



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Proceedings of the 4<sup>th</sup> Biennial Conference  
of the  
African Farm Management Association

# Farm and Farmer Organisation for Sustainable Agriculture in Africa



Edited by  
Johann Laubscher

26 - 30 January 1998  
University of Stellenbosch, South Africa

## EDITOR

Prof. Johann Laubscher, Department of Agricultural Economics, University of Stellenbosch, South Africa.

## PANEL OF REFEREES

Mr. A. M. Cronje, Department of Agricultural Economics, University of the Orange Free State, Bloemfontein, South Africa.

Prof. D. Graham, Department of Agricultural Economics, Ohio State University, USA.

Prof. J. Laubscher, Department of Agricultural Economics, University of Stellenbosch, South Africa.

Dr J. M. Laubscher, Chief Director VISIMED, formerly professor of Agricultural Management, University of the Orange Free State, Bloemfontein, South Africa.

Dr W. T. Nel, Centre for Agricultural Management, University of the Orange Free State, Bloemfontein, South Africa.

Prof. J. Sanders, Department of Agricultural Economics, Purdue University, USA.

Prof. E. Tollens, Kotolieke Universiteit van Leuven, Belgium.

Prof. H. D. van Schalkwyk, Department of Agricultural Economics, University of the Orange Free State, Bloemfontein, South Africa.

Prof. N. Vink, Department of Agricultural Economics, University of Stellenbosch, South Africa.

## ACKNOWLEDGEMENT

The African Farm Management Association (AFMA) wishes to express its gratitude and appreciation to the following companies for their generous contributions, which made it possible to hold the conference:

### Main sponsor

Massey Ferguson SA Ltd

### Co-sponsors

ABSA Bank

Bonnita

ENGEN Petroleum

First National Bank

Nederburg Wines

SASKO

Shoprite-Checkers

Standard Bank of South Africa

Wes-Kaap Molasse

WPK Agriculture Ltd

## FOREWORD

Agriculture is at present experiencing rapid change in the socio-economic, technological, political and institutional fields. Agricultural reform and adjustment are occurring in all regions. Basic changes in operating conditions will require fundamental restructuring of the working methods of farmers in the coming decades. The transformation of international trading conditions, for example, requires adjustment everywhere. Countries involved in the GATT agreement have committed themselves to reduce protectionism and give more scope for competitive advantages. Rapid developments in the field of information technology will further the globalisation of agricultural trade. Under these conditions the Organising Committee considered the choice of "Farm and Farmer Organisation for Sustainable Agriculture in Africa" as a conference theme as very appropriate. Principles and perspectives from practice regarding sustainable agriculture were covered thoroughly in the papers and during conference discussions.

Altogether 139 delegates attended the conference. Of the 58 papers that were accepted for presentation at the conference only 35 were actually presented. A possible reason for the late withdrawal of papers is the relatively high travelling costs on the African Continent. The 12 papers that are included in this publication were selected by a panel of referees (refer to the list of referees elsewhere in this publication). We are indebted to the referees, as without their input this publication would not have been possible.

The Division for Marketing and Communication of the University of Stellenbosch undertook secretarial work regarding liaison with the authors as well as with the preparation of this publication. A special word of thanks is owed to Mr C. J. Britz for his considerable involvement in the editorial process.

Finally, the views expressed in this publication are those of the authors and do not necessarily reflect those of AFMA or of the institutions to which the various authors are affiliated.

Johann Laubscher  
Editor  
Stellenbosch

## CONTENTS

### FOREWORD

Johann Laubscher

Department of Agricultural Economics, University of Stellenbosch, South Africa

v

### KEYNOTE PAPERS

#### CONCEPT AND MEASUREMENT OF SUSTAINABILITY IN AGRICULTURE

Eric Tollens

Department of Agricultural Economics, Katholieke Universiteit Leuven, Belgium

1

#### SUSTAINABILITY OF MICRO-FINANCE ORGANISATIONS IN THE 1990s: A BRIEF COMMENTARY ON ISSUES OF PERFORMANCE AND DESIGN

Douglas H. Graham

Department of Agricultural Economics, Ohio State University, USA

12

### CONTRIBUTED PAPERS

#### SUSTAINABILITY IN AGRICULTURE: THE NIGERIAN EXPERIENCE WITH RESEARCH AND EXTENSION SERVICE AGENCIES

O. O. Akanji and E. D. Balogun

Research Department, Central Bank of Nigeria, Abuja, Nigeria

25

#### FOOD CONSUMPTION OF SMALLHOLDERS IN SUB-SAHARAN AFRICA: DO LIVESTOCK REALLY HELP?

Carol R. Cabal

University of Hawaii and International Livestock Research Institute, Ethiopia

Simeon K. Ehui

International Livestock Research Institute

Carol A. Ferguson

University of Hawaii

43

#### FARM ORGANISATION FOR SUSTAINABILITY IN AGRICULTURE

J.P. Lombard

Department of Agricultural Economics, University of Stellenbosch, South Africa

52

#### THE DEVELOPMENT OF A WHOLE-FARM PLANNING MODEL WITH DYNAMIC LINEAR PROGRAMMING FOR THE LIVESTOCK- SMALLGRAIN-PASTURE AREAS OF THE SOUTHERN CAPE

D.B. Louw

Department of Agriculture: Western Cape, George, South Africa

J.P. Lombard

Department of Agricultural Economics, University of Stellenbosch, South Africa

59

**ECONOMIC ANALYSIS OF IRRIGATED HORTICULTURAL  
PRODUCTION: A CASE STUDY OF GENDER ISSUES IN KENYA** 71

O.L.E. Mbatia

Department of Agricultural Economics, University of Nairobi, Kenya

**BROADENING THE ENVIRONMENTAL VISION OF AGRICULTURAL  
STUDENTS THROUGH TRAINING: A CASE STUDY OF SUSTAINABLE  
AGRICULTURAL TRAINING AT THE ELSENBURG COLLEGE OF  
AGRICULTURE, SOUTH AFRICA** 77

R.J. Nowers

Assistant Director: Agricultural Economics, Department of Economic Affairs,  
Agriculture and Tourism, Western Cape Province, South Africa

D.R. Schreuder

Head of the Environmental Education Programme, Faculty of Education,  
University of Stellenbosch, South Africa

**SUSTAINABLE USE OF EXISTING IRRIGATION WATER BODIES BY  
MEANS OF AQUACULTURE IN SOUTH AFRICA: A CASE STUDY** 96

K. Salie, L. Van Roey, L.C. Hoffman and D. Brink

Aquaculture Research Unit, University of Stellenbosch, South Africa

**DEVELOPING TECHNOLOGY FOR AGRICULTURE IN SUB-SAHARAN  
AFRICA: EVOLUTION OF IDEAS AND SOME CRITICAL QUESTIONS** 102

John H. Sanders and Jeffrey D. Vitale

Department of Agricultural Economics, Purdue University, USA

**INTENSIFIED LIVESTOCK PRODUCTION AND ACHIEVING  
SUSTAINABLE AGRICULTURE AND FOOD SECURITY IN AFRICA** 116

Barry I. Shapiro

International Livestock Research Institute, Ethiopia

**A FARM HOUSEHOLD ANALYSIS OF LAND USE AND SOIL  
CONSERVATION DECISIONS OF SMALLHOLDER FARMERS IN THE  
ETHIOPIAN HIGHLANDS** 130

Bekele Shiferaw and Stein T. Holden

Department of Economics and Social Sciences,

Agricultural University of Norway, Norway

**LAND REDISTRIBUTION IN SOUTH AFRICA - SOME PRACTICAL  
LESSONS** 149

Peter Simms

KwaZulu Finance and Investment Corporation, Ulundi, South Africa

Justin Chadwick

South African Cane Growers Association, Durban, South Africa

ASPECTS OF SUSTAINABLE DAIRY FARMING IN THE SWARTLAND

160

A. L. van der Spuy

Department of Agriculture, Western Cape Province, South Africa, and  
postgraduate student, University of Stellenbosch, South Africa

J. Laubscher

Department of Agricultural Economics, University of Stellenbosch, South Africa