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## CONFERENCE REVIEW

### RURAL DEVELOPMENT AND COMPETITIVENESS: RE-THINKING STRATEGIES IN A GLOBAL ENVIRONMENT

Proceedings of the 40<sup>th</sup> Annual Conference of the Agricultural Economics Association of South Africa held at the President Hotel, Bloemfontein on 18-20 September 2002

*TI Fényes<sup>1</sup>*

Congratulations to the Free State Branch of AEASA and the organising committee under the chairmanship of André Jooste for this excellent conference.

The main conference was preceded by three workshops on the following topics:

- 1.a The role of Agriculture in pro-poor growth (Facilitated by the University of Pretoria and Ghent University);
- 1.b A solution for the price risk management in the dairy industry: A futures market for Milk? (Facilitated by the Department of Agricultural Economics, extension and rural development, UP and the Milk Producers Organisation);
2. From development finance to entrepreneurial finance in rural areas Facilitated by the Policy Business Unit of the Development Bank of Southern Africa (DBSA), UP and Ebony Consulting International);
3. Assessing international markets: Opportunities, support measures and constraints (Facilitated by the Agribusiness Chamber and the ABSA chair in Agribusiness Management, UP); and
4. Modelling of water management in agriculture: from field to catchment level (Facilitated by the water Research Commission)

Interested parties should contact the facilitators for future details on the deliberations.

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<sup>1</sup> *Professor, Head of Department of Economics, Vista University, Mamelodi Campus.*

Mr Mann Oelrich, MEC for Agriculture in the Free State Province opened the main conference with his welcoming address and conveyed a positive outlook for the activities of our Association.

The Presidential address of Prof Johann Kirsten gave a concise summary of "Forty years of agricultural economics scholarship and practice in South Africa: A time to challenge the consensus and refocus our intellectual work". He challenged the theoretical building block of agricultural economics and provided some indication of how the discipline rectified some of its shortcomings mainly with the incorporation of some aspects of the New Institutional Economics into the discipline. He also recommended that we should make more use of the other social sciences, such as sociology and anthropology, especially to understand better the major complexities of black economic empowerment in agricultural and thereby contribute to the most important task of building a "united and prosperous agricultural sector".

The Simon Brand Memorial Address was delivered by the distinguished Professor Edward Schuh (University of Minnesota). The topic of his address was: Can lagging countries catch up? According to him, the key to alleviating poverty on a global scale is to raise the productivity of the poor and disadvantaged of the world. He sees economic integration with other countries as an important means for lagging countries to close the gap between themselves and the more advanced countries. Rural development, investment in human capital and the importance of institutional innovation and development locally and internationally are the other major areas to receive increased attention. He ended his presentation with an optimistic note that the lagging countries can close the gap with the now advanced countries. To this end, however, a rather unconventional agenda is needed - one that includes increased reliance on agriculture.

The invited paper by Prof H van Schalkwyk (UFS) on: Competitiveness, Productivity and Economic Progress set the scene for further deliberations. In his contribution he outlined and documented the steady decline of the growth of the South African economy since the 1970s. On the positive side, he showed that multi-factor productivity in South Africa is rising steadily, as well as fixed capital productivity. He recommended a changing paradigm to increase competitiveness through globally competitive industries using the home base to create competitive advantages by the continuous upgrading of resources and rapid innovations. His agenda for the future is based on new strategies to avoid competing on price, develop supporting industries, improve the links with research and training, upgrade standards and lobby for the right government policies.

The second invited paper was presented by Mr Mohammad Karaan (US) and he focussed on the theoretical foundations of the New Institutional Economics and its influence on agricultural development. He emphasised issues such as constructive engagement, remediableness, land reform, entrepreneurship, supply chains and the building of social capital.

A special plenary session was held to discuss what has been achieved, what needs to be done and the way forward, ten years after the Kassier Report. Interesting contributions were made by Proff Kassier and Vink and Mr J Tube. Prof Jan Groenewald summarised the deliberations.

In another plenary session the following upgraded papers were presented:

- Positive mathematical programming as calibration tool in regional optimisation models: The Berg River water allocation model case study  
DB Louw, HD van Schalkwyk & W Britz
- Evaluating potential investment in the pink lady apple variety under uncertainty and irreversibility  
PA Hardman, MAG Darrich & GF Ortmann  
*This paper won the ABSA Agribusiness prize for the best contributed paper.*
- The market potential of the South African deciduous fruit industry: Strategies and options  
NG Meyer & MC Breitenbach

In the final plenary session current President Prof Johann Kirsten gave an able synopsis of the proceedings of this very successful conference.

Thereafter, the following contributed papers were presented:<sup>2</sup>

RM Mamphiswana, LA Du Plessis & G Kundlande

*University of the Free State*

Socio-economic acceptability of water conservation techniques in semi-arid areas of the Free State Province

Semi-arid farmers face constraints limiting their agricultural production due to low rainfall, poor soil fertility, high evaporation and runoff. The Agricultural Research council of South Africa has developed water conservation techniques for application by farmers in semi-arid areas. Techniques include the use of no till, basin tillage and the use of mulches, which have shown an increase in moisture availability in farmer's fields, reduction of runoff and evaporation. Currently efforts are underway to

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<sup>2</sup> *Abstracts submitted by authors.*

promote the wide-spread adoption of these techniques among developing farmers in the Free State Province of South Africa. Information on the social acceptability of the water conservation techniques was collected using Participatory Rural Appraisal techniques. These techniques are suitable on the basis of which the social acceptability analysis is conducted. PRA field visits were conducted, introducing the water conservation concept, and a growing interest to adopt water.

**B Grové & LK Oosthuizen**  
*University of the Free State*

**A target motad approach to quantifying economic and environmental trade-offs of instream flow requirements under stochastic water supply and irrigation water demand**

The effects of stochastic irrigation water demand on the economic cost to irrigation farmers while maintaining an instream flow requirement are demonstrated by comparing model results from a chance-constrained (water supply risk) and an environmental Target MOTAD (irrigation water demand and water supply risk) model. Results showed that ignoring irrigation water demand uncertainty would cause an underestimation of the true probability of maintaining the instream flow requirement and an overestimation of both the economic costs and hydrological impact which will lead to socially unacceptable water allocation policies. Prerequisites for meaningful water policy development are a thorough understanding and correct quantification of the economic and hydrological consequences of alternative water allocation policies through the integration and application of economic and hydrological models in catchments with varying production and hydrological characteristics.

**D Poonyth, RM Hassan, GA Gbetibouo, JM Ramaila & MA Letsoalo**  
*University of Pretoria*

**Measuring the impact of climate change on South African agriculture: A Ricardian approach**

A modified Ricardian model was used to assess the potential effects of climate change on South African agricultural sector. These effects were estimated for seven major field crops, which represent 80% of the field crops of South Africa. An increase of 2°C in temperature will decrease the real net revenue per hectare by 25%, but the net impact on revenue without accounting for adaptation will decrease net revenue by 29.5%. The results suggest that there has been to some extent an adaptation element in the South African agricultural sector. Given the evidence that climate change is happening slowly, the concerned authorities should devise methods to minimize its impact on the agricultural sector.

S Farolfi, RM Hassan & L Mqadi

*University of Pretoria*

**Food industry wastewater management: lessons from the rest of the world for South Africa**

Food processing is considered to be one of the most water demanding and polluting industries in South Africa (SA), however not very much has been done to examine more cost effective options for wastewater management within this important sector. Among the measures proposed in the National Water Act for pollution management in general and wastewater in particular are market-based instruments and incentives. Those include the use of pollution charges, quotas and tradable permits. While market-based instruments have several advantages over command and control measures they require careful application based on proper modelling and measurement of processes involved. One of the most challenging tasks in the use of such policy measures is the determination of an optimal charge or permits schemes. Experiences from France and Italy are here illustrated in order to provide useful information and valuable lessons for SA to learn from about how.

MF Viljoen

*University of the Free State*

**The economic impacts and management of irrigation droughts in Sub-Saharan Africa: Towards guidelines for effective drought management policies and strategies**

Globally agricultural activities drain more than two thirds of all fresh water consumption, while the comparative proportion rises to almost 90 per cent in Africa. Irrigation plays a very important role in the agricultural sector in many countries, but especially in the more drier and arid regions of the world. Irrigation is often the most important component of the economic base of these areas, and affects many social and political activities. It therefore stands to reason that the socio-economic welfare of populations in irrigation areas is largely dependent on the adequacy and stability of the irrigation water supply. However, increasing levels of environmental degradation worldwide have resulted in an increase in drought frequencies in some regions that again affect water supply to irrigation farmers. This situation is exacerbated by a rapid growth in population numbers (mainly in developing countries) as well as growing consumption levels and economic activities (mainly in industrialised countries). The inevitable result is an increase in the demand and competition for water. Thus, with irrigation droughts becoming more frequent, it also becomes necessary that droughts and the effects thereof should be managed properly in order to minimize the negative impacts on people and the environment. Against this background this paper is a brief literature review on the economic impacts

and management of droughts in Sub-Saharan Africa as an input to developing guidelines for effective irrigation drought management policies and strategies.

JM Tsephe, LA du Plessis & FOC Nwonwu

*University of the Free State*

**Determining the value of irrigated water in the Ramah Canal at Vanderkloof Dam**

The floodplain in the Orange River at Vanderkloof Dam is classified as arid such that crop production is only feasible through irrigation. Determining the value of irrigation water is a requirement for efficient and profitable farming. Linear Programming (LP) and Stochastic Dynamic Programming (SDP) models were developed to determine short-term and long-term marginal value product (MVP) for irrigation water. The LP model was first developed and used to generate short-term gross margins. From the gross margins generated, short-term values in the form of MVPs were derived. The gross margins generated by LP were later used as input into SDP to determine the long-term value of water. The MVPs for water derived from LP were R0.09, R0.18, R0.25 and R3.64 whereas those derived from SDP were R0.08, R0.16, R0.22 and R3.28 respectively for maize, lucerne, cotton and potatoes. With this information, it is possible to trade water and formulate water policies for efficient water allocation.

M Mashatola<sup>1</sup> & MAG Darroch<sup>2</sup>

*<sup>1</sup>South African Canegrowers' Association, South Africa; <sup>2</sup>University of Natal*

**Factors affecting the loan status of sugarcane farmers using a graduated mortgage loan repayment scheme in KwaZulu-Natal**

Factors affecting whether or not 83 medium-scale sugarcane farmers using a graduated mortgage loan repayment scheme in KwaZulu-Natal were current or in arrears on loan repayments as at 31 March 2001 were analysed using a logit model. Results show that the estimated probability of a farmer in the scheme being current on loan repayments was higher for clients with higher levels of average annual gross turnover relative to loan size, and for clients with access to substantive off-farm income. This suggests that farm size (proxied by annual gross turnover) does matter when policymakers in South Africa consider future similar schemes designed to improve access to commercial farmland by people that previously could not buy farmland. Access to off-farm income could also be considered as a criterion in selecting potential farmers for such schemes as it helps to provide additional liquidity to fund future operations and debt repayments.

K Spio<sup>1</sup> & G Coetzee<sup>2</sup>

*<sup>1</sup>Technikon Pretoria; <sup>2</sup>Ebony Consulting International and University of Pretoria*

**Factors influencing the accessibility of agricultural credit: A case study of small-scale farmers in the Limpopo Province of South Africa**

The study examines the different factors limiting small-scale farmers' access to formal credit. Data was collected from 153 small-scale farmers in the Lowveld and Northern Regions of the Limpopo Province. The results of a logistic regression shows that area cultivated, title deeds, non-farm income, awareness, repayment record, remittances and pensions, and financial assets are important variables which can be used to predict the accessibility of credit. The results poses a major challenges for both the government (in terms of land reform programme) and rural financial institutions since access to credit is imminent if small-scale farmers are to make inroads into the 'plane of entrepreneurship'.

C Bizimana, W L Nieuwoudt & SRD Ferrer

*University of Natal*

**Factors influencing adoption of recommended farm practices by coffee farmers in Butare, Southern Rwanda**

Factors influencing technology adoption by Rwandan coffee farmers, assessed according to extent of adoption of soil testing and use of fertilizer, are studied based on a survey of 183 coffee farmers from Rusatira and Muyira districts in Butare Province during 2001. Twenty per cent of farmers surveyed have adopted both practices, however, forty-nine per cent have adopted neither practice. A chi-square test showed a strong association between the two practices, implying that a farmer who tests soils on his farm is also likely to use fertilizer. Results support expectations that farmers who adopt more recommended technologies and farming practices are more productive and more efficient producers of coffee. A discriminant analysis identified land fragmentation, availability of wealth and liquidity, and education of the principal farm decision-maker as the most important factors influencing the adoption of recommended and appropriate farming practices on coffee farms, followed by gender of farm operator, and farm information acquired by farmers. It is concluded that transformation of Rwandan coffee farming requires policies that (a) remove obstacles to the development of an efficient land market in order to reduce land fragmentation and to transfer land to more efficient farmers; and (b) improve rural education and liquidity, and reduce gender discrimination in order to promote adoption of recommended farming practices.



**G Kundhlande & LA du Plessis**

*University of the Free State*

**Understanding rural livelihoods: Case study of smallholder farmers in the Thaba Nchu district in the Free State Province**

This paper reports on the use of the livelihoods approach to describe the farming system of small-scale farmers in the Thaba Nchu district of the Free State Province in South Africa. The results show that application of the framework yields some new insights that can be useful in selection of agricultural research projects that will make the greatest contribution to food security and poverty reduction.

**MB Masuku, JF Kirsten, CJ van Rooyen & S Perret**

*University of Pretoria*

**Contractual relationships among smallholder sugarcane growers and the millers in the sugar industry supply chain in Swaziland**

This paper proposes and analyzes a model of relationship between smallholder cane growers and the millers in the sugar industry supply chain. In particular, it identifies the behavioural factors that contribute to the level of satisfaction by cane growers in their relationship with the millers. Using multiple regression analysis, the results indicate that trust and commitment are related to cooperation; cooperation is an antecedent of benefits and satisfaction. Cooperation was found to be important for the cane growers to realize benefits from their exchange relationship. Trust was not significant in explaining the growers' commitment to the relationship. The results concur with theory that trust, cooperation strategic benefits, commitment and absence of opportunistic behaviour are.

**CS Blignaut**

*University of Pretoria*

**A comparison in transito: The export performance of fresh grapes and oranges**

Die *International Trade Centre* in Geneva het 'n handelsindeks (*Trade Performance Index*) ontwikkel waarmee lande se prestasies en mededingendheid in internasionale handel onderling vergelyk word. Die veskillende aanwysers van die indeks kan dien ook as rigvlakke vir lande en kan veranderinge in hul internasionale handelsprestasies verklaar. In die referaat word die indeks wat vir onderlinge landvergelings ontwikkel is, aangepas om vir 'n land uitvoerprodukte onderling te vergelyk. Die resultate lyk belowend en blyk dit dat vars lemoene se uitvoerstrategie in vergelyking met die van duiwe aangepas moet word.

D Esterhuizen<sup>1</sup> & CJ Van Rooyen<sup>2</sup>

<sup>1</sup>*Agricultural Business Chamber*; <sup>2</sup>*Agricultural Business Chamber and University of Pretoria*

**Measuring the agribusiness decision environment: Constructing an Agribusiness Confidence Index for South Africa**

Agricultural and agribusinesses are experiencing far reaching changes. To measure these changes economists have developed indicators, generally known as indexes. An index is a ratio that measures a relative change. In this paper the methodology to construct a business confidence index for agribusiness in South Africa is discussed. The objective of such an index is to determine the business confidence of agribusinesses as accurate as possible. 80 agribusinesses is participating in conducting the Agribusiness Confidence Index. For the first quarter of 2002 the Agribusiness Confidence Index points to a 20% improvement in the business confidence of South African agribusinesses compared to the same period last year, and for the second quarter of 2002 a 14% increase in business confidence compared to the second quarter of 2001. This increase in confidence goes hand in hand with some other positive trend in the agricultural sector of South Africa re: competitiveness and investment.

M Geyser & IE Liebenberg

*University of Pretoria*

**Creating a new valuation tool for South African agricultural co-operatives**

Independent of the size of an organization, long-term shareholder wealth is equally important for all profit seeking organizations. This paper examines introducing Economic Value Added (EVA) as a performance measure for agribusinesses and co-ops in South Africa. EVA is an effective measure of the quality of managerial decisions as well as a reliable indicator of an enterprise's value growth in future. The question posed is whether South African agribusinesses and cooperatives are capable of creating shareholder and member value after the deregulation of the agricultural markets.

FOC Nwonwu

*University of the Free State*

**The role of site improving investments in promoting the competitiveness of the tourism industry in South Africa**

This study investigates the role of natural resource management in the promotion of the tourism industry in South Africa. The six-year 1996-2001 data on travel and tourism in the country is analysed. The specific aim is to determine the effect of investments on natural resource improvement on the demand for visits to tourists' destinations and the propensity to consume or spend by tourists. The analysis is based on the assumption that the attributes and conditions of tourists' destinations determine the amount

of visits made to the sites. It is further assumed that increased investment in site improvements in addition to the site attributes will improve the quality of the sites and increase the willingness to pay by visitors. Results show that the marginal willingness to pay of visitors increased with increase in investments and fell with divestment. It is further shown that investment-driven demand for visits is highly elastic. This makes the tourism industry very competitive in investment spending. A comparative analysis in the Southern African region shows that South Africa is the leader in total absolute investment in the tourism industry and therefore enjoys a competitive advantage in visitors' arrivals over other countries in the region. Future projections show that South Africa will continue to lead the region in tourists' arrivals to the year 2020. The paper concludes that since there is a positive correlation between site improving investments and visitors' arrivals and their willingness to pay, South Africa will continue to lead the region in natural resource-based tourism income earnings.

N Vink<sup>1</sup>, JF Kirsten<sup>2</sup> & C Woermann<sup>1</sup>

<sup>1</sup>*University of Stellenbosch*; <sup>2</sup>*University of Pretoria*

South Africa's Consumer Price Index (CPI) for food in comparative context

The consumer price index was first used in 1707. In 1925 it became institutionalised when the Second International Conference of Labour Statisticians, convened by the ILO, promulgated the first international standards of measurement. These original standards have been revised three times, in 1947, 1962 and 1987, and are currently under review. Statistics South Africa compiles and disseminates different CPI aggregates, including the Consumer Price Index; the Core Index; CPIX; and CPIF, or the Food Price Index. StatsSA has gone to considerable trouble in complying with international best practice in the calculation of the CPI. Nevertheless, three problems still remain, namely that StatsSA works with an unsatisfactory definition of rural areas, that no provision is planned for sales through informal sector outlets, and that no provision is made for food consumed away from home.

SL Knight & MC Lyne

*University of Natal*

Perceptions of farmworker equity-share schemes in South Africa

Farmworker equity-share schemes have received both positive and negative publicity since they were initiated by the private sector in the early 1990's. This paper compares the results of case studies conducted by the Surplus People's Project (SPP) in 1998 with more recent (2001) case studies. These studies suggest that many of the concerns raised by the SPP, such as, beneficiaries' participation and expectations, power relations between management and worker-shareholders, skills transfer and labour relations

have been addressed. The paper also highlights issues that remain areas of concern. It is recommended that Department of Land Affairs (DLA) grants should be awarded only to beneficiaries of projects that have been co-financed by a bank or reputable investor as this ensures a thorough financial assessment of the project, and only to projects that can demonstrate a history of good labour relations.

M Mahabile<sup>1</sup>, M Lyne<sup>1</sup> & A Panin<sup>2</sup>

<sup>1</sup>*University of Natal*; <sup>2</sup>*University of Swaziland*

Factors affecting the productivity of communal and private livestock farmers in southern Botswana: A descriptive analysis of sample survey results

This article compares herd productivity, levels of investment and socio-economic characteristics of communal and private livestock farmers sampled in the southern region of Botswana during 1999/2000. The object is to determine whether land tenure and other socio-economic variables might contribute to differences in investment and herd productivity. Descriptive statistics show that levels of investment and herd productivity are higher on private farms than on open-access communal grazing. Private farmers are also better educated, more liquid, and have larger herd sizes, but do not differ from their communal counterparts in terms of age, gender, race or household size. Levels of investment in fixed improvements and operating inputs are negatively correlated with herd mortality, and positively correlated with calving and off-take rates, and with liquidity and private ownership of land. While these findings appear to support Botswana's agricultural policy of privatising some communal grazing land to individual farm households or to small, organized groups of farmers, it is clear that land tenure is not the only variable of policy interest. A more rigorous analysis of the data is required to untangle the causes of observed differences in herd productivity and investment.

MN Makhura<sup>1</sup> & WSK Wasike<sup>2</sup>

<sup>1</sup>*Development Bank of Southern Africa*; <sup>2</sup>*Kenya Institute for Public Policy Research and Analysis*

Patterns of access to rural service infrastructure: Case of farming households in Limpopo Province

Inadequate infrastructure is a major development challenges in developing countries. This paper applies factor analysis to determine the pattern of access to rural service infrastructure on 158 farming households in the Limpopo Province. The nine components of access to service infrastructure (distance to Polokwane, nearest town, local government, hospital, magistrate office, post office, traditional authority, district agricultural offices and extension service) were subjected to factor analysis. The results

support the concept of centre-periphery pattern of service infrastructure development. Polokwane is a major centre in the Province. Its peripheries are regions, which have towns as centres. Health, local government and postal services are found in such regional centres. The district centres provide mainly agricultural and justice services. Finally, local centres provide services of traditional authorities, agriculture and postal services. These patterns have major implication for infrastructure development policy and programs. They also need to be considered in planning the role of institutions in economic development.

TS Mkhabela

*KwaZulu-Natal Department of Agriculture & Environmental Affairs*

**Economic feasibility of using composted feedlot manure on dryland maize**  
The economic feasibility of using composted manure from KwaZulu-Natal midlands feedlots in combination with commercial N in production of dryland grain maize [*Zea mays* (L.)] was evaluated. Effective disposal of large quantities of manure from large scale feedlots is a concern. Yield data from Cedara experiment station was used to estimate a quadratic production function where maize grain yield is a function of manure and commercial fertiliser N application rates. Four rates of commercial N (0, 50, 100 and 200 kg ha<sup>-1</sup>) and five rates of composted feedlot manure (0, 5, 10, 20 and 30 t ha<sup>-1</sup>, as is basis) in a factorial arrangement were applied to dryland maize. The production function estimate was used to determine the combination of composted manure and commercial N, which maximized net returns. The results suggest that a compost application rate of 15 t ha<sup>-1</sup> with 20 kg ha<sup>-1</sup> of commercial N would be economically feasible when the price of commercial N, including application charges, is R4.50 kg<sup>-1</sup> and the price of compost R77.20 t<sup>-1</sup>. Once the price of compost reaches R95.00 t<sup>-1</sup> compost use is no longer economically feasible.

B Fufa, RM Hassan & D Poonyth

*University of Pretoria*

**Determinants of fertilizer use on maize in Eastern Ethiopia: A weighted endogenous sampling analysis of the extent and intensity of adoption**  
Factors influencing the extent and intensity of fertiliser adoption on maize production in Ethiopia were analyzed. A Weighted Endogenous Sampling Maximum Likelihood estimator was used in the specification of a Probit and Tobit fertilizer adoption models. The results have important implications for the formulation of policies and programs targeted to promotion fertilizer use in small-scale maize production. Those include improved road infrastructure, consideration of weather related crop failure insurance programs, development of drought tolerant cultivars and targeting particular farmer groups.

**AD Alene & RM Hassan**

*University of Pretoria*

**Determinants of farm-level technical efficiency among adopters of improved maize production technology in Western Ethiopia**

A translog stochastic production frontier was used to analyse the technical efficiency of small farmers using improved maize production technology in Western Ethiopia. The study estimated a mean technical efficiency for the entire sample of 76% indicating that a significant potential for gains from efficiency improvement in maize production remains to be exploited even among users of improved technology. This specifically suggests that maize producers can increase their production by an average of 24% with their current farm resources and technology if they operate at full technical efficiency levels. The study also revealed that farm size, education, access to credit and timely availability of modern inputs are important determinants of technical efficiency among small-scale maize producers in Ethiopia. Policies and strategies that promote rural education, credit, timely availability of inputs through better infrastructure and markets will be greatly instrumental in realising considerable gains in maize production with available farm resources through more efficient and appropriate use of improved technology.

**A Bekele<sup>1</sup>, MF Viljoen<sup>1</sup> & G Ayele<sup>2</sup>**

*<sup>1</sup>University of Free State; <sup>2</sup>Debre Zeit Agricultural Research Centre, Ethiopia*

**Effect of farm size on technical efficiency of wheat production: A case study of the Moretna-Jirru district in Central Ethiopia**

In Ethiopia, where small farming households are predominantly subsistence producers, efficiency plays a significant role in boosting food production. Especially, as land resources are becoming limited (scarce) with population expansion, increased food production is coming mainly from more effective use of existing resources and technological innovation. Although the Ethiopian government, since 1980, focused on achieving food self-sufficiency, the problem of food insecurity still persists in the country. The objectives of this paper are to reflect on the technical efficiency of small farmers households, the determinants of technical efficiency and the relationship between farm size and household food production in the central highlands of Ethiopia. This paper employed the stochastic frontier production function approach and applied it to a total of 199 sampled farm households to examine efficiency. The results revealed that large farmers are technically more efficient than the small farmers. The technical efficiencies of large farm size range from 0.652 to 0.982, with the mean technical efficiency estimated to be 0.853. For small farm size, the technical efficiencies

range from 0.528 to 0.857, with the mean technical efficiency estimated to be 0.624. It is hence important to give attention to existing resource use and technical efficiency determining factors to enhance productivity at farm level in the Moretna-Jirru district of Ethiopia.

**ZG Alemu, LK Oosthuizen & HD van Schalkwyk**

*University of the Free State*

**Ethiopian agriculture: A leading or passive sector?**

The objective of this study was to perform causality tests between agriculture and the rest of the economy using the Granger causality test procedure (1969). Years of bi-directional causality were discovered between agriculture and manufacturing between 1974 & 1977 and between 1991 & 1996. On the other hand, years of unidirectional causality were discovered between 1974 & 1977 and between 1988 & 1996 from agriculture to manufacturing and visa versa. With regards to agriculture and services, unidirectional and bi-directional causalities were discovered only between 1974 and 1977. The period between 1974 & 1977 corresponds to the time when socialist institutions were in their embryonic stage. On the contrary, the period between 1991 & 1996 corresponds to the replacement of a command economic system by a free market economic system. The interim period i.e. 1988-1991 witnessed different positive economic policy adjustments. This paper proves that agriculture must be freed from policy constraints for it to stimulate growth in other sectors.

**D du PS Jordaan, D Poonyth & OT Doyer**

*University of Pretoria*

**Performance measurement indices on the buying behaviour of ram buyers in the Highveld Merino Club**

Merino rams are an important input in the Merino breeder's production process. Breeders need to make informed decisions when buying rams because of the influence that the ram will have on the characteristics of the herd, especially with regards to the characteristics of the animal that are deemed economically important. Before the advent of performance testing through objective measurement a system of subjective evaluation was used to determine the breeding value of Merino rams. The use of the subjective system of evaluation seemingly continues and the prevalence of this system of evaluation raises the question to what extent ram buyers are using performance measurement indices in aiding them in their buying decision. This study finds that performance measurements supplied to buyers are indeed used to determine the economic value of an animal. These performance measurements are, however, only responsible for determining a small proportion of the economic value of an animal.

D Scheepers

*University of Pretoria*

**Portfolio theory in support of the development of an optimal hedging strategy for South African maize producers**

This paper has a dual aim of answering two important questions regarding the newly founded agricultural derivatives market in South Africa. Firstly, since producers hedge in order to obtain the benefits of portfolio variance minimisation, what if a farmer did not hedge, would he necessarily have been at a disadvantage to a farmer who did hedge? Secondly, if hedging does have a significant benefit for reducing price risk, can a low to no-cost, generic time scale strategy be developed as a rule of thumb for hedging of producers. Only once such a strategy has been shown can one proceed towards building even more advanced strategies to enhance the results of the generic strategy regarding price/t received, portfolio risk reduction and minimising hedging cost. The widely acceptance of such a rule of thumb will then also help producers in their hedging decisions especially against excessive profiteering by traders due to their superior knowledge regarding the market instrument compared to producers often less advanced knowledge. This in itself could then contribute to increasing the effectiveness of the derivatives markets to all hedge participants.

LJC Viljoen & GG Antrobus

*Rhodes University*

**Return regularities in the prices of commodities traded on the Agricultural Products Division (APD) of the Johannesburg Securities Exchange (JSE)**

The main objective of this paper is to investigate intra-week, intra-month, and monthly return regularities of agricultural commodities traded on the JSE APD. Mean daily returns for three commodities, white maize, yellow maize, and wheat were calculated and sorted into different time intervals. Results are consistent with the so-called Monday effect and provide evidence of the influence of weekends on the market. Mean returns tend to increase gradually as the week progresses. The presence of public holidays has significant effects on the trading days directly before and after the holiday. Early week returns are affected if a holiday is following in the week while late returns are significantly different from normal if it follows a public holiday. A significant shift is evident from month-end to the beginning of the following month with mean return increasing significantly from a low month-end return into the following month. The common January effect is not evident in any of the three markets under consideration, however, mean monthly returns show significant positive patterns in the last three months of the year.



JF Kirsten<sup>1</sup>, N Vink<sup>2</sup>, D Scheepers<sup>1</sup>, F Meyer<sup>1</sup>, M Calcaterra<sup>1</sup> & L Geyser<sup>1</sup>

<sup>1</sup>*University of Pretoria*; <sup>2</sup>*University of Stellenbosch*

**The political economy of food price inflation in South Africa**

This paper reports on a study that investigated the increase in food prices in South Africa. It is set against the scenario of an increasing inflation rate since September 2001. The June 2002 STATSSA figures estimated the annual inflation rate (CPIX) at 8.8% with food inflation being the major contributor with an annual increase of 14%. The high unemployment and poverty rate in South Africa has already lead to concerns about the negative impact of these increases on the cost of living for the poorest. In this paper we show that the sharp depreciation of the exchange rate towards the end of 2001 had a major impact on the producer price of maize – one of the key agricultural commodities because of its role as a staple food and as an input in the production of white and red meat and other animal products.

JF Kirsten<sup>1</sup>, D Schimmelpfennig<sup>2</sup>, L Beyers<sup>1</sup>, F Meyer<sup>1</sup>, D Scheepers<sup>1</sup> & M Calcaterra<sup>1</sup>

<sup>1</sup>*University of Pretoria*; <sup>2</sup>*ERS- USDA*

**Long-run equilibrium relationships and short-run dynamics between world prices, exchange rates, and the price of staple maize in South Africa**

The dynamic market for the consumer staple, white maize, in Southern Africa can be characterized from the time series properties of consumer and producer prices, world prices and exchange rates in terms of an error-correction model. Adjustment to long-run equilibrium takes place quickly, within two or three months, but dramatic disequilibria shocks and strong, volatile short-run dynamics persist for up to seven months and result in a temporary negative relationship between exchange rates and producer prices.

TO Nakhumwa, RM Hassan & D Poonyth

*University of Pretoria*

**Adoption of soil conservation technologies in Malawi: The case of Mangochi and Nkhatabay districts**

A Selective Tobit model was used to analyse patterns of adoption of soil conservation technologies by smallholder farmers in Malawi. Smallholder farmers face a two-step choice problem in adopting soil conservation practices. They first decide whether or not to adopt soil conservation practices and then chose the level of adoption such as how much land to invest in soil conservation. The study results revealed that factors that influence farmers' decision to adopt soil conservation are not necessarily the same ones that determine farmers' choice of adoption levels.

**B Fufa & RM Hassan**

*University of Pretoria*

**Stochastic maize production technology and production risk analysis in Ethiopia**

A stochastic production technology that allows risk effects of factor inputs was estimated for maize farmers in Ethiopia. The results suggested that the promoted improved maize technology exhibits constant returns to scale whereas non-adopters use decreasing returns to scale technology. The study showed that timely planting is critical for maize yield stability among both adopters and non-adopters and suggests the importance of using oxen and higher efforts to achieve that. Nevertheless, the results showed that most of the factors under the control of the farmers do not offer powerful explanation to maize yield variability compared to natural factors such as rainfall, frost, pests and diseases.

**AD Alene & RM Hassan**

*University of Pretoria*

**Total factor productivity and resource use efficiency for alternative cropping systems and technologies across agro-climatic zones in Eastern Ethiopia**

This paper compares the resource use efficiency of alternative cropping systems and technologies based on multilateral total factor productivity measures using detailed production data collected from 960 plots in the dry land and wet highland zones in Eastern Ethiopia. The results indicate considerable variation in resource use efficiency among cropping systems in both zones. The cereal-pulse systems showed higher efficiency over sole cropping in the dry zone. While maize was superior to sorghum in these intercropped systems, sorghum is widely grown due to its higher tolerance to drought and unreliable weather conditions prevailing in dry lands. On the other hand, intercropping of maize with potatoes showed the highest efficiency advantages in the wet highlands over other cereals (wheat and tef) and potatoes combinations. The results have important implications for research and extension services not only for promoting innovative cropping systems across farming communities but also for integrating currently available improved technologies into the complex farming systems that are dictated by agro-climatic and demographic conditions.

**F Liebenberg<sup>1</sup> & JF Kirsten<sup>2</sup>**

*<sup>1</sup>ARC; <sup>2</sup>University of Pretoria*

**Agricultural R&D policy in South Africa: Reflections on the past and options for the future**

The South African agricultural research system has undergone a series of fundamental structural, institutional and policy changes over the past 20 years. Against this background this paper highlights the changes that took

place in the public sector in terms of relative investment and capacity. Although public sector financing still remains the most important source of funding, this has come under severe pressure in recent years. The last 5 years saw an increase in the contributions of producer organisations and international donors to the funding of agricultural research with universities increasingly playing a more important role in providing research. The public sector agricultural research system is under threat of demise as top researchers are leaving the main research service provider. Several lessons are drawn from the historical trends and a summary of the debate about a future, more sustainable NARS is presented.

JF Kirsten, M Gouse & L Jenkins

*University of Pretoria*

**Bt cotton in South Africa: Adoption and the impact on farm incomes amongst small-scale and large-scale farmers**

South Africa is one of few developing countries, and the only one in Africa that has adopted genetically modified crops for commercial production. The very impressive adoption rate of insect-resistant cotton in South Africa can be attributed to different benefits enjoyed by adopters. Both large-scale and small-scale farmers enjoy financial benefits due to higher yields and despite higher seed costs. In addition, those who adopted the technology appear to be more technically efficient than those who do not adopt – indicating that it is perhaps the better farmers who spot the potential benefits of the Bt cotton seed. It is encouraging to hear reports of cross-pest control improvements due to less spraying. Further diverse analysis of the results from the various surveys are underway and promises to deliver interesting results on the various impacts Bt cotton is having on the South African cotton industry.

S Ngqangweni

*University of Pretoria*

**Decisions on livestock keeping in the semi-arid areas of Limpopo Province**  
One of the central questions facing South African agricultural and rural policy makers is whether poor rural households would take opportunities afforded to them through increased public expenditures in these areas. This study spotlights the rural livestock sub-sector in the poor semi-arid areas of the Limpopo province and investigates the factors behind the decision by households to keep livestock and also the rationale to keep given herd sizes. It tests the central hypothesis that poor households would invest in livestock when there are opportunities for them to do so in the form of infrastructure and other support services. The study finds that these poor households indeed do respond positively in cases where there are such opportunities by investing in livestock. These findings illuminate the need

for deliberate investments aimed at promoting agricultural (particularly livestock) growth, and thereby creating opportunities for sustainable livelihoods in these areas.

J Maphutha<sup>1</sup>, R Nowers<sup>1</sup> & N Vink<sup>2</sup>

<sup>1</sup>*Directorate Agriculture: Western Cape;* <sup>2</sup>*University of Stellenbosch*

An analysis of the effect of foreign investment on land redistribution in the selected magisterial district of the Boland region

This paper investigates whether and how an inflow of foreign investment into farmland in some magisterial districts of the Boland region in the Western Cape, South Africa affects land prices and land redistribution thereof. Information on the trends of ownership of land in the mentioned region during the year 1998, 1999 and 2000 was extracted from the Deeds Registry, which aided in achieving the objective of the study. The research findings indicate that the level of foreign investment is not minimal and it exerts an upward pressure on land prices resulting in a slowdown in land redistribution. It was found few Black farmers who are rather the affluent participated in the land market by purchasing land through private cash and loan mortgages. Only five government redistribution projects were registered.

SL Hendriks & MC Lyne

*University of Natal*

Growth linkage potential for two communal areas of KwaZulu-Natal

Expenditure elasticities and growth linkages were estimated from household consumption data collected from 99 households in two communal areas of KwaZulu-Natal in 1997. Relatively weak agricultural growth linkages were estimated for these communal areas (multiplier of 1.28), predicting that a one Rand increase in household income would only add an additional 28 cents to the local economy. It is argued that even relatively weak growth linkages could lead to much needed new income and employment opportunities within the local farm and non-farm sectors if the constraints inhibiting broad-based growth in rural incomes are alleviated. Substantial public investment in both physical and institutional infrastructure to reduce transaction costs and a risk in all markets is required to encourage greater participation by local entrepreneurs and private sector investors. Extension agents should assist communities by promoting collective marketing, facilitating land rental contracts, and providing training, technical and business support for farm and non-farm entrepreneurs.