

**LIVING WITH MULTIPLE, COMPLEX RISKS OF COMMERCIAL SUGARCANE  
FARMING IN KWAZULU-NATAL: THE ROLE OF CLIMATE CHANGE?**

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## DECLARATION

I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Master of Science in the University of the Witwatersrand, Johannesburg. It has not been submitted for any degree or examination in any other University.

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## ABSTRACT

The aim of this research is to examine the contextual environment in which farmers operate so as to improve our understanding of the factors shaping vulnerability to climate risk. A key focus is on the livelihoods of sugarcane farmers, using a case study of small-, medium-scale (emerging) and large-scale sugarcane farmers in the KwaZulu-Natal Midlands area of Eston and its surrounds. A social vulnerability assessment was undertaken under the Sustainable Livelihoods Framework (SLF) to test the hypothesis that climate risk is considered a major contributing factor to the vulnerability of commercial farmers in KwaZulu-Natal and needs to be effectively managed. This involved an investigation into the multiple stresses (both external and internal, on-farm and off-farm, climatic and non climatic) acting on the system. It is clear that climate change risk and variability is a major, but not the sole contributing factor to the vulnerability of commercial farmers in this part of KwaZulu-Natal. Climate change does need to be effectively managed but it will be best done in conjunction with the management of the other multiple and interacting threats and stresses identified in this study. Climate change and vulnerability, as well as the other multiple stresses, are acting on an already vulnerable system, exacerbating and compounding present risks.

This research also explored a number of coping and response strategies that commercial farmers have adopted in response to the threats and stresses and investigated particularly, what elements enhance or restrict these strategies (both on-farm and off-farm). These strategies possess potential as possible future adaptation options. It was found that the issues of access to livelihood assets (social, financial, natural/environmental, physical, human, knowledge assets and capital under the SLF) are key to the adaptive capacity and the adaptation strategies that farmers employ. Institutions (both formal and informal) play a pivotal role in this access to livelihood assets both enabling and restricting access.

In conclusion, this work determined that a focus on only one element, such as climate change, will not significantly reduce the vulnerability of commercial farmers. There is an interactive, dynamic and multifaceted network present with a number of factors acting within and from outside the system. Political, biophysical, social and economic factors interact and combine to compound vulnerability, requiring more integrative and multiple response strategies.

## **DEDICATION**

This work is dedicated to the memory of my Grandfather Ken Fish. A true Geographer and enthusiastic teacher in the Natal midlands.

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## PREFACE

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The research has already generated a number of products. The research was presented in poster form at the 6<sup>th</sup> Open Meeting of the Human Dimensions of Global Environmental Change Research Community at Bonn University in Germany during October 2005. Poster title: The Vulnerability of Sugarcane Farmers in KwaZulu-Natal, South Africa, to Climate Change, Climate Variability and Non-Climate Related Stresses.

Preliminary findings of this work were also presented in 2004 as a paper at the Annual Geography Students Conference. Presentation Title: Climate Risk and its Impact on Commercial Farming in KwaZulu-Natal and at The 9<sup>th</sup> International Meeting On Statistical Climatology in Cape Town in 2004, presentation title: Coping with Climate Change, Related Risks and Non-climate Related Stresses: Perceptions and Responses of Subsistence and Commercial Farmers in KwaZulu-Natal (South Africa). Preliminary findings were also presented at the International Human Dimension Programme (IHDP) Regional Workshop on Human Dimensions of Global Environmental Change Research - Southern Africa in 2004 at Richards Bay. Presentation title: Climate Risk and its Impact on Commercial Farming in KwaZulu-Natal. Contributions on climate change and adaptation derived from this work have been published in the Wildlife and Environment Society's (WESSA) National Magazine: African Wildlife (2006) and the Department of Environmental Affairs and Development Planning (Provincial Government of the Western Cape) EnD Newsletters (2005). Contributions from this work were also made to the Energy and Climate Change section of the City of Cape Town's Environmental Resource Management Department.

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## ACRONYMS

**A** – All farmers

**AGM** – Annual General Meeting

**AIACC** – Assessment of Impact and Adaptation to Climate Change

**AOGCM** – Atmosphere – ocean coupled general circulation model

**CSAG** – Climate Systems Analysis Group

**DFID** – Department for International Development

**DoA** – Department of Agriculture (National)

**FANR** – Food, Agriculture and Natural Resources Directorate

**FAO** – Food and Agriculture Organisation

**FEWSNET** – The Famine Early Systems Network

**GCM** – Global Circulation Model

**GDP** – Gross Domestic Product

**GEF** – Global Environment Fund

**GIEWS** – Global Information and Early Warning System

**HIV/AIDS** – Human Immune Deficiency Virus

**IDS** – Institute for Development Studies

**IHDP** – International Human Dimensions Programme

**IPCC** – The International Panel on Climate Change

**IUCN** - International Conservation Union

**L** – Large-scale farmers

**M** – Medium-scale (emerging) farmers

**MAP** – Mean Annual Precipitation

**MRU** – Migration Research Unit

**ODI** – Overseas Development Institute

**PAETA** – The Primary Agricultural Education Training Authority

**PRA** – Participatory Rural Appraisal

**RRA** – Rapid Rural Appraisal

**RV** – Recoverable Value

**S** – Small-scale farmers

**SA** – South Africa (Republic of)

**SADC** – Southern African Development Community  
**SACU** – South African Customs Union  
**SASA** – The South African Sugar Association  
**SASRI** – The South African Sugar Research Institute  
**SAVI** - Social Assets and Vulnerabilities Indicators  
**SEI** – Stockholm Environmental Institute  
**SLF** – The Sustainable Livelihoods Framework  
**SRES** - Special Report on Emissions Scenarios  
**SWOT**- Strengths, weaknesses, opportunities and threats  
**UK** – United Kingdom  
**UNDP** – United Nations Development Programme  
**UNEP** - United Nation Environmental Programme  
**UNFCCC** – The United National Framework Convention on Climate Change  
**US** – United States (The United States of America)  
**VA** – Vulnerability Assessment  
**VAM** – Vulnerability Analysis and Mapping  
**WFP** – World Food Programme  
**WRC** – Water Research Commission  
**WTO** – The World Trade Organization