

**Abstracts:**  
**Keynote Presentations**

# **ECOSYSTEMS: THE NEXUS BETWEEN SOIL, WEEDS, PRODUCTION AND PROTECTED AREAS**

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## **INTRODUCTION**

Healthy ecological systems are often assumed to be synonymous with biodiversity rich, protected natural landscapes. This is perpetuated by a commonly held perception that 'ecological' and 'production based' systems are separate and potentially incompatible. Similarly, the management of natural systems are frequently considered isolated from production, soil and associated weed management systems. Ecology is broadly defined as the complex relationship between organisms and their physical surroundings. Thus, at a functional level, all systems are integral parts of a larger entity, and the physical environment provides the connection where soils-weeds-production and protected areas can be investigated.

## **PROTECTED AREAS**

Landscapes are matrixes of differing land use types, ranging from large regional scales to micro-habitats. In addition different land uses can also vary in their compatibility with each other. Protected areas, as one category of land use, have a specific mandate to maintain biodiversity and ecosystem functioning, and facilitate the sustainable use of the goods and services they provide. In contrast, agricultural lands are managed to maximise production of specific goods. By virtue of their objectives, and the ecological links across landscapes, management practices in one area can impact on another. However, optimal management of each can provide substantial benefits to the needs of neighbouring areas. A substantial and globally growing concern amongst all land owners and managers, and around which this presentation will be constructed, is the invasion, impact and management of alien weeds or invasive plants for protected areas generally and Kruger National Park (KNP) specifically. Invasive alien plants constitute one kind of landscape-level, multi-stakeholder concern, which has severe ecological and economic impacts, and for which a holistic approach to management is required.

## **MANAGEMENT CHALLENGES**

Management approaches are derived from the specific requirements and aims of the primary land use. Even where similar problems are a concern priorities can be different, for example prioritisation of alien plant species for control. But, ecologists and managers on either side of the agro-natural ecological system can develop an understanding and appreciation for the challenges that others face. Further, this can provide opportunities for shared learning and the potential for implementation of novel methods outside of the traditional thinking of a single field. This is important in protected areas, even those as large as KNP. Even though it covers an area of 20 000 km<sup>2</sup>, the KNP is surrounded by large human populations on two sides and a multitude of land use types. Moreover, and a problem that is particularly difficult to manage, is the fact that the KNP sits at the bottom of seven major catchment areas. For example, the Olifants River is about 700 km long, of which only 14% falls within KNP. This makes the KNP a sink for alien invasive plants, other alien organisms, toxins, nutrient enrichment, silt, and other problems. These have further impacts, accumulating through higher organisms and across the broader landscape.

## KEY TOPICS

In this presentation I will follow-up on these themes, discussing:

- threats to protected areas
- typical impacts of alien plant invasions recorded in protected areas globally, including biogeochemistry,
  - fire regimes,
  - changes to species, communities and habitat structure,
  - invasional meltdown; ecosystem-level, self-perpetuating positive feedback loops
- similarities and differences in problems and approaches at the agro-natural ecosystem interface, and the lessons for conservation practices
- status of invasions in KNP
- agronomic weeds as invasive aliens in KNP
- management of alien plants in KNP

*Keywords:* Conservation, crop production, invasive alien species, soil science, weed science

# **ENDEAVOURING TO BUILD A MUTUALLY BENEFICIAL RELATIONSHIP BETWEEN ACADEMIA AND INDUSTRY – THE SA DECIDUOUS FRUIT EXPERIENCE**

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Industry requires academia to deliver a pipeline of well-trained graduates (both under and post graduate) to serve the needs of the industry. In addition, it has a need for both basic and applied research to address the current and future challenges of the industry and a mechanism to ensure that the outputs of research are well communicated to the users of the technology. Academia and the faculties and departments that operate within an university are primarily measured by the number of students that are graduated and the number of scientific publications that are produced. It is evident that there should be a synergistic relationship between academia and industry. Is this the case? The South African deciduous fruit industry will be used as an example to explore the relationship between academia and industry – what has worked and what has not worked and what does the future hold?

# **THE INSTITUTIONAL AND FUNDING DISPENSATION OF AGRICULTURAL RESEARCH IN SOUTH AFRICA: A NEED FOR BETTER COLLABORATION**

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To ensure growth and improved competitiveness of South African agriculture it is important to have an efficient and innovative agricultural research system. This paper reviews of the current institutional and funding structure and then highlights the difference with the structure envisaged in 1989/90 when the ARC was conceptualised. We also compare funding trends with current funding of the research system and then suggest the need for a reconfiguration of the South African agricultural research system which will involve much stronger collaboration between universities, the ARC, government departments and the various commodity organisations.

# PROMOTING SUSTAINABLE AGRICULTURAL NATURAL RESOURCE MANAGEMENT: A SOIL SCIENCE PERSPECTIVE

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In line with the theme of the Congress, “Promoting Sustainable Agricultural Production Together” ways in which greater co-operation, cohesive and motivation can be encouraged and promoted between the major constituent groups of our Societies are investigated. Broadly speaking, our membership comprises representatives of academia, industry and government.

Unfortunately there is limited active co-operation between these components, and mainly on a two-way partnership at best: Service provider and client, researcher and funder, professor and student. There are exceptions to this, however, and some of these are highlighted in the presentation.

The IUSS has broadened its focus from earlier days: it currently has four major Divisions:  
Soil in Space and Time  
Properties and Processes  
Soil Use and Management  
The Role of Soil in Sustaining Society and the Environment

Each of these is divided into 5 or 6 Commissions, encompassing both classic and increasingly innovative fields of soil science endeavour. The message is clear: we are broadening our scope.

A number of examples of broader thinking by the Soil Science community are also discussed, including through the IUSS, FAO, ARC, Government departments, tertiary organisations, industry and the use of social media.

An important event that took place in Kempton Park less than two months ago is also discussed: The 3<sup>rd</sup> Global Conference on Agriculture, Food Security and Climate Change. This follows on two previous conferences, in the Hague and Vietnam.

Frustrated with the slow pace and complexities of the formal UNFCCC process, a group of countries and organisations is pursuing the possibilities of establishing a Climate Smart Agricultural Alliance. Their approach has been to expedite action and, as a further example of broader thinking, this envisaged process, with wide stakeholder involvement, is discussed as a real possibility for making progress.

The Soil Science community has a lot to offer in issues of sustainability, but we need to position ourselves at the forefront of natural resource based research and development.