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How the leopard has changed its spots: past dynamics and future opportunities[1]

FR Tomlinson Commemorative Lecture held on 31 July 2009, Rhodes University
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1. Introduction

I feel very humbled being afforded the opportunity to present the FR Tomlinson Commemorative Lecture. In the process of preparing this lecture, I looked up the previous presenters of the lecture and saw the names of eminent agricultural economists who have made major contributions to the subject in South Africa. I feel extremely proud to be included in such a prominent group and it made me to feel somewhat of an interloper amongst the likes of, *inter alia*, FR Tomlinson, Eckart Kassier, Lieb Nieuwoudt and Johan van Zyl.

In choosing a title for this lecture, I felt that I wanted to look at the dynamic nature of the discipline under the Agricultural Economics Association of South Africa over the period of its existence and propose some opportunities for the future. In discussing this with my colleague, Geoff Antrobus, he suggested that I look for a 'catchy' title and suggested something along the lines of a leopard changing its spots. Given that the Association has a recognition award called the Leopard Award, the title seemed to be appropriate. The saying goes that 'a leopard cannot change its spots', but I shall argue that this leopard has successfully managed to change its spots and will continue to do so as it rises to future challenges.

I wanted to divide the development of the Association and the discipline in South Africa into a number of segments, and this resulted in its own problems – how to divide the development of the discipline into identifiable phases. I immediately thought of Shakespeare's Seven Ages of Man. It did not take me long to discard the idea, for a number of reasons. Firstly, I could not think of a way of dividing the development of the discipline into seven distinct parts. Secondly, the first age refers to "the infant, mewling and puking in the nurse's arms", which does not accurately reflect the strong beginnings of the

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Association. Finally, the Association does not reveal the imminent demise as depicted in the last age, namely, the "last scene of all, that ends this strange eventful history, is second childishness and mere oblivion, sans teeth, sans eyes, sans taste, sans everything". The Association is very much alive and growing from strength to strength. Various other scenarios came to mind, but I decided to adopt a rather mundane approach of looking at the development of the discipline in terms of the early years, development years and, lastly, the maturity of the Association. In developing this pen-sketch of the Association, I have used the journal of AEASA, *Agrekon*, as a proxy to show the manner in which the leopard has changed its spots over the years.

2. The early years: 1961-1980

The Association was founded on the initiative of SP (Faan) van Wyk and, although the first President was an academic, FR Tomlinson, the articles in the journal were largely dominated by the Department of Agricultural Economics and Marketing. The papers contributed to *Agrekon* focussed on the work and policies of the Department, which is not surprising as, at that time, it was not the journal of the Agricultural Economics Association of South Africa but rather the Quarterly Review of the Department of Agricultural Economics and Marketing.

The articles in the journal were akin to a journey of discovery through which the discipline was trying to find its role and purpose. The articles were generally of a descriptive and informative nature, rather than of an analytical one. Many of the papers focussed on issues, such as:

- The role of agriculture in the South African economy (Du Plessis & Swanepoel, 1963),
- The South African Agricultural Union and liaison with the Department of Agriculture (Van Heerden, 1963),
- The Division of Commodity Services – its creation, function, extent and future organisation (Dippenaar, 1963),
- The economic nature of the challenge to South African agriculture (Van Biljon, 1966), and
- The contribution of the agricultural departments to agricultural development (Van der Merwe & Du Toit, 1967).

With hindsight, these contributions may seem to be inconsequential in their contribution to the subject and the agricultural industry. However, they were building a firm foundation for the development of the discipline.

In terms of specific contributions to the journal, a significant proportion of the papers concentrated on farm management and marketing issues. As with the more general contributions, these articles were also of an explanatory character, and some of them could be seen to have educational aspects. The farm management contributions included papers such as:

- Determination of an economic farming unit (Van Wyk, 1963),
- Management accounting in agriculture (Seldon & Groenewald, 1966),
- Some thoughts on the concepts of operator's earnings and gross profit (Smith & De Swardt, 1967),
- The economics of irrigation farming in South Africa (Siertsema, 1968),
- An approach for the development of planning standards for a homogeneous farming area: Part I (Viljoen, 1976a) and Part II (Viljoen, 1976b), and
- Financial management as seen by the commercial bank (Vogel, 1978).

Even more numerous than the farm management articles published were the contributions that addressed marketing aspects in the agricultural sphere. This appears to be somewhat of an anomaly considering that the bulk of the agricultural produce was marketed through one or other of the statutory Marketing Boards, which had varying degrees of control over the marketing and pricing of agricultural produce. Controlled marketing, under the Marketing Act of 1937, the consolidated Marketing Act of 1968 and other specific legislation, handled as much as 86% of agricultural production with only the marketing of vegetables and subtropical fruit (excluding bananas) not being regulated. The articles addressed topics relating mainly to products covered by the Marketing Boards, such as:

- A general review of the dairy products' market in South Africa (Maree, 1962),
- The development of the South African citrus industry (Moore, 1962),
- The South African fruit and vegetable canning industry and its markets (Glendining, 1963),
- The registration policy of the Wheat Board for the baking industry (National Marketing Council, 1965), and
- The possibility of a marketing management approach in South African agriculture (Du Toit, 1974).

A relatively small number of articles were submitted dealing with the produce that did not fall under the Marketing Boards.

It may appear as if there was a total dearth of theoretical and empirical agricultural economic research in the early period of the Association. The first empirical research articles I found in my review of *Agrekon* dealt with farm

management issues, *viz*. labour planning, farm-enterprise planning, feed cost reduction with silage and labour budgeting techniques. The first of many future papers dealing with farm land prices was published in 1970 (Behrmann & Collett, 1970). The definitive paper, "Factor subsidies and certain policy implications", was published by Lieb Nieuwoudt in 1972. Empirical papers were not the sole domain of the farm management practitioners; there were also papers of a marketing and demand and supply analysis variety, such as:

- The maize/meat price gap (Nieuwoudt, 1973),
- Demand for improved protein maize in monogastric animal rations (Nieuwoudt & Gevers, 1979), and
- Role of processors, wholesalers and retailers in the marketing of food in South Africa (Antrobus, 1979).

3. Development years: 1981–1993

After the foundation had been laid for the discipline over the first 20 years, the contributions made by the agricultural economists began to blossom. The breadth of issues covered in the articles published in *Agrekon* became more specific and analytical. The focus of research shifted from the traditional areas of interest of marketing and farm management to investigations of demand and supply, price analysis, production theory and risk analysis. A greater emphasis was placed on quantitative research and this could probably be attributed to the greater accessibility of computers. In the early 1980s, computers, and particularly desktop computers, started to become more commonplace with the concomitant increase in the possibility of analysing large quantities of data.

Although there was an increase in the breadth of issues covered and more quantitative research being undertaken, the focus of the research was still inward looking. The pressure being applied on South Africa because of its policies was intensifying, impacting on trade with traditional trading partners. Exports remained fairly constant over the period 1981 to 1987, even dropping in 1983 and 1984. The policy of self-sufficiency during this period resulted in the research concentrating on local economic issues.

The probable reason for the change in the focus and type of research published in the journal can be accredited to an increase in the participation of academics from the Departments of Agricultural Economics at the universities with agriculture faculties. Two departments, in particular, made a significant contribution to the discipline in this period, *viz.* those at the universities of Pretoria and Natal. This also coincided with the emergence of a new group of agricultural economists, who were destined to make a great impact on the

subject, and an increase in the number of students undertaking postgraduate research.

Prof. Lieb Nieuwoudt and his students at the University of Natal upped the ante during this period with significant contributions to the policy debate. They dealt with a wide range of issues in papers such as:

- A supply and demand analysis of regular Black labour in Natal (Latt & Nieuwoudt, 1985),
- An economic analysis of demand and policies in the beef industry (Nieuwoudt, 1985),
- The demand for bananas and the economic affect of supply restriction (Chadwick & Nieuwoudt, 1985),
- Estimation of demand and supply functions for fresh and industrial milk in South Africa (McKenzie & Nieuwoudt, 1985a), and
- An economic analysis of the effects of the fresh milk scheme (McKenzie & Nieuwoudt, 1985b).

Other members of the Department also made significant contributions to the discipline, *viz.* Gerald Ortmann, Mark Darroch and Mike Lyne. At the University of Pretoria, Jan Groenewald and Johan van Zyl made a serious bid to monopolise the journal. As opposed to the demand and supply emphasis of the University of Natal researchers, those at the University of Pretoria indulged, albeit not exclusively, in research in the field of production theory and risk analysis. Other agricultural economists who were beginning to make noteworthy contributions to the subject were, *inter alia*, Nick Vink, Kobus Laubscher, Klopper Oosthuizen, Herman van Schalkwyk and Johann Kirsten.

A major development that took place during this period was that in 1990 the Agricultural Economics Association of South Africa took over the publishing of *Agrekon* from the Department of Agricultural Economics and Marketing, which had been responsible for publication since its inception. The idea was to make *Agrekon* an even more balanced journal, representing all the diversity of interests found in the discipline and to include a broader range of interest than the science of agricultural economics generally represents. To meet this objective, the policy statement of *Agrekon* identified three general areas of importance, being the following:

- Disciplinary topics in economics applied to problems in the agricultural and food sector;
- Multidisciplinary or subject matter topics that bring together relevant evidence and information about the food and agricultural sector: and
- Articles dealing with problem solving in all sectors of the sector.

Whether this policy statement made any significant difference is difficult to tell, but it did open the door for a much broader focus than had been the case up until then.

4. Maturity: 1994–

The democratic elections in April 1994 brought about major changes in the social and business dynamics in the country as a whole, its relations with the international community, and in the agricultural sector. The new dispensation affected the agricultural sector in terms of issues such as land reform and a greater representivity of previously disadvantaged segments of the South African population in agriculture. The acceptance of South Africa back into the international community and the inclusion of agricultural produce for the first time under the terms of the General Agreement on Tariffs and Trade had a significant effect on the direction of agricultural research in the country. This brought about a change in the focus of the research to having a much more outward looking approach.

South Africa's commitments under the GATT Uruguay Round of negotiations and the Department of Agriculture's decision to implement a policy of import tariffs opened up a new area for agricultural economic research. Swart, Van der Vyver and Van Zyl (1995) proposed a tariff policy framework and a tariffication strategy to guide the Department of Agriculture in its shift from a policy of protecting local industries by means of quantitative import restrictions to one of import tariffs. Other contributions addressed the impacts of tariffs on the agricultural sectors. The implications of the Uruguay Round Agreement on Agriculture was also covered in articles on international trade in sub-Saharan Africa and, more specifically, within the Southern African Customs Union. The increase in agricultural trade raised questions as to the competitiveness of the local industry *vis-à-vis* the country's competitors, which brought forth research to answer these questions. Examples of these studies are the international comparison of the competitiveness of Western Cape wheat production by Vink, Kleynhans and Street (1998) and determinants of competitiveness in the South African agro-food and fibre complex (Esterhuizen, Van Rooyen & D'Haese, 2001). The changed marketing structure also resulted in research related to agribusiness and supply chains in the agricultural sector.

The post-1994 election period with the implementation of the Reconstruction and Development Programme brought about research dealing with land reform and farm worker participation. Land reform addressed models such as small farmer settlement schemes and communal farming models, whereas the

participation schemes aimed at providing access to farming assets on privately owned farms between the farm owner and the farm workers. Nel, Van Rooyen and Ngqangweni (1995) highlighted the factors that might influence the successful implementation of the farm worker participation. The reform of property rights by means of 'equity sharing' schemes resulted in a plethora of research into the schemes from various angles. These included the following:

- Equity sharing as a (unique) local agrarian reform experience: perceptions of farm workers (Ngqangweni & Van Rooyen, 1995),
- Perceptions of farmworker equity-share schemes in South Africa (Knight & Lyne, 2002),
- Best institutional arrangements for farmworker equity-share schemes in South Africa (Knight, Lyne & Roth, 2003),
- Measuring the performance of equity-share schemes in South African agriculture: a focus on financial criteria (Gray, Lyne & Ferrer, 2004), and
- Criteria to monitor the poverty alleviation, empowerment and institutional performance of equity-share schemes in South African agriculture (Gray, Lyne & Ferrer, 2005).

Access to greater agricultural resources in the communal areas were also addressed in contributions relating to land rental markets. High transaction costs and insecure tenure made it difficult for land rental markets to operate in the communal areas, and this was addressed in a number of papers, including the following:

- Institutional change to promote land rental markets in the developing regions of southern Africa (Lyne, Thomson & Ortmann, 1996), and
- Secure land rental contracts and agricultural investment in two communal areas of KwaZulu-Natal (Dengu & Lyne, 2007).

The land reform measures and the changing marketing structure in the country resulted in a renewed interest in agricultural and rural development, especially in terms of linking small-scale farmers with the formal markets. The increased power of the supermarkets and the demands of the export market have made it exceedingly difficult for these farmers to compete on an equal footing with the large-scale commercial farmers. Means of improving the livelihoods of the rural population were also the focus of many contributions such as:

- Rural non-farm enterprises: A vehicle for rural development in South Africa? (Kirsten, 1995),
- The role of women in the reconstruction of agriculture in developing areas: the case of the Northern Province (Ngqaleni & Makhura, 1995),
- Savings mobilisation in rural areas: Lessons from experience (Spio, Groenewald & Coetzee, 1995), and

- Alternative marketing options for small-scale farmers in the wake of changing agri-food supply chains in South Africa (Louw, Jordaan, Ndanga & Kirsten, 2008).

This journey through the development of the discipline of Agricultural Economics in South Africa does certainly not do justice to the contributions made by the practitioners of the subject, but was to give an indication of the dynamism and resourcefulness of the researchers to adapt to the changing situation in the country. I have found this to be one of the joys of being part of this fraternity. The researchers have risen to the challenges posed by the changes in the country, whether they are related to policy or institutions, or on the international front, such as the changes in the trade regime. I am sure that there will be other shifts in the direction of research in the discipline locally, but now I want to propose some areas of research that could be considered by the discipline.

5. Future opportunities

The research performed by agricultural economics researchers in South Africa has concentrated almost exclusively on pure agricultural economic issues, which may appear at face value to be the sensible approach to take. I wish to advocate that agricultural economists look at the matter of natural resources in a broader context and include environmental and ecological debates in their research profile. The changing environmental and ecological scenario holds serious implications for the country and the globe. Global climate change and the concomitant hazards that it will bring, population growth and the changing use of agricultural resources have grave potential outcomes.

My proposals are not an attempt to take the discipline off into unchartered waters, but simply to suggest that we move in the same direction as other associations in the discipline. The Australian Agricultural Economics Society, founded in 1957, took the step to bring resource economics under its wing in 1995 and changed its name to the Australian Agricultural and Resource Economics Society. The President of AEASA, Prof. Mohammed Karaan, in his presidential address at the annual conference in Windhoek in 2008, noted that the American Agricultural Economics Association was changing its name to include a broader approach to the discipline and hinted that this should be considered locally. The American Association is now called the Agricultural and Applied Economics Association (AAEA) and aims to analyse issues and solve problems in the areas of food, agriculture, resources, environment, development and allied fields.

I am not attempting to infer that agricultural economists do not address issues relating to natural resources. They certainly do and there is significant work relating to soils and, especially research into water usage. Prof. Giel Viljoen and the staff and students at the University of the Free State have done a tremendous amount of work on the subject of the economics of water for agricultural purposes. In addition, research is being undertaken on environmental and ecological topics by researchers in Departments of Agricultural Economics. The Centre for Environmental Economics and Policy for Africa at the University of Pretoria is actively involved in environmental economic research and recently I met up with two colleagues from the University of Stellenbosch at the Environmental and Resource Economics Conference in Cape Town. Research of this nature has been published in *Agrekon*, albeit in relatively small doses, and includes:

- Direct-use values of non-timber forest products from two areas on the Transkei Wild coast (Shackleton, Timmermans, Nongwe, Hamer, Palmer & Palmer, 2007),
- Measuring the effect of climate change on South African agriculture: The case of sugarcane growing areas (Deressa, Hassan & Poonyth, 2005),
- An environmental accounting approach to valuation of services of natural forests and woodlands in Swaziland (Ngwenya & Hassan, 2005), and
- Marketable pollution risk: A potential policy for agriculture (Aihoon, Groenewald & Sartorius von Bach, 1995).

However, I feel that there is scope for agricultural economists, with their economic skills and knowledge of natural resources, to make a greater contribution in this area.

South Africa is one of the most biologically diverse countries in the world in terms of its species diversity and the endemism of its vegetation. The country occupies only 2% of the world's surface but is home to at least 10% of the world's plants and 7% of the world's reptiles, birds and mammals. The high degree of plant genetic diversity holds great potential economic benefits in the development of new medicines, crops, cosmetics and other useful products. Three globally recognised biodiversity hotspots are found in South Africa: the Cape Floral Kingdom, the Succulent Karoo and the Maputoland-Pondoland-Albany Centre of Endemism. These are areas with a high concentration of biodiversity, which is under threat. The Red Data List of southern African plants and the Red Data book of Mammals of South Africa have indicated that large numbers of plants and mammals are under threat in the country due to, *inter alia*, habitat transformation from agricultural activities, urban development (especially coastal development), the spread of invasive alien

plants, subsistence harvesting and illegal collection of plants for commercial trade. The declining prominence of ecosystems is a cause for distress as research has shown that their degradation leads to a reduction in ecosystem services such as a reduced capacity to generate clean water and air and a loss of food production. The rural poor are disproportionately affected as they are more exposed to the effects of pollution and rely directly on the natural environment for their livelihoods.

There are a number of areas in terms of natural and biological resources that hold out scope for the research by agricultural economists. These could include the increased economic activity in game farming, ecotourism, including the proliferation of private game reserves, and the use of natural resources for the development of recreational activities such as golf estates. However, there are two particular areas on which I wish to focus. The first has a direct effect on agriculture, but has predominantly received attention only from biologists, and the second has the potential for improving the livelihoods of the rural poor.

The invasion of alien plants has become a major problem in South Africa and has resulted in the degradation of the natural vegetation, the loss of biodiversity and had a significant impact on agricultural production. Van Wilgen *et al*. (2001) reported that 10 million hectares of South Africa had been invaded by 180 alien species and, although the effects of these plants are not totally understood, their impact is extensive. Common species of invasive aliens are Black Wattle (*Acacia mearnsii*), Port Jackson Wattle (*Acacia saligna*), Lantana (*Lantana camara*) and Jointed Cactus (*Opuntia aurantiaca*). The impact of these plants on the environment is varied and includes the following: increase in biomass, decrease in the diversity of ground-living invertebrates, decreased streamflow, decreased pasture productivity and increase in flammability in forest and riverine woodland. The infestation of invasive alien plants is not confined to terrestrial plants but also includes aquatic invasive plants, such as water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), Kariba weed (*Salvinia molesta*) and red water fern (*Azolla filiculoides*). These species, in the absence of natural enemies and the presence of eutrophic waters, form large dense mats that degrade water systems and impact on water utilisation. The impact of both terrestrial and aquatic plants has economic implications for the country in terms of production loss and loss of ecosystem services.

Although a significant amount of research has been into the costs and benefits of controlling invasive plants and the impacts of their invasions, there are opportunities for working together with biologists to quantify the economic

consequences of the invasive plants. At the annual Workshop on the Biological Control of Invasive Alien Plants in 2008, Prof. John Hoffmann, an entomologist from the University of Cape Town, stated that he was pleased to have an economist attending the workshop as he felt there was a need for the two disciplines to pool their resources. I feel that there are opportunities for agricultural economists to investigate the influence of these plants on the agricultural sector in the country. South Africa is a water scarce country and some of the terrestrial plants, for example, the tree *Prosopis,* commonly known as mesquite, which is found in the Northern Cape, and the numerous species of Australian trees in our catchments, and the aquatic plants are having a major impact on the available water supply as well as on biodiversity. There is also the opportunity for agricultural economists to branch out into the realm of determining the economic costs on the ecosystem and biodiversity, which could provide necessary information for policy decisions.

The second area I wish to focus on is that of payment for ecosystem services (PES). These services are supplied by the natural ecosystems and which hold vital benefits for the human population. These services include provisioning (production of food and water), regulating (control of climate), supporting (nutrient cycles and pollination), cultural (spiritual and recreational benefits) and preserving (maintenance of biodiversity) measures. The increased human population and development of the world's economies has placed severe strain on ecosystems, the impact of the so-called global or human footprint. Too often these ecosystem resources are treated as if they were free, invulnerable and infinite. There appears to be a greater realisation in society that ecosystem resources are not only limited and under threat, but that there is an urgent need to evaluate the trade-offs between the immediate and long term human needs. The challenge is to attach an economic value to ecosystem services and to treat them like any other product or service. Payment for ecosystem services promotes the conservation of natural resources in the marketplace and provides an incentive for the private sector to incorporate sustainable practices by imposing a cost on the use of ecosystem services.

One form of payment for economic services is the system of carbon credits. This represents attempts to mitigate the growth in concentrations of greenhouse gases (GHG). The objective is to permit market forces to drive industrial processes to use less carbon intensive approaches than would be the case when there is no cost to emitting carbon dioxide and other GHGs into the atmosphere. GHG mitigation projects generate credits which are sold to customers who wish to lower their carbon footprint. The carbon offsetter can purchase the credits from a carbon development agency that has aggregated the credits from individual projects.

What is the potential for these mitigation techniques in improving the livelihoods of the rural poor? In various developing countries the small-scale farming sector is a dynamic part of food production and rural economies. This has not generally been the case in South Africa where the developing areas have been faced with constraints such as increasing reliance on labour markets and welfare grants, land pressures leading to a decline in participation in agricultural markets and even subsistence agriculture. In addition, the institutions necessary for viable smallholder agriculture are often lacking. Amongst other strategies for developing the rural areas, such as issues of land and agriculture, service delivery and human capital development, focus needs to be attached to natural resources. The payment for ecosystem resources can be used to create new opportunities for rural employment by encompassing water, energy, waste and the possibility to earn carbon credits from these. An example of this is the Pico Bonito Forests in Honduras where carbon credits are generated by planting indigenous trees to sequester carbon. The community members around the forest earn income and share profits from implementing sustainable forestry practices. By 2017, the project is expected to sequester about 0,85 Mt of carbon through reforestation and agroforestry and through avoided deforestation (World Bank, 2008).

The potential exists in the former homelands to improve livelihoods of the rural population through the generation of carbon credits by means of reforestation, whether that be through indigenous plants or through agroforestry, which would have the added advantage of providing feed for livestock. It would also provide ecosystem services such as providing clean water, preventing soil erosion and improving biodiversity, in the case of indigenous plants. The Subtropical Thicket Restoration Project has been advocating the planting of the succulent shrub *Portulacaria afra*, commonly known as spekboom, due to its carbon sequestration abilities. The thicket covers about 800 000 hectares in the Eastern Cape of which half is degraded. Conservatively, a hectare of spekboom has the capability of sequestrating 4,2 tonnes of carbon per annum and, at a price of about US$10 (R80) per tonne, will result in an income of R336 per hectare per annum. This has the potential to provide a substantial additional source of income for the rural poor. This will not simply happen in the rural areas and I feel that agricultural economists have a role to play in this process: What are the implications for the rural poor? Will it impact on agriculture, and how? Are there economic benefits to be derived for the ecosystem? For this to be a success there will be a need to identify what institutions need to be in place, what existing institutions may need to be adapted and where the institutional gaps are in the system. All these are in the scope of the agricultural economics profession.

I hope that this lecture has provided some food for thought in terms of potential future directions for agricultural economists in the country. I would, finally, like to thank the Agricultural Economics Association of South Africa for honouring me with the opportunity to present this lecture.

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