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REVITALISING GRASSLANDS TO SUSTAIN OUR COMMUNITIES

Editors

David L Michalk

Geoffrey D Millar

Warwick B Badgery

Kim M Broadfoot

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Preface

Revitalising Grasslands to Sustain our Communities

David Kemp and David Michalk

Grasslands occupy 54% (52.5m km^2) of the world's ice-free land area, one-quarter of the world's human population live on and around grassland, one-tenth of the world's population is involved in animal production, one-third of the world's livestock (1.5 billion) rely on grassland and this is likely to increase, and the world will soon have 4b head of livestock. Grazing lands occupy some 400m ha of Australia approximately 60% of the continent, making grasslands the largest collection of ecosystems in the country.

Grasslands are the dominant ecosystems in many countries, either remaining as resources for grazing, watershed and biodiversity conservation or now being used for crop production, often with a grassland phase. Grasses and associated species sustain landscapes, ecosystems, livestock and communities across the globe. Many of the world's cereals are grasses. The future of humankind depends deeply on understanding, managing and sustaining grasslands.

Since 1927, the International Grassland Congresses have been the premier event where the current status of grasslands is updated and the latest themes of grassland research and development are presented. Grassland has always been widely defined as any system that makes uses of grasses and other plant types not only to support livestock production, but to improve the health of these globally important ecosystems to sustain livelihoods and enhance people's enjoyment from their use for recreation, sport or other purposes. There are many common elements across these diverse systems and the great benefits of the Grassland Congresses is that people are brought together from diverse fields and this interaction between colleagues facilitates learning that stimulates future research.

Revitalising grasslands to sustain our communities

The theme for the 22nd International Grassland Congress acknowledges that grasslands include many systems where real threats exist to future productivity and to the communities dependent upon grasslands. Yet grasslands and their importance are often poorly recognised by Governments, as is the need to provide the support services to sustain these systems and the communities that depend upon them. Declining support for agricultural research and development around the world is leading to a plateauing in yields and exposing societies to an increased risk of severe problems in the future. There are rapid changes taking place in the world environment and this Congress recognises that between developed countries and developing nations there are often, different responses to these changes. Population pressures, climate change, food security, declining water resources and reduced energy reserves will impact profoundly on grassland resources and their management. Competing uses for grasslands mean that there are many conflicts, and a common challenge is how to resolve the potential conflicts between livestock production and the environment? The Congress aimed to encourage and support revitalisation processes in terms of:

- Enhancing the traditional role of grazed grasslands in sustainable food and fibre production;
- Shaping grasslands towards new environmental and community roles in response to climate and water imperatives as well as the traditional production and sustainability objectives;
- Encouraging more young scientists, in Australia and across the world, to become involved in addressing the issues of multiple goals in grassland management; and
- Closing the gap between developing and developed nations in grassland science and management.

As well as the interchange of information on the latest research and development across diverse fields the International Grassland Congresses have always provided excellent opportunities to see grassland systems in new and different contexts.

The International Grassland Congress and Australia

The first time the International Grassland Congress was held in Australia was in 1970 at Surfers Paradise in Queensland. That Congress celebrated the very impressive developments in tropical grasslands and forages in which Australia played a key role. In 1993 there was a joint Congress between New Zealand and Australia with part of that moving Congress being held at Rockhampton in Queensland to again celebrate the very impressive work being done in tropical grasslands and rangelands.

The 22nd International Grassland Congress was the first time that it had been held in southern Australia, with more opportunities to review the diversity of work being done across the subtropical, temperate and Mediterranean environments. Australia has been prominent in the selection and use of annual and perennial legumes for both grassland and cropping systems. Much of this technology which aims to fatten livestock at pasture has been shared with the world through publication, collaborative research networks, and aid programs. Research in other countries has been equally successful in developing forage production and conservation strategies for intensive livestock systems.

The program reported in these Proceedings provided an opportunity to again showcase to the world and Australian communities, how Australia's and the

World's largest natural land resource, grasslands, can be managed to achieve a balance between production, environmental, economic, social and political objectives.

These Proceedings

The Scientific Program and the many associated Congress events were designed with the above themes in mind. The challenge given to delegates was to broaden their thinking beyond the implications for specific problems under study to embrace the wider issues within which we all work. Some of these challenges are:

- What trends, problems and solutions are occurring in food and fibre production from grasslands continent by continent, and the services and policies to support them?
- How is grassland management adjusting to population pressures, food security, climate change, declining water allocations for agriculture and reduced energy availability?
- How are tools, processes and policies developing to resolve the competition for grassland resources to meet agricultural and environment imperatives?
- What technologies and innovations have been added to the pool of knowledge for the study and management of grasslands?
- Are the drivers for more effective grassland management coming from technology, ecosystem management, cultural and community forces or markets?
- How do grassland priorities and imperatives vary around the world, particularly between developed and developing nations?
- What markets are available for ecosystem services and how are these markets organised?
- How are new genetic technologies being used in plant breeding and grassland management?
- What changes are happening in the roles of scientists, land and livestock owners, and communities in influencing the management of grassland resources?
- What are the strengths and weaknesses of various models and approaches to Research, Development, Education and Extension, in terms of the balance of short, medium and long-term projects, their funding by government, producers, communities and agri-business, and their impact on the well-being of communities?

In addition to the presentation of papers forums were held to review the current issues confronting early career researchers and farmers across the globe. The Early Career Researcher Forum had the objective of "Making the grass greener for early career grassland researchers" through a focus on how Early Career Researchers can forge a career and conduct high quality research on grasslands when there is a global shift to decrease investment in research. The Farmers Forum showcased progressive grasslands farming systems from different parts of the world; highlighted challenges and opportunities facing grassland-farming systems in 2013; and demonstrated the mutual respect between farmers and those involved in research and development as they collectively work to address local to global problems. The outcomes of these forums will be published separately.

A selection of the Plenary and Keynote papers presented have been chosen for publication, with additional material, in special forthcoming issues of *Crop and Pasture Science*, *Animal Production Science* and the *Rangeland Journal*. The Congress papers will also contribute to the first issue of a new, open-access online journal, *Tropical Grasslands–Forrajes Tropicales*, to continue the tradition of the former *Tropical Grasslands* (published by the Tropical Grassland Society of Australia Inc. during 1967-2010) and the former CIAT journal *Pasturas Tropicales* (1984-2006).

These Proceedings report the 696 Plenary, Keynote, Oral and Poster papers presented at the 22nd International Grassland Congress. This is the record of the current state of knowledge of grasslands in 2013.

Forums

Two forums were held as part of the IGC

Early Career Researchers Forum: "Making the grass greener for early career grassland researchers"

The forum focused on how Early Career Researchers can forge a career and conduct high quality research on grasslands when there is a global shift to decrease investment in research.

A panel of four early career researchers: Melissa Santos-Garcia (Brazil), Patricia Masikate (Zimbabwe), Elodie Ganche (Ireland) and Tospulot Rajabov (Uzbekistan); and two experienced researchers: Jim Pratley (Australia) and Charles Brummer (USA) took part in the panel.

The discussion focused on four key areas; (1) why the participants chose grasslands research; (2) the current issues around funding and tenure of positions for grasslands research; (3) actions that have been taken to build a successful career path; and (4) what can be done to develop careers in grasslands research. Questions and comments were gathered prior to the session to structure debate. An on-line poll, comments posted before, during and after the session and a record of the dialogue during the session will be synthesised in a future publication.

Farmers Forum: “Revitalising Grasslands to Sustain our Communities”

The state of our grassland systems underpins the livelihoods, cultural practices, ecosystems and economies of rural communities around the world. The Farmers Forum posed three questions: (1) what did these systems look like in 2013? (2) what challenges do they face? and (3) what opportunities and innovations are our progressive farmers finding to meet these challenges?

Interviews of progressive grassland farmers from across the world were compiled into a number of short video clips to showcase grassland farming systems and give voice to farm managers to outline their views on research direction and needs. These clips created a starting point for discussions in this forum around research needs of our grassland farming systems and to provoke a deeper consideration of how these congresses can better influence the sustainability and vitality of grassland farming communities.

Satellite meetings and tours

As part of the IGC a series of Satellite Meetings and Tours, pre- and post-Congress, were organised:

	Meeting/Tour	Description
1	Forages in Mediterranean Systems, Western Australia; *10-13 September 2013* Organiser: Dr John McGrath, Cooperative Research Centre for Future Farm Industries	The tour/symposium focused on the roles of forages and management in meeting the challenges of climate change, mixed farming and environmental management issues in southern WA, which has a Mediterranean-like climate. The Symposium in Albany dealt with novel plants for Mediterranean farming systems, livestock, and the scientific and socio-economic issues that underpin these systems.
2	Tropical legumes and the beef industry in northern Australia, North Queensland; *10-14 September 2013* Organiser: Associate Professor Max Shelton, University of Queensland	This theme of this was the impact of tropical legumes and grasses on farming systems in the world, and in northern Australia for cattle production. The tour included seed, pasture and livestock production; species and cultivars; management issues; cattle fattening on leucaena; and monitoring methane emissions and grazing behaviour in extensive grazing systems.
3	Temperate Grasslands in Tasmania – Diversity and Management; *11-15 September 2013* Organiser: Dr Peter Lane, University of Tasmania and the Grassland Society of Southern Australia Inc.	This tour showcased Australia's scenic island State, Tasmania, recognised worldwide for the quality of its produce. Delegates explored innovative agricultural enterprises from intensive dairy and beef production on irrigated and dryland sown pastures to extensive meat and fine wool production on dryland sown and native pastures. This tour featured the integration of livestock production into farming and landscape systems.
4	NSW Grasslands Unlimited: a taste of NSW and Canberra; *20-24 September 2013* Organisers: Dr Richard Simpson and Dr Hugh Dove, CSIRO and the Grassland Society of NSW Inc.	The tour dealt with a number of features and issues in managing pasture-livestock systems on the Southern Tablelands of New South Wales. The tour included options for visiting Canberra and the Australian Capital Territory.
5	Plant adaptation to drought and high temperature, Sydney University; *13th September* Organiser: Dr Mark Norton, NSW Department of Primary Industries	This pre-Congress meeting was convened for those grassland scientists interested in the physiology and application of knowledge of how plants adapt to drought and high temperature.
6	IV International Symposium on Forage Breeding, Victoria; *23-25 September 2013* Organiser: Professor German Spangenberg, Victorian Department of Primary Industries and La Trobe University	This 4th Symposium for forage breeders/physiologists included 8 themes; genetic resources and novel species, breeding and managing symbioses, overcoming abiotic stresses, forage quality and nutritive value, breeding for new environments and production systems, biotic stresses and disease tolerance, new traits and technologies, and whole genome selection in forages.
7	2013 International Herbage Seed Group Workshop *"R&D adoption by seed-growers – making good science work on the farm"*, Methven, New Zealand; *22-26 September 2013* Organiser: Dr Phil Rolston, AgResearch, New Zealand	The International Herbage Seed Group held the latest workshop for those involved in research and development into herbage seed production.
8	2013 Spatially Enabled Livestock Management tour and Symposium, University of New England, Armidale then University of Sydney, Camden; *22-27th September*. Organisers: Dr Mark Trotter, University of New England and Dr Lachlan Ingram, University of Sydney	This event comprised a field Expo at UNE of smart-farm technologies, electronic monitoring systems and e-management of livestock approaches, followed by a Precision Livestock Management symposium at a University of Sydney farm at Camden for researchers, industry and early adopters.

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