for governance and investments will be based on a SADC WEF Nexus Conceptual Framework shown in Fig. 4 below.



**Figure 4: SADC WEF Nexus Conceptual Framework**  
(Source: SADC, 2019)

The SADC framework is based on broad ecosystem approach which has a natural system integration and human system integration. The natural systems integration includes climate change adaptation and environmental security while the human system integration covers livelihood security. Hence, the SADC framework covers all the aspects which are in the water-centred framework (Fig. 2) and in the nexus-based adaptation framework (Fig. 3).

## 2.5 Case study on application of WEF nexus approach

### Pilot project on solar powered drip irrigation system in Benin

In 2007, with support from Stanford's Woods Institute for the Environment, Burney and her colleagues partnered with the non-profit Solar Electric Light Fund (SELF) on a pilot irrigation project in rural Benin. SELF financed and led the installation of three solar-powered drip irrigation systems in two villages in Benin's Kalalé district. Each system was used by a local women's agricultural group, which typically consisted of 30 to 35 women who shared the maintenance costs of the new irrigation technology (Dean, 2010). In Kalalé, 80 percent of the villagers lived on less than \$1.25 per day, which was representative of a number of poor, rural communities in Africa. In rural Benin, women and girls traditionally are responsible for hauling water by hand, often from very long distances. The solar-powered irrigation systems were designed to free them from hauling water to grow vegetable crops, particularly during the dry season (Figs. 5 and 6).



**Figure 5: A woman cleans a solar panel that powers the drip irrigation system in Benin**  
(Photo: Marshall Burke)



**Figure 6: The crops watered by a solar-powered drip irrigation system in Benin**  
(Photo: Marshall Burke)

## Benefits of the project

**Improved food and nutrition security:** The three solar-powered irrigation systems supplied on average 1.9 metric tons of produce per month, including such high-valued crops as tomatoes, okra, peppers, eggplants and carrots. In villages irrigated with solar-powered systems, vegetable intake increased to three to five servings per day – the U.S. Department of Agriculture's Recommended Daily Allowance for vegetables – with most of the improvement taking place during the long dry season. In a world where 20 to 25 percent of global disease burden for children is due to malnutrition, such improvements could have a large impact over time.

**Reduced labour and time:** In rural Benin, women and girls traditionally are responsible for hauling water by hand, often from very long distances to grow vegetable crop in hand-watered gardens. The solar-powered irrigation systems freed women and girls from the drudgery of hauling water from long distances.

**Increased household income:** Women who used solar-powered irrigation became strong net producers of vegetables and earned extra income from sales, allowing them to significantly increase their purchases of high-protein food and other staples during the dry season

**Sustainability:** Each solar-powered drip irrigation system is about 0.5 hectare in size, cost was approximately \$18,000 to install and required about \$5,750 a year to maintain. From the earnings of the farmers, the system paid for itself in about 2.3 years.

**Clean energy:** Solar-powered irrigation provides a cleaner source of energy (emissions free) that is less susceptible to global price fluctuations.

**WEF nexus approach application:** The case study on women's farming groups in rural Benin revealed that solar-powered drip irrigation – a clean, cost-competitive technology – significantly improved nutrition and food security as well as household incomes in one year. The study shows that solar-powered pumps installed in remote villages can provide a cost-effective way of delivering irrigation water, particularly during the long dry season. The nexus between energy, water, food, security and development is very clear in this project. Clear again, is the huge role that renewable energy can play in creating new economic opportunities, and bringing water, and food, to poor communities.

## 3 WATER, ENERGY AND FOOD SECURITY IN THE SADC REGION

### 3.1 Water, energy and food security for sustainable development in the SADC Region

The SADC countries are endowed with different amounts of water, energy, and land for agricultural production. From the humid and well-watered regions of northern Democratic Republic of Congo, to the deserts along the Namibian coastline, there are extremely different climates within SADC (Schreiner and Baleta, 2015). In addition to spatial variability, climate within the SADC region is also temporally variable, with many parts of the region experiencing multi-year droughts and frequent floods. Combined with the differential endowment of natural resources is the fact that there is enormous variation in the level of development of these resources among the SADC member states. In some states these resources are relatively well developed, while in others there is still significant scope for further development. The relative level of endowment changes the opportunities and costs of integrating resource use across the region.

### 3.2 Opportunities for improving WEF security through nexus approach in SADC

The nexus approach provides a framework for addressing competition for resources and enhancing resource use efficiency with a cross-sectoral focus (Rasul, 2014). Water, energy and food security are key priority areas for SADC. Integrated planning of water, energy and food sectors, and promoting regional cooperation have been considered as a strategy to meet water, energy and food security targets, and to improve efficiency in natural resource use in the region. The WEF nexus is an approach that can be applied at different scales and contexts. The SADC WEF Nexus Operational Framework is expected to provide overall guidance and tools to make decisions, coordinate between different sectors and facilitate nexus investments in the SADC region. The goal is

to inform investment, decision making and associated risk management to ensure optimization of water, energy and food security.

There are numerous areas of opportunity for sustainably improving water, energy and food security through a nexus approach emerged when compiling this paper. These include: enabling environment; Potentials for exploiting available WEF resources in the region; increasing resource productivity; using waste as a resource in multi-use systems; stimulating development through economic incentives; governance, institutions and policy coherence; benefiting from productive ecosystems; integrated poverty alleviation and green growth; capacity building and awareness raising and supporting a green economy.

### 3.2.1 Enabling Environment

The greatest opportunity is the political commitment of SADC member states which is demonstrated through the SADC Council Decision (Aug 2018) which called for strengthened collaboration between Water, Energy and Food Sectors in the region. Another important enabling factor is the commitment of the member states to the Revised Regional Indicative Strategic Development Plan (RISDP), 2015-2020, which is the blueprint for SADC’s regional integration agenda – the process whereby the Member States agree to integrate their markets, co-operate and work closely together to achieve peace, stability and wealth (SADC, 2017). This provides the perfect enabling environment for effective implementation of the WEF nexus approach at regional level.

The other great opportunity for implementing the WEF nexus approach in the SADC region is the fact that SADC has put in place WEF sectoral and multi-sectoral frameworks in the form of policies, strategies, plans and programs (Table 2), and institutional arrangements (Table 3).

**Table 2: SADC Priority Frameworks: WEF Sector Policies/Strategies/Plans/Programs**

Water	Energy	Food
<ul style="list-style-type: none"> <li>▪ Regional Protocol on shared Watercourses (2000)</li> <li>▪ Regional Water Policy (2005)</li> <li>▪ Regional Water Strategy (2006)</li> <li>▪ Regional CCA Strategy (2011)</li> <li>▪ The Southern African Vision for Water, Life and the Environment in the 21st Century (2000)</li> <li>▪ The SADC Guidelines for Strengthening River Basin Organisations (2010)</li> <li>▪ Climate Change Adaptation in SADC: a Strategy for the Water Sector (2011)</li> </ul>	<ul style="list-style-type: none"> <li>▪ SADC Protocol on Energy ( 1996)</li> <li>▪ Regional Energy Access Strategy and Action Plan (REASAP) (2010)</li> <li>▪ Regional Infrastructure Development Master Plan (RIDMP) and Energy Sector Plan 2012 - 2027</li> <li>▪ Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP) 2016;</li> <li>▪ Market &amp; Investment Framework for SADC Power Projects (2016);</li> <li>▪ SAPP Power Generation and Transmission Master Plan (SAPP Pool Plan) (2017 – 2040)</li> <li>• SADC Biofuels Decision Making Tool (2010)</li> <li>• Framework for Sustainable Biofuels – (2010)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Regional Agricultural Policy (RAP) (2014)</li> <li>▪ Regional Agricultural Investment Plan (RAIP, 2017-2022)</li> <li>▪ SADC Food and Nutrition Strategy (2015-2025) (2014)</li> <li>▪ Regional Agricultural Fund</li> <li>▪ Protocol on Fisheries (2001)</li> <li>▪ Dar-es-Salaam Declaration on Agriculture and Food Security in the SADC Region (2004)</li> <li>▪ SADC Multi-Country Agricultural Productivity Programme (MAPP, 2008)</li> </ul>
<b>Multi-sectoral instruments</b>		
<ul style="list-style-type: none"> <li>▪ SADC Regional Indicative Strategic Development Plan (RISDP-2001/rev2007/2015)</li> <li>▪ The Regional Infrastructure Development Master Plan (RIDMP - 2012)</li> <li>▪ The SADC Industrialisation Strategy and Roadmap (2015-2063) (2015)</li> <li>▪ SADC Climate Change Adaptation Strategy for the Water Sector (CCASWS - 2012) – building resilience</li> <li>• SADC Declaration on Infrastructure Development (2014)</li> </ul>		

(Source: SADC, 2016a)

**Table 3: SADC Priority Frameworks - WEF Sector Institutional Arrangements**

Water	Energy	Food
<ul style="list-style-type: none"> <li>▪ SADC Water Ministers</li> <li>▪ Committee of Water Ministers</li> <li>▪ Water Resources Technical Committee</li> <li>▪ Sub-Committees [S-Water, G-Water, WQ]</li> <li>▪ Subsidiary Organisations</li> <li>▪ Sub-Regional: Shared Watercourse Institutions                             <ul style="list-style-type: none"> <li>• Water Governance ...RBOs</li> <li>• Joint Transboundary Project Cooperation : RBAs</li> </ul> </li> <li>▪ National: Departments of Water Affairs</li> </ul>	<ul style="list-style-type: none"> <li>• SADC Energy Ministers</li> <li>• Task Force-Energy Projects</li> <li>• Energy Technical Committee</li> <li>• Subsidiary organizations-RERA, SACREEE, SAPP</li> <li>• National: Departments of Energy</li> </ul>	<ul style="list-style-type: none"> <li>▪ SADC Agriculture Ministers</li> <li>▪ Task Force-Agricultural Projects</li> <li>▪ Agricultural Technical Committee</li> <li>▪ Subsidiary organizations-CCARDESA</li> <li>▪ National: Departments of Agriculture</li> <li>▪</li> </ul>
Ministries of Finance/Economic Planning		
Ministries of Environment and Climate Change		

(Source: SADC, 2016a)

The SADC Treaty is the overarching framework for the region. Its main objectives are to achieve economic development, peace and security, and growth; alleviate poverty; enhance the standard and quality of life of the peoples of Southern Africa; and “support the socially disadvantaged through regional integration” (SADC, 1993). Article 22(1) of the SADC Treaty provides that member states should conclude a series of protocols with clearly stipulated objectives and scope as well as institutional mechanisms to address the specific issues that underlie co-operation and integration. The first of these Protocols is the SADC Protocol on Shared Watercourses (PoSW) the main objective (Article 2) of which is to “foster closer co-operation for judicious, sustainable, and co-ordinated management, protection and utilization of shared watercourses, and advance SADC’s agenda of regional integration and poverty alleviation”. As a result of the PoSW, and the co-operative approach to shared basins in the region, most of the significant shared river basins have basin level agreements in place which are aligned with the PoSW. Table 1 also presents other instruments which deal with energy and agriculture in the region.

The SADC region has also set WEF sector targets to achieve by 2027 (Table 4).

**Table 4: The SADC Regional Context: Sectoral Development Targets**

Sectors	Potential	Baseline (2012)	Targeted Plan (2027)
1. Hydropower	150 GW	12 GW	Increase to 75 GW (50% of the sector’s potential)
2. Irrigation	50 M has	3.4 M has	Increase to 10 M hectares (13% of the potential land available)
3. Water Storage: Annual renewable WR	2,300 km <sup>3</sup>	14% retained	Increase to 25%
4. Access to Safe drinking water		61%	Increase to 75%
5 Access to Safe sanitation		39%	Increase to 75%

(Source: SADC RIDMP (2012-2027))

These frameworks and targets provide the necessary enabling environment for SADC to effectively implement the WEF nexus approach.

### **3.2.2 Water Resources**

The SADC renewable water resources are about 2,300 km<sup>3</sup>/yr but current level of abstraction is 44 km<sup>3</sup>/yr, and only 14 per cent of the total annual renewable water resources is currently stored (Schreiner and Baleta, 2015). The available water which is used in the region is about 5%. Over 70 per cent of the SADC fresh water resources are shared between two or more member states, resulting in the development of regional instruments to support joint management and development of the shared water resources (SADC, 2012a). These instruments including: the Revised Protocol on Shared Watercourses (SADC, 2000); the Regional Water Policy (SADC, 2005); the Regional Water Strategy (SADC, 2006); and the Regional Strategic Action Plan on Integrated Water Resources and Development Management (SADC, 2011). The SADC Regional Water Policy is implemented through a Regional Strategic Action Plan (RSAP), a 5-year regional water program, and the current RSAP IV (2016-2020) consists of eight programs, out of which one is a water, energy and food (WEF) security nexus.

### **3.2.3 Energy Resources**

SADC is well endowed with energy resources, and yet only 48% of the total population in the region have access to electricity in terms of connectivity. The SADC region has vast energy potential from solar, wind, nuclear, hydro, thermal, gas and petroleum sources in several countries (SADC and SARDC, 2016). However, biomass is by far the major source of energy in most SADC Member States. Traditional biomass such as wood and charcoal accounts for more than 45 percent of final energy consumption in the region, according to a report by the Renewable Energy Policy Network for the 21st Century (REN21, 2015). Despite the abundance of energy resources, access to electricity in the region is low: 24 per cent of residents have access (compared to 36 per cent in Eastern Africa, 44 per cent in Western Africa) and only 5 per cent in rural areas (SADC, 2012b). Only in South Africa and Mauritius is access to electricity high (70 per cent) and the majority of power generation is from coal (75 per cent), a significant contributor to greenhouse gas emissions (SADC, 2012b). The overall hydropower potential in SADC has been estimated at around 1,080 TWh/year (SADC, 2012b) and only 12 GW of the possible 150 GW of hydropower has been harnessed (SADC, 2011). The current utilized capacity is just under 31 TWh/year (Knowledge for Development, 2014). All this shows that there is need and potential for applying the WEF nexus approach in order to optimise exploitation of the regional energy resources.

### **3.2.4 Land resources**

About 55 per cent of the land area in southern Africa is classified as agricultural land (FAO, 2014). Only about 21 per cent of the region's 225.6 million ha of arable land is under cultivation (SADC, 2012c). There are about 50 million ha of irrigable land available in the region, of which only 3.4 million ha (7 per cent) is currently irrigated (SADC, 2011). There is, thus, extraordinary potential for the development of food and energy production in the region in order to meet the food and energy needs of the region, while still operating within sustainable use of fresh water resources. Most of the agriculture in the region is rainfed, largely produced by small-scale or subsistence farmers. Application of the WEF nexus approach is particularly of greatest interest to countries like Botswana, Namibia, South Africa and Zimbabwe which are water scarce, and are approaching the limits of their readily available fresh water resources (Turton, 2008).

## **3.3 Challenges associated with WEF security in SADC**

### **3.3.1 Income inequality and unemployment**

Countries with high per capita income in the sub-region seem also to have the highest income inequality between the rich and the poor. Namibia and South Africa, for example, are among the countries with the highest per capita incomes but they have also the highest income Gini-coefficients, South Africa at 63.1 and Namibia at 63.9 (UNECA, 2015). Mozambique and Swaziland, at the opposite end of the scale on per capita income, have income Gini-coefficients of 45.7 and 51.5 respectively (UNDP, 2013). Other statistics show that income inequality has also been increasing for low-income countries in the sub-region. Another challenge is that unemployment, especially for the youth, has been increasing despite the reported economic growth. Where youth unemployment exists alongside high vacancy rates, it is attributed to a mismatch between education skills and the job market. In many cases, however, unemployment is simply due to lack of employment opportunities.

### **3.3.2 Heterogeneity in WEF resource endowments and development**

Some of the challenges associated with WEF security in the SADC region are linked to the differences in WEF resource endowment and levels of economic development. While SADC can be characterized as a single economic block of strongly interlinked economies where water, energy and food flow between producers and consumers, it has considerable heterogeneity in its natural resource endowments and infrastructure distribution, socio-political cohesion and economic development. At both regional and national levels, this implies significant challenges in attempting to balance supply and demand while maintaining coherent policies towards integrated management of water– energy–food resources.

There are strong contrasts in food self-sufficiency with high cereal import dependency ratio in Eswatini (79%), Lesotho (85%), Botswana (90%), Namibia (65%) and Angola (55%) (Endo, 2017). Chronic and episodic food insecurity remain important problems at household and individual levels in the region dominated by poverty, environmental stressors and conflict.

Energy is a key driver for economic growth. Southern Africa is rich in renewable and non-renewable energy resources, including coal, oil and natural gas hydrocarbon resources, as well as significant deposits of uranium, a source of nuclear energy (Merven et al., 2010). Despite these rich natural resources, energy access and utilization are low by world standards. Outside South Africa, power consumption averages 124 kilowatt-hours per person per year or just about enough to power one light bulb per person for six hours a day (AfDB, 2010). The development and supply of energy in many parts of Southern Africa is still a critical resource constraint on development. Tackling it involves developing infrastructure (in terms of transmission networks) and energy in sufficient quantities to meet demand.

### **3.3.3 National sovereignty**

One of the forces that operate against the effective adoption of a regional nexus approach in the SADC region is the priority given to national sovereignty in the region. Implementation of the nexus approach becomes technically complex by sovereign food, electricity, and water security national interests of member states. For example, South Africa, despite the financial benefits from taking a more regional approach to energy generation, opted for a national approach in which the generation of sufficient power is largely within the control of the South African Government (Schreiner and Baleta, 2015).

### **3.3.4 Climate change**

Climate change is a growing threat to any sustainable future for the region. The extent and diversity of the climate-change threat to southern African livelihoods is becoming increasingly more apparent. The effects of changing temperatures and precipitation patterns will be felt in various sectors, including agriculture, forests, biodiversity and ecosystems, coasts, human settlements, water resources, energy and human health (UNECA, 2015). Hence, climate change poses a key uncertainty in the region and it makes the water-energy-food nexus approach both more important and more challenging. The climate change dimension worsens the above nexus situations, especially in light of pressures such as population growth, water-related disasters such as floods, droughts and sea water intrusion, which are on the increase (SADC, 2016a).

### **3.3.5 Silo mentality within and across the WEF sectors**

The rapidly increasing demand for energy by industry and mining, rapidly growing urban areas and agricultural intensification impose increasing strain on the water–energy–food nexus. The entrenched vertically structured government departments and sector-based structures of agencies, policies and regulatory mechanisms complicate coordination, and remain challenges to cross-sectoral integration.

### **3.3.6 Governance related challenges**

There are a number of governance related challenges that hinder effective implementation of the WEF nexus approach in the SADC region. Some of the region's sectoral plans and targets are uncoordinated. For example, the RIDMP targets were set for the agriculture, water, energy sectors without adequately considering the available water, land and energy resources of the region. There are sector-focused policies and institutions with inadequate coordination mechanisms, with limited recognition of the linkages between the water-energy-food resources. Programs are more sector-based such as energy sector development, agricultural sector development or water

sector supply service programs. The focus is on attaining sector-specific targets rather than meeting a comprehensive and integrated WEF targets. There inadequate sensitization/awareness, institutional capacities, knowledge and tools to carry out WEF nexus analysis and support decision making. There is general lack of practical cases that demonstrate the application of the WEF nexus approach in the region. There are inadequate multi-stakeholder and multi-sectoral platforms to facilitate dialogue between the sector institutions towards a balanced decision making process. The existing SADC Multi-Stakeholder Water Dialogues provide WEF nexus regional platforms but a wider forum with a balanced representation of water, energy and agriculture sectors is needed.

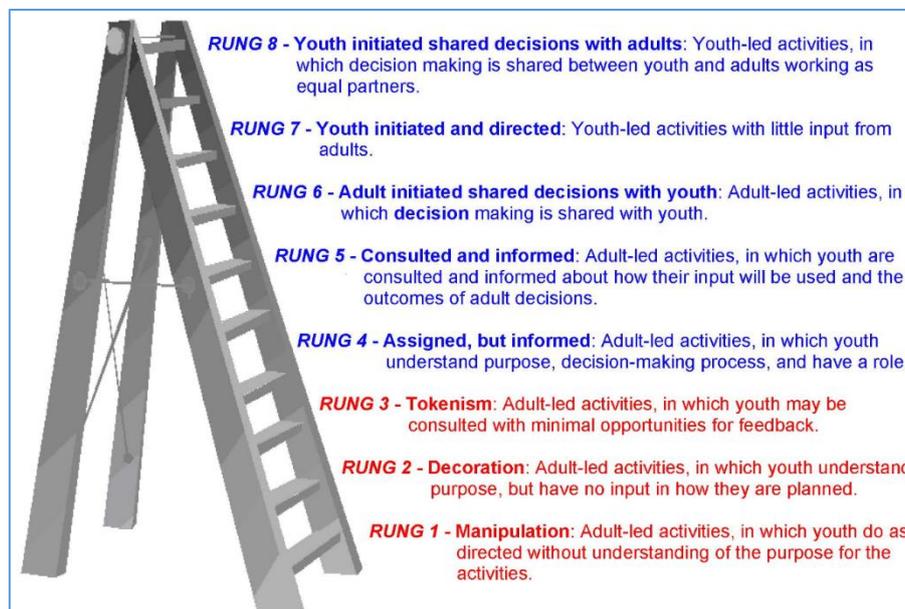
## 4 THE ROLE OF THE YOUTH IN SUSTAINABLE DEVELOPMENT IN THE SADC REGION

### 4.1 Definition of Youth

The term ‘youth’ carries a variety of meanings in different cultures and societies. Selvam (2008) defines youth as: ‘A window period between childhood and adulthood, often between the onset of puberty and marriage, which is marked by a restless energy, fast sprout of growth, hence also by extreme vulnerability, while being so rich in promise. The African Youth Charter “refers to the youth as every person between the ages of 15 and 35 years of age” (African Union Commission, 2006). The SADC policy framework adopts the African Union classification of the youth as persons between the ages of 15 and 35 years (SADC, 2016b).

### 4.2 Youth Participation

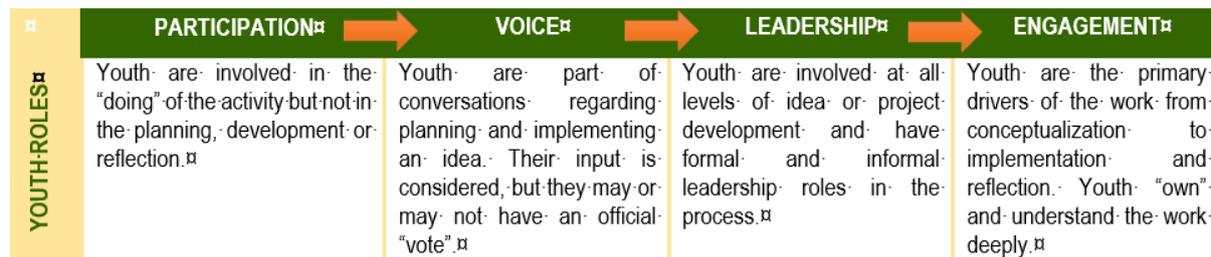
Youth participation is the **active engagement** of young people in decision-making processes on issues that affect them throughout their own communities. Young people make invaluable contributions to communities and are empowered themselves when they participate. Meaningful youth participation requires that the youth involved should have a chance to influence the decisions made on the policies. This is especially significant in those policies which have a direct impact on their day to day lives. In 1980 Roger Hart developed The Ladder of Participation in an effort to “organise” his thinking around children’s participation (Hart, 2008). Hart’s ladder depicts a linear ascension through types of participation, starting with three forms of non-participation (manipulation, decoration and tokenism) and rising through degrees of participation to end, at the top of the ladder, with ‘Child-initiated, shared decisions with adults’ (Fig. 7).



**Figure 7: Roger Hart’s ladder of youth participation**  
(Adapted from Hart, 1992; Hart, 2008 and Mhlongo, 2016)

### 4.3 Youth Involvement, engagement and empowerment

Youth involvement refers to the act or process of the youth taking part in socio-economic development activities. The continuum of youth involvement stretches from participation through having voices and leadership to engagement (Fig. 8)



**Figure 8: The continuum of youth involvement**

(Source: Anderson Williams: [http://www.ncjfcj.org/sites/default/files/Engaging\\_Youth\\_Materials.pdf](http://www.ncjfcj.org/sites/default/files/Engaging_Youth_Materials.pdf))

Youth engagement is the result when young people are involved in responsible, challenging actions to create positive social change. This means involving youth in planning and in making decisions that affect themselves and others. Youth engagement happens in **youth-adult partnerships** that are structured so that both groups contribute, teach, and learn from each other. Youth engagement refers to youth participation to a wider scope of activities that empower young people by involving them in their communities.

Youth empowerment refers to young people having greater control of their lives through **participation and engagement**. Youth Empowerment Programs (YEPs) are interventions that regularly involve young people as partners and participants in the decision-making processes that determine program goals, planning and/or implementation. With the support of caring adults, YEPs engage young people in program leadership as a characteristic of their involvement in safe, positive, and structured activities outside of formal education. Common examples of YEPs are found in particular youth councils, teen centres, community-based participatory research programs, social action and advocacy groups, peer education models, and informal and non-formal education programs that regularly integrate youth participation in program decision-making, as stated above. Structurally, this participation within programs usually takes the form of advisory councils, committees, youth on boards, workgroups, or staff positions. Youth empowerment involves a collective, democratic, and pro-social process of engagement, which implies group interaction (Jennings *et al.*, 2006).

Youth empowerment specifically develops socio-political awareness in young people, enhancing their skills to be community change agents (Zimmerman, 2000). Youth empowerment facilitates young people in constructing meaningful community change, with the goal of enhancing the wellbeing of all individuals. A youth empowerment approach utilizes young people as resources rather than a "collection of problems" in establishing community change (Holden *et al.*, 2004). By emphasizing collective participation and contribution, young people gain skills and competencies that cultivate their own positive development, while also promoting the healthy development of others.

### 4.4 The Youth in the SADC Region

The youth comprise well over 50 percent of the population in many SADC countries; they also make up the largest group of the unemployed. The youth are the most energetic, creative and innovative sector of society. Youth involvement in the water sector remains critical for the development of the sector and the region.

#### 4.4.1 The challenges the youth face in the SADC region

Young people constitute the larger proportion of the total countries' populations in Southern Africa but it remains a region where young people are faced with a multitude of challenges which include: high unemployment and joblessness; high levels of poverty; early marriage and teenage pregnancy; high prevalence of HIV and AIDS and sexually transmitted infections (STIs); limited access to a range of sexual and reproductive health services; weak implementation of policies and programmes on sexual and reproductive rights; high rates of violence, smoking, drug, alcohol and substance abuse; high drop-out rates and inadequate technical and skills development;

inadequate access to complementary factors of production such as finance, land and skills; insufficient life skills to accept responsibilities and handle crises, conflicts and pressures; limited of access to sporting and cultural opportunities; lack of social cohesion and volunteerism; youth exploitation including sexual abuse, child labour, domestic abuse; lack of voice and low levels of political participation, which are closely linked to social exclusion; and low self-esteem, which prevents young people from fully participating in the development process and becoming responsible and accountable.

Young people have limited access to land which is a vital resource for developmental achievement. Most youths in Southern Africa face the challenge of limited access to this resource. Even civil society institutions such as youth organizations face the same problem. This is due to impediments such as national land policies and youth's lack of financial capability to acquire land. One of the major challenges the youth face is lack of investment capital. Young people lack the required financial resources simply because of their age and financial status. This is an impediment to youth being able to engage in economic activities. While some governments offer limited financial assistance for youths, most young people do not have the necessary financial management and marketing skills to start or even run business projects (Mathivha, 2012). Unemployment and poverty is rife among youth. When unemployed, their right to decent living standards is infringed. This also affects their confidence to compete for public office, such as standing in elections. More serious negative variables include violent crime, political instability, alcohol and substance abuse, low morality and compromised health

Young people have limited youth representation in decision-making. At times, youth policies and programmes do not answer or provide solutions to youth problems. This is so, simply because youths are neither involved in formulating interventions nor consulted about the interventions hoping to help them. The youth have generally limited access to health services and it not surprising that the HIV/AIDS pandemic has had a huge impact on youth and it is every government's responsibility to respond appropriately ((Mathivha, 2012)). It is also evident that there is a clear relationship between HIV and youth inequalities.

#### **4.4.2 The opportunities for the youth in the SADC region**

Most countries in SADC have designed and implemented various interventions to tackle youth unemployment. The interventions have variously been targeted at affecting the employment chances of young people by influencing the dynamics of labour demand, labour supply and improving the match between supply and demand sides of the labour market. The youth employment interventions have mainly revolved around policy guidance, provision of vocational education and training, acquisition of skills and work training, enhancing the entrepreneurial capacities of young people, financing youth enterprises, and increasing the integrability of young workers to allow them to take advantage of employment opportunities as labour demand increases. Some of the interventions also involve direct job search in countries abroad, employment creation through public works programmes, and facilitating self-employment by young people, particularly in the informal sector.

There are regional and national instruments which provide opportunities for empowering the youth to participate in achieving WEF security in the region. These instruments include the SADC Revised Regional Indicative Strategic Development Plan (RISDP) 2015-2020; the SADC Declaration on Youth Development and Empowerment, the SADC Strategy and Business Plan 2015-2020; the Youth Participation and Empowerment for Sustainable Development; and the Africa Ministers Council on Water (AMCOW) Policy and Strategy for Mainstreaming Youth in the Water and Sanitation Sector in Africa (SADC, 2016a).

There are global, regional and national policies and initiatives which have been developed to provide the youth with opportunities of becoming engines of socio-economic development in the region. National youth policies of SADC countries are informed by the national Constitutions, the United Nations World Programme of Action for Youth and the African Youth Charter (2006). The African Youth Charter (2006) is a political and legal document that serves as a strategic framework that gives direction to youth empowerment and development at continental, regional and national levels. The Charter has identified the following priorities: education, skills and competence development, employment and sustainable livelihoods, youth leadership and participation, health and welfare, peace and security, environmental protection, and cultural and moral values. The national youth policies of the member SADC states share the charter's aim to holistically develop young people by supporting actions and processes that bring the youth into the mainstream of the economy and society. The national youth policies are

informed by the following Sustainable Development Goals (SDGs): No poverty (SDG1); Zero hunger (SDG2); Good health and well-being (SDG3); and Quality education (SDG4);

The national youth policies are also informed by the Commonwealth Youth Charter (2005) which provides the parameters within which youth policies in all Commonwealth countries should be developed. The Charter aims to empower young people to develop their creativity, skills and potential as productive and dynamic members of society. The charter highlights the importance of full participation of young women and men at every level of decision-making and development. It identifies the following principles and values for youth development: gender inclusivity, empowerment and social equity, human rights, and sustainability and integration or mainstreaming of youth issues across all levels of government.

Within the context of UNESCO's Technical and Vocational Education and Training (TVET) strategy and guided by a Memorandum of Understanding between UNESCO and the SADC Secretariat, UNESCO has been supporting SADC and its member states to implement the 2030 agenda for skills development and to foster TVET for enhancing the development of skills and competences for life, in line with SDGs 4, 8 and 9, on education; inclusive economic growth and decent work; and industry, innovation and infrastructure, respectively. In 2017, UNESCO initiated support to the SADC Secretariat in developing the second Strategic Framework for the development of TVET in SADC (2018-2027). The strategy recognises the importance of TVET as a critical component of human resource development. It will give direction to the TVET work in the region for the next 10 years. In 2017, UNESCO and SADC supported the implementation of the Eastern and Southern Africa (ESA) Ministerial Commitment on sexuality education and sexual and reproductive health services for adolescents and young people, which has become an important platform for advocating for positive health outcomes for young people in the region.

## **5 CASE STUDIES FOR YOUTH EMPOWERMENT**

### **5.1 Case Study 1: The Feed the Future Project in Tanzania**

In Tanzania, approximately 800,000 young people entering the workforce each year, providing youth with vocational skills and connecting them to employment opportunities has become an increasingly important and urgent need. The youth have the potential to play an enormous role in their Country's sustainable economic development. Advancing Youth Activity, funded by Feed the Future and the U.S. Agency for International Development (USAID), helps young people aged 15 to 29 to enhance their employability, business savvy, leadership skills, and participation in civic life. This is a project which is aimed at empowering young people in Tanzania.

The Feed the Future Tanzania Advancing Youth activity collaborates with young people in program design and implementation (Fig. 9) and builds public-private partnerships to bolster job opportunities for them. The main activities of the project include: identify potential employment market gaps that youth could fill and partner with local organizations to develop curricula and deliver vocational training to match skills needed by employers; utilize grants program to support businesses in implementing new on-the-job training opportunities, internships, and placements for youth; foster leadership among youth by adapting the successful Champions for Change experiential leadership development methodology created by USAID's Africa Lead project; and collaborate with the government of Tanzania to implement healthy life skills curricula in schools and roll out community-based healthy life skills services through pre-existing networks.



**Figure 9: Youth discuss Feed the Future Tanzania Advancing Youth activity in Tanzania**  
(Source: DAI, <https://www.dai.com/our-work/projects/tanzania-youth-economic-empowerment-activity>)

The other project in Tanzania is Advancing Youth Activity (AYA) which is implemented by SNV Netherlands Development Organisation (SNV). To help Tanzania's youth lead productive and healthy lives, and contribute to their Country's growth and development, SNV is implementing USAID's Tanzania Youth Economic Empowerment (YEE) activity, led by DAI. YEE aims to empower Tanzanian youth between the ages of 15 and 29 with the skills, knowledge, and resources they need to enter into meaningful and sustainable employment or entrepreneurship in agriculture and other rural-based value chains that have sustainable income-generating potential. YEE works with the private sector to identify the skills and labour needed by agribusinesses to accelerate growth in the sector, and based on this demand, YEE develops tailor-made interventions to empower young people with relevant new skills and opportunities. Responding to the most pressing needs of the private sector, government, and youth workforce, the project connects youth with employment and entrepreneurship opportunities that coincide with their interests, aspirations, and capabilities. This matching process is paired with mentorship and grant opportunities to stimulate viable youth-driven investments.

The activities of the youth in this project place them on Rung 5 in the Hart's ladder of youth participation (Fig. 6). There is still considerable adult led process. The students are developing skills which will help move up the ladder towards Rung 8.

## 5.2 Case study 6: Harnessing the Wind with Junk: Malawian Wind Inventor

This is about project of an intrepid Malawi youth, William Kamkwamba who, despite having no formal education or training, recently engineered and built a windmill to power his house. The then 14 year old Malawian boy with a meagre education crafted a working windmill out of a tractor fan blade, a broken bicycle, an old shock absorber, and some blue gum trees (Figs. 10 and 11). His invention wasn't the product of following one of the many DIY plans found online, but rather an incredible example of *innovation* and *drive*, because his electricity generating device was built using information found in an 8th grade American textbook called Using Energy, which he found in his local community library<sup>2</sup>.

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<sup>2</sup> <https://inhabitat.com/malawi-youth-builds-windmill-to-power-village/>



**Figure 10: The first Kamkwamba windmill built**  
(Photocredit: <https://www.ted.com>)



**Figure 11: William Kamkwamba atop his windmill**  
(Photocredit: <https://www.ted.com>)

With much trial and error, some local materials, and an investment of about 16 dollars, William constructed a windmill that could generate enough energy for a few light bulbs and a radio. While a few bulbs might sound insignificant, the difference changed William's and his family's life entirely. Instead of using expensive paraffin candles, which produce smoke and irritate the eyes, William and his family now use the energy generated by the wind to light up their house. The engineering youth also hooked up a car battery to his generator to use as a backup in case of a non-windy day. His first windmill, connected to an automobile battery for storage, powered just four light bulbs and was able to charge the villagers' cell phones. He built homemade light switches and circuit breakers for his device as well, and built another higher windmill to better harness the 'electric wind', as he called it. Kamkwamba then built a third windmill to pump grey water for irrigation, and a radio transmitter made from broken radio cassette tape players to broadcast both music and HIV prevention messages.

The 12-meter tall windmill (it was originally only 5 meters) is made out of scrap timber. The blades, originally made from PVC, now steel, power a bicycle dynamo, the type that power a bicycle headlamp, which in turn provides electricity to the battery. William uses this energy for his house, as well as to help others recharge their batteries. Just recently, he moved from a car battery to a deep discharge battery, which will help improve with the power storage of his house.

After appearing in the local papers, and blogged by Soyapi Mumba, William was contacted by Emeka Okafor, the recent curator of the TED Global Conference in Arusha, Tanzania. Okafor invited William to speak at the conference as one of the 100 other prestigious presenters (Fig. 12).



**Figure 12: William Kamkwamba at TED in 2007**  
(Photo: *Wiki commons/Erik (HASH) Hersman*)

It was there that William was first introduced to computers, the internet, Google, and the blog (he now has **his own blog**, in which he writes about his experience).

Since his initial windmill success, Kamkwamba's projects have included a deep water well with a solar powered pump for clean water, a drip irrigation system, and solar powered electricity and lighting for homes in his family

compound. He's also the inspiration for the Moving Windmills Project, which supports Malawian-run rural economic development and education projects in Malawi, aiming for community economic independence and self-sustainability in the areas of food, water, health security, and educational success. The story of the innovative Malawi youth is now being told through a film titled "*The Boy Who Harnessed the Wind*" which is based and set in Malawi and was debuted on Netflix on 1 March 2019<sup>3</sup>.

This is an example of how innovative the youth can be. This also highlights the importance of supporting the youth and providing enabling environment for them to develop and apply their innovative ideas in providing sustainable solutions to achieving water, energy and food security. In this case, the youth has reached Rung 8 on the Hart's ladder of youth participation (Fig. 7). This is a youth initiated shared decision with adults. The youth is fully empowered.

## 6 CONCLUSIONS

### 6.1 Summary of main findings on WEF Security and the Nexus approach

The rapidly increasing demand for energy by industry and mining, rapidly growing urban areas and agricultural intensification is likely to impose increasing strain on the water–energy–food nexus. At the regional level, nexus interdependencies are strong, due to multiple shared major river basins and aquifers, the SAPP power sharing infrastructure, and intraregional food and embedded water trade. These links are enhanced by governance mechanisms such as the SADC, which has established protocols on shared water, energy and food security, the Southern Africa Regional Climate Outlook Forum, and initiatives on trade and the green economy.

There are various global advances in the application of the WEF nexus which need to be considered. One of the approaches has been to link the WEF nexus with climate change adaptation. Leck *et al.* (2015) developed a WEF nexus based adaptation framework. Hoff (2011) also located the nexus within the green economy and green growth debate and developed a nexus framework which integrates global trends (drivers). Environmental livelihood security (ELS) framework focuses on the challenges of maintaining global food security and universal access to freshwater and energy to sustain livelihoods and promote inclusive economic growth, whilst sustaining key environmental systems functionality, particularly under variable climatic regimes (Biggs *et al.*, 2015).

The paper has shown that there is already a framework for regional integration in the SADC region that would provide some foundation for a regionalized approach to addressing the water-energy-food nexus. There are various instruments, such as SADC Treaty and the Protocol on Energy, which set the framework for a regional approach. The energy instruments need to consider not only energy, but the implications of energy on water and food at a regional level. It has also been shown that the region has differential distribution of resources in terms of energy sources, agricultural land and water, which i great potential for optimizing delivery in all three of these sectors by taking a regional approach and focusing sectoral development in the optimal areas. Thus, there are major economic development opportunities for the region based on harnessing the different resource endowments and water-food-energy needs of the various countries in the region.

It has also been shown that a regional nexus approach requires multi-sector planning approaches and a multi-criteria approach to selection of project options which is technically complex and made more so by sovereign food, electricity, and water security national interests that need to be addressed. The paper has shown that what is needed for such an approach to prevail is a clear demonstration of the national benefits of such integration, and how legitimate national security and political concerns can to be addressed. Although there are strong foundations in the region for successful application of the WEF nexus approach, considerable work still needs to be done before the benefits of the nexus approach are fully realized.

It is evident that, as WEF resources become increasingly stressed in the region, either through growing economic development, population growth, or climate change, improved resource use efficiency will become necessary. It is

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<sup>3</sup> <https://thisisafrica.me/the-boy-who-harnessed-the-wind-film-set-in-malawi-debut-netflix/>

also evident from the study that successes elsewhere provide solid and effective business cases for nexus planning in the region.

It is clear that the SADC member states have different endowments of land, water, and energy sources. The level of development of resources also varies enormously. In some states these resources are relatively well developed, while in others there is still significant scope for further development. The differential allocation of natural resource endowments allows for the possibility to optimize the use of such resources by taking a regional, rather than a national view, and exploiting the resources where they are naturally found in abundance, for the benefit of the region as a whole.

The paper has shown that there is already a framework for regional integration in the SADC region that would provide some foundation for a regionalized approach to addressing the water-energy-food nexus. There are various instruments in place to support such an approach. These include the SADC Treaty, and the Protocol on Energy, which set the framework for a regional approach. The agreements on energy need to consider not only energy, but the implications of energy on water and food at a regional level. With the differential distribution of resources in the region, in terms of energy sources, agricultural land and water, there is the potential for optimizing delivery in these sectors by taking a regional approach and focusing sectoral development in the optimal areas.

The paper has shown that application of the WEF nexus approach can assist the SADC region adapt to the challenges posed by population growth, increased urbanisation, increased consumption demands due to improved standards of living and climate change and variability. In such a nexus, there is need for transformation involving institutional change and joint implementation by the public and private sectors.

Agriculture can and should be a sector of opportunity for SADC's youth. The paper has shown that SADC has plentiful supplies of potentially exploitable land and water resources. If young people can gain access to these resources and use them in conjunction with strategies to make agriculture more productive, the results could be transformative for livelihoods and economic growth. More than two-thirds of the young people who work in rural areas already work in agriculture, and most will remain there, even if the non-farm sector develops extremely rapidly. Although agriculture is the most immediate means of generating income and employment for large numbers of young people, efforts to accelerate agricultural growth and improve food security in the region have been conceptually separated from efforts to create jobs for young people. Yet these goals are highly complementary. Increasing young people's opportunities for productive work in rural areas is arguably the most important catalyst for the region to reap its demographic dividend. It is clear that low agricultural productivity is the primary impediment to overcome.

As presented in this paper, southern Africa has the added advantage of being home to strong regional institutions that are already positioned to play a greatly increased role in youth empowerment. These include international, regional and national professional associations, training institutions, media platforms, youth-serving organizations, faith-based networks.

## **6.2 Main lessons from the case studies**

A considerable threat to achieving future economic progress in the region is a population that is younger, more urban, and growing. By 2050, the population will almost double and become increasingly urban with 77% living in cities, compared to 54% today (USAID, 2011). While youth can play a crucial role in spurring growth through increased productivity, unless there policies are put in place to absorb the youth into productive employment, they can become socially and political destabilizing.

It has been shown that socioeconomic challenges, such as poverty and unemployment, inhibit the participation of youth in developing countries such as those in the SADC region. Ensuring greater youth facilitation and development helps them to play a greater role in public life and also develop their aptitude and potential. There are various regional and national instruments which are being used to empower young people so that they actively and gainfully participate in the economic development of the region. Case studies have illustrated various ways young people are being empowered and various activities in which the youth are engaged in the WEF sector in the region.

The strategies of empowering young people include formal and informal training, skills development, knowledge and experience sharing among the youth and with adults through youth networks, clubs and professional and technical forums. Regional institutions and national governments need to continue investing in building capacities of young people in the WEF sectors in order to build a sustainable foundation for the successful implementation of the WEF nexus approach in the region.

## **7 RECOMMENDATIONS**

### **7.1 Implementing WEF approach in the region**

In view of the many nexus frameworks which have been developed, there is a need to consider the other dimensions of the WEF nexus approach, such as livelihood and environmental security and climate change adaptation requirements. Hence, there is a need for more research to closely examine the possibilities of regional integrated nexus planning globally in addition to the current nexus planning taking place within SADC countries.

There is a need to examine the transition from a traditional Integrated Water Resources Management approach to a more 'Nexus-Based Approach' embedded within governance frameworks. Effective and successful implementation of the WEF nexus approach requires that we establish a sound evidence base to improve local and regional understanding of the water, energy and food nexus. Hence, there is a need for investment in science and technology for water, energy and food diagnostic decision support systems. There is a need to come up with innovations that can guide institutional arrangements to implement the development of nexus-based policies, and catalyse action to apply them in practice. Successful implementation of the WEF nexus approach requires effective partnerships designed to solve problems using public, private, funder and civil society networks, rather than solely relying on conventional institutional arrangements (IUCN & IWA, 2013).

A regional nexus approach requires multi-sector planning approaches and a multi-criteria approach to selection of project options which is technically complex and made more so by sovereign food, electricity, and water security national interests that need to be addressed (Schreiner and Baleta, 2015). There is a need for a clear demonstration of the national benefits of such integration, and how legitimate national security and political concerns are to be addressed. While the foundations may be present for such an approach, considerable work will be required before it will be fully realized.

There is a need for more research through demonstrative projects in order to generate scientific evidence and to: unpack issues and challenges surrounding land utilisation and water in the region (availability, access, utilisation, etc.); understand the linkages, opportunities and constraints of implementing the WEF nexus in the region; and understand the trade-offs between energy, water and/or food to improve optimisation.

### **7.2 Confronting the WEF challenges**

In order to confront the challenges for implementing the WEF nexus we need to find the answers to the following questions:

- Which technologies for the nexus approach?
- What governance arrangements?
- Whose risks and benefits and at which scale?
- Which investment options across sectors?
- Which sectors are most powerful?
- What innovations can guide and catalyse actions for implementing nexus policies and strategies?
- How do we demonstrate the benefits of the nexus approach?

### **7.3 Creating jobs for the SADC youth**

The SADC countries have continuously articulated the need to create sufficient employment opportunities to absorb the continent's growing labour force, especially young people. Nonetheless, youth unemployment continues to be a difficult and persistent problem for the region. Skills constraints, which include technical, cognitive, or socioemotional skills, inhibit the employment chances of young people. Thus, problem-solving

techniques (among young people), mentorship, and continuous induction and training should all be promoted in order to tackle these constraints. Instilling a sense of hope in young people is also one of the measures that could be used, especially by employers, to build on their strengths. Measures proposed to turn the weaknesses of young people in employment into opportunities include: designing and implementing an appropriate skills training in identified areas of skills gap; providing soft skills training at the education and training institution levels and the industry level; and developing and enforcing organizational code of conduct, inclusive of dress code. Underqualification is an important labour market issue in Africa, given the relatively low levels of educational attainment. The widespread underqualification of young people points to the need for more education, even if it occurs alongside relatively high unemployment rates for tertiary educated workers.

Young people in the region face a number of challenges with regard to youth entrepreneurship. Working capital constraint is one of the major factors hindering many of them from trying to start a business or becoming self-employed. To cope with the poor conditions and lack of educational opportunities, many young people turn to the informal market for work and financial services. Thus, there is urgent need for appropriate and inclusive financial services for young people that can equip them with the resources and support they need to become productive and economically active members of their households and communities. Youth entrepreneurship has been identified as one of the interventions capable of providing a solution to Africa's youth unemployment problem (UNECA, 2017). Entrepreneurship is viewed as an option of generating sustainable livelihoods. With their ability to adapt to changes and innovate, young people have the potential to drive tech-entrepreneurship and growth.

#### **7.4 Youth empowerment**

There is need for governments, the private sector, and other stakeholders to provide resources for youth to actively participate in food production and distribution; in agro-business; as well as in the management of natural resources (such as land, water resources, and forests), and climate change.

There is a need for integrated research approach in the WEF sectors whereby capacity building goes beyond offering research opportunities, and includes mentorship and on the job-training programmes as well as technology and skills transfer to young professionals. It is critical that development initiatives groom students and emerging professionals to contribute meaningfully to research for development. In the WEF sectors. Universities and high learning institutions need to have strong internship programmes that can prepare young people to be stronger participants in the WEF value chains and agents of change.

SADC and its member states should create and continue to support effective platforms for young professionals to interact and exchange ideas and knowledge regarding relevant research, innovations, opportunities and challenges in the WEF fields of research. This would keep them informed on progress made and information available in their respective subjects of research.

It is recommended that existing and proposed participatory platforms for the youth be strengthened by including youth in their design, implementation and the monitoring and evaluation of instruments, strategies and programmes. Youth participation should also be enhanced by improving education, updating the curriculum and building capacity. Youth-friendly information and materials can be developed with young people themselves, through traditional forms of media such as newspapers, radio and magazines, as well as Internet-based social media. Structures and mechanisms should also be created to advance youth participation and institutionalize youth participation in decision-making processes that affect young people, for example, by establishing youth advisory groups and youth networks for positive civic engagement.

#### **7.5 Moving the youth to Rung 8**

What needs to be done in the following areas to move the youth to Rung 8 in Figure 7?

- Financial services for young people?
- Entrepreneur & technical skills & business management?
- Effective platforms for young professionals?
- Effective youth participation in decision-making processes?
- Innovation, science and technology development?

- Sexual and reproductive health services?
- Gender equality?

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