

December 2018

The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

Assessing the state of the water-energy-food nexus in South Africa

The Water Research Commission (WRC) has identified the water-energy-food (WEF) nexus as one of its focus 'lighthouse' areas of research. Unlike integrated water resource management, which is water-centric in nature, the goal of the WEF nexus is to approach resource management more holistically by utilising a multi-centric philosophy. Each resource sector within this sector has an equal weighting. In its latest study on the subject, the available information and knowledge about the WEF nexus in South Africa was reviewed.

Background

The water-energy-food (WEF) nexus is broadly defined as an approach that considers the interactions, synergies and trade-offs of water, energy and food when undertaking the management of these resources. Water, energy and food securities are inextricably linked, with usage within one sector influencing the use and availability in the adjacent sectors.

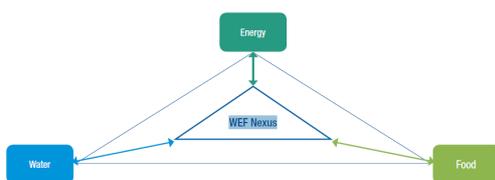


Figure 1. The water-energy-food nexus.

The WEF nexus is gaining recognition internationally as an intersectoral approach to resource management and sustainable development. The WEF nexus is a focus research area for the WRC. The WEF nexus presents an opportunity for policymakers, researchers and development agencies to integrate the sectors to optimise the use of the resource base, maximise synergies and minimise trade-offs and conflicts.

In this latest project, the WRC led a review of available information and knowledge about the WEF nexus in South

Africa. More specifically, the study reviewed past, present and ongoing work on the WEF nexus, focusing on the current status, potential, challenges and opportunities for intersectoral WEF nexus planning.

Main results

Much of the WEF nexus information that has been produced has a regional SADC focus. South Africa, however, has significant opportunities to implement WEF nexus thinking in resource management.

Solar power generation, water reuse and recycling, and precision agriculture are examples of opportunities that could contribute to intersectoral optimisation. For South Africa and the region, it is imperative that the WEF nexus approach be closely aligned with the United Nations Sustainable Development Goals (SDGs), particularly to SDG 2 (zero hunger), SDG 6 (clean water and sanitation and SDG 7 (affordable and clean energy).

A diverse set of challenges hinder the effective implementation of the WEF nexus in South Africa. As a developing country, South Africa's primary focus is on alleviating poverty, inequality and corruption while attempting to increase economic growth.

Secondly, resource management and policy development are generally sector-specific, with little acknowledgement of adjacent sectors. Thirdly, data related to the three sectors, and especially their interactions, are frequently unavailable,

inaccessible or unusable due to scale, unit or temporal differences. Furthermore, WEF nexus implementation will be subject to its inclusion in national policies and standards, implying the integration of the water, energy and agricultural departments at planning level.

Conclusion and recommendations

A systematic analysis of existing WEF nexus framework in academic and grey literature resulted in the development of a South African framework that considers the three sectors as well as technological innovations, human-wellbeing, SDGs and different drivers of the WEF nexus.

It is proposed that this framework be utilised as a point of departure for future research related to the WEF nexus in South Africa. To this end a research agenda for the WEF nexus in South Africa is proposed in the final report of the study.

It is recommended that future research on the WEF nexus focus on the following:

- Developing an integrated model, indicators, metrics and indices to monitor and evaluate the WEF nexus in South Africa and creating a WEF nexus database.
- Translation of existing knowledge to inform policies for integrated sustainable resource management among the WEF sectors
- Participatory research aimed at demonstrating the applicability of the WEF nexus at the local level, especially among the poor, and generating cases that demonstrate how the WEF nexus could assist in achieving the SDGs.

South Africa is well positioned to achieve these goals as there are large datasets already in existence. The development of a WEF nexus model, indicators, metrics and indices would help to unlock the value of such existing data and also guide the generation of new datasets.

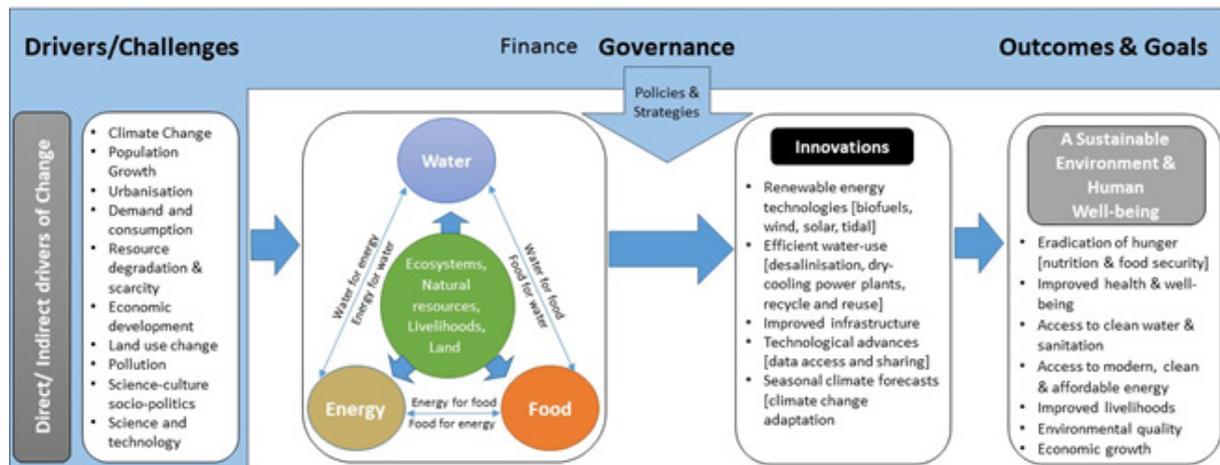


Figure 2. The proposed WEF framework for South Africa.

Further reading:

To order the report, *Assessing the state of the water-energy-food (WEF) nexus in South Africa* (Report No. KV 365/18) contact Publications at Tel: (012) 761 9300, Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.