

Water Security and Social-Hydrological Resilience for Rural Small-scale Crop Value Chains



Mwale M.^{1*}, Nkhata B.², Muchara B.^{2,3} and Chaffin B.⁴

¹Institute for Rural Development, University of Venda, P. Bag X5050, Thohoyandou 0950, South Africa ²Department of Society & Conservation, Monash University, South Africa; ³Graduate School of Business Leadership, University of South Africa, Cnr Janadel & Alexandra Avenue, 1685 ⁴W.A. Franke College of Forestry and Conservation, Missoula, Montana University, United States of America. *Email: mukudzeishe@yahoo.com

Introduction

The Southern African region face three interrelated problems

- Rapid population growth
- Food scarcity
- Water insecurity

Water security → capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability (UN Water, 2013)

Agricultural value chains → the sequence of value-adding activities that bring products from the farm to the final consumer (Kaplinsky and Morris, 2001; Miller and Da Silva, 2007). Such chains connect inputs, farmers, processors, retailers and consumers.

Problem Statement

Little attention has been paid to understanding how water security relates to rural small-scale crop value chains (Waibel, 2011). Hence, there is little awareness regarding how the structure and function of the value chains of rural small-scale crop farming strongly influence the quantity and quality of water. Therefore the following is critical:

- Secure scarce water
- Promote water security to support agricultural productivity
- Access to appropriate quantity and quality of water to ensure food security and social hydrological resilience

Objectives of the Project

Main objective: Assess water security along the value chains of rural small-scale crop farming at the river basin in SA and the SADC region

Specific objectives

- To review relevant literature on water security in the production, post-harvest handling and consumption processes of small-scale crop farming in South Africa and the SADC region.
- To assess water security in the production, post-harvest handling, and consumption of selected crops using designated sites in the Limpopo and Zambezi River Basins as key case studies.
- To estimate water footprints for various agricultural value chains selected from the Limpopo and Zambezi River Basins.
- To share data and technical expertise in improving agriculture and nutrition with other southern African countries.
- To recommend evidence-based policies to promote water security that supports the social-hydrological resilience of rural small-scale crop farming systems and the broader basins in which these systems are embedded.

Table 1: Project Milestones

Deliverable/Activity	Description
1. Review report	Review of literature on water security, utilisation, consumption of crops in South Africa.
2. Inception report	Description and profiling of study sites as well as identifying the suitable value chains.
3. Stakeholder workshop	Stakeholder workshop to discuss water security issues and how to conceptualise the issues in the agricultural sector.
4. Value chain report	Apply the value chain analysis framework to understand water utilisation in the Production and post-harvest handling processes.
5. Water utilisation report	Quantification of water utilisation along the value chain for selected crops.
6. Stakeholder workshop	Stakeholder workshop to discuss water use and water footprint in the agricultural sector. How these concepts can be used to improve water security among smallholder farmers.
7. Water foot front report	Detailed report on water foot print for selected smallholder agricultural crops.
8. Water security conference	Conference on water security in the agricultural sector.
9. Feedback session	Research Feedback session to communities and project participants.
10. Integrated report	An integrated technical report that articulates the key findings of the research and the proposed policy positions.

References

- Kaplinsky, R. & M. Morris. 2001. A Handbook for Value Chain Research. Brighton, United Kingdom, Institute of Development Studies, University of Sussex.
- Miller, C. & Silva, C. 2007. Value chain financing in agriculture. *Enterprise Development and Microfinance* 13(2/3), Practical Action Publishing, Rugby.
- United Nations University 2013. Water Security and the Global Water Agenda: A UN-Water Analytical Brief. Ontario UNU Institute for Water, Environment and Health.
- Waibel, H. 2011. Theoretical concepts for socio-economic research of vegetables in Africa. In: Mithfer, D. & Waibel, H. (Eds.). *Vegetable production and marketing in Africa: socio-economic research*. CABI, International UK. DOI: 10.1079/9781845936495.0000

Research Methodology

A value chain approach to answer project research questions

Measuring progress toward water security is one way to determine and thus monitor social-hydrological resilience (Lautze and Manthritlake, 2012).

Phase 1

Detailed literature review on agricultural water use, security, productivity and foot-printing. The review will seek to document the potential benefits of understanding water utilisation by rural small-scale crops in South Africa and the broader region. An in-depth review of prior work by the research team and other researchers on the production and utilisation of these crops will be conducted. The phase will contribute to the identification of suitable sites and suitable crops to be evaluated.

Phase 2

Application of value chain analysis framework to assess water use in the production, post-harvest handling and consumption of selected crops in the Limpopo and Zambezi River Basins. Value chain mapping will also be used to identify and characterise actors and their linkages from the producer to the final consumer. Value chain analysis involves a sequence of steps, from identification of actors through chain actor mapping, linkages, and quantification of earnings into rewards by various actors using information gathered from observation, rapid appraisals, and through quantitative and qualitative surveys administered and augmented by secondary data. Constraints and opportunities within crop value chains will be analysed.

Phase 3

Estimating water footprint (WF) for selected crops within the Limpopo and Zambezi River Basins focusing on the production stage, that is, the cultivation of the agricultural crops from planting to harvesting, during the 1990-2017 period. A comparison of the water footprint for crops grown in both the Limpopo basin and the Zambezi basin shall be done to produce regional data sets that can inform policy. The proposed water foot-printing exercise will provide information that is useful for post-harvest applications as well.

Project Impact

- Vital empirical evidence relevant for production planning and value chain up-scaling
- Establishment of an evidence-based platform from which to plan the production, marketing, consumption and water utilisation along value chains of rural small-scale crop farming
- Directly address food insecurity challenges among rural, low income groups in South Africa and the region. Equity and underdevelopment redress
- Benefit the regional economy through improved household economic production and coupled resilience of social-ecological and hydrologic systems.
- Responsive to the human development challenges around agriculture, food and water security facing southern Africa. This research project will provide research, policy and management recommendations

Figure 1: Flow diagram for the proposed Project Methodology

Table 2: Project Events Executed in the First Quarter

Event Title	Event Description	Event Organizer(s)	Event Date(s)	Participant Description	Number of Females	Number of Males
Project Inception Meeting	Preliminary discussions on project conceptualisation and operations	Prof Bimo Nkhata, Dr Muchara & Dr Manjoro	20 May 2018	Project Team members	2	2
Site selection	Preliminary discussions on project conceptualisation and operations	Prof Bimo Nkhata, Dr Muchara, Linda Downsborough & Dr Manjoro	9-10 July 2018	Project Team and officials from Department of Agriculture, Fisheries and Forestry Monash representative & WWF-Zambia management	1	6
*WWF Strategic Partner	Stakeholder engagement	Prof Bimo Nkhata, Dr Muchara, Linda Downsborough & Dr Manjoro	6 July 2018		2	3

*WWF: World Wide Fund for Nature

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