ANNEX to The History of The International Grassland Congress - From 2021 Forward

V. G. Allen · R. J. Wilkins · J. Pickert · G. D. Lacefield · S. R. Smith

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The Congresses

The XXIV International Grassland Congress and The XI International Rangeland Congress, Mombasa, Kenya – 2021

The XXV International Grassland Congress, Covington, Kentucky, USA – 2023

ANNEX to The History of The International Grassland Congress - From 2021 Forward

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Cattle grazing observed by drone. Created by Philip Brown, Texas Tech University, Lubbock, Texas, USA

Special Recognition

Professor Ross Humphreys

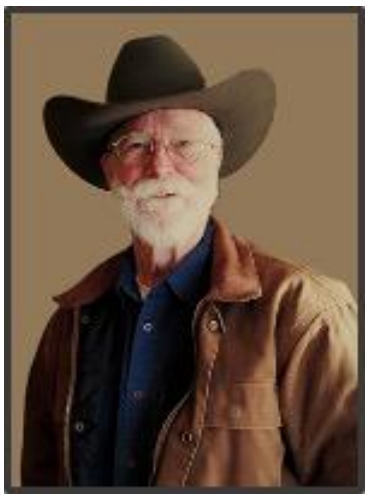
Ross Humphreys had a long career in grassland science as a teacher and researcher at the University of Queensland in Australia. Sadly, he passed away in May, 2024. Ross attended his first International Grassland Congress in Reading, UK, in 1960 and was thereafter a regular and enthusiastic supporter of the Congress.

Ross became the 'guru' of the history. We are privileged to tread in his footsteps and to build on his publications. His book, *The Evolving Science of Grassland Improvement* (1997), traced the development of grassland science over a 60-year period, largely through the changing contributions to the International Grassland Congresses. An Appendix to the book detailed the Congresses from 1927 to 1993 with analyses of the number of participants and their geographical origin and the numbers of papers on different topics. He followed this up with invited papers at the XIX Congress in Brazil in 2001 and the XX Congress in Ireland in 2005.

These papers stimulated us to embark on a fuller account of the Congresses, resulting in the book, *The History of the International Grassland Congress – 1927 to 2020,* that delves further into the origins and nature of the first Congresses and, with this Annex, brings our history up to the present time. We were privileged to know Ross well and were delighted that Ross, who lived in retirement in Brisbane, was able to read and comment on key sections of the original book. It was a great pleasure to dedicate that book to Professor Ross Humphreys.

Jim O'Rourke
Secretary-General
of The International Rangeland Congress (2011 to 2024)

Jim O'Rourke was known, respected and admired throughout our global Grazing Lands community. He was a builder of bridges among organizations, agencies, and individuals for mutual and multiple benefits. His collaboration with the International Grassland Congress over many years will continue to yield long-lasting benefits.



James T. O'Rourke

Jim grew up in the western rangelands of the USA while developing a passion for our rangelands and the recognition of their global importance. He put his vast knowledge of rangelands into teaching others and into actual practice on the family's RUJODEN Ranch in northwest Nebraska. A 60-year member of the Society for Range Management, he served in many positions including President and received numerous awards recognizing his accomplishments. His leadership was crucial through the formative years of the International Rangeland Congress. He was President of the International Rangeland Congress Continuing Committee during a critical time when decisions were being made that greatly influenced the future of both the International Rangeland Congress and the International Grassland Congress. Among these was the realization that collaboration between the two Congresses could accomplish more of mutual interest than either Congress could accomplish alone. This collaboration led to the first joint Congress in Hohhot, China, in 2008. Other examples demonstrated his ability to foster cooperation among these and other organizations and agencies crucial to progress in numerous objectives including the publication and acceptance of *An International Terminology for Grazing Lands and Grazing Animals* (2011) that was jointly sponsored by both the International Grassland Congress and the International Rangeland Congress (IRC). Most recently, Jim played a pivotal role in organizing the *International Year of Rangelands and Pastoralists,* a worldwide event sponsored by the United Nations that, during 2026, will recognize and celebrate the importance of our global rangelands.

Jim O'Rourke died unexpectedly on March 5, 2024. His positive impact on our lives, our profession, and on our global grazing lands, both rangelands and pasturelands, is beyond measure and will continue to influence both International Congresses long into the future. He will be much missed.

The sun rises on an uncertain world but as demonstrated in the past, grazing lands and grazing animals will be an important part of the solutions for the future. Photo courtesy of V. G. Allen.

The History of The International Grassland Congress - From 2021 Forward

Introduction

Background: Although interesting and important parts of the History of the International Grassland Congress (IGC) can be found in many different places, the need for an organized documentation and recording of its history was perhaps first fully recognized by Dr. P. V. Cardon (USA). In his presentation at the Sixth IGC in Pennsylvania (USA) in 1952, he gave us valuable information about the awakenings during the late 1800's to the need for a greater knowledge of grazing lands[1] and grassland agriculture. He also gave us insights into the lives and professions of key individuals who were involved in early research and discussions regarding management of forages and grazing animals [See Cardon (1952)].

Professor Ross Humphreys (Australia) preserved later valuable information about our Congress and its people. After attending his first Congress (IX IGC) in 1960 in Reading, England, he published several papers documenting parts of our history (Humphreys, 1997 and 2001) concluding with his invited paper *A brief history of the International Grassland Congress* (2005). This was published in the Proceedings of the XX International Grassland Congress held in Dublin, Ireland, in 2005.

During 2017, the need to update and further record the history of the International Grassland Congress was recognized and discussed by Dr. Ray Smith and Dr. Garry Lacefield. At their request and with their involvement, *The History of the International Grassland Congress - 1927 to 2020* was written and was published in 2021 by The Forage and Grassland Foundation, Lexington, Kentucky, USA. Vivien Allen and Roger Wilkins were the primary authors of the Book. Both were long-time attenders of the Congress with broad acquaintance of the membership and with others who had knowledge of the history of this Congress. Garry Lacefield and Ray Smith provided many insights especially into the more recent Congresses, as well as technical support in publishing, and pursuit of grants to cover costs of publication. Jürgen Pickert (Germany) was especially valuable in his perspective and knowledge of the early history

[1] Any vegetated land that is grazed or has the potential to be grazed by animals (domestic or wild). Allen *et al*., (2011) An International Terminology for Grazing Lands and Grazing Animals, page 4.

including crucial information about the Founding Fathers as well as family members of Professor Friedrich Falke (President of the First Meeting). He is well acquainted with the location of the first meeting and he became a co-author of the Annex to the Book. Peter Edling (Sweden), grandson of Anders Elofson (President of the Second Meeting), gave us pictures and information that could so easily have been lost without his contributions. Roger Wilkins unique first-hand knowledge of the XII and XIII Congresses, held in Moscow and Leipzig, as well as people involved provided important global insights. He played a key role in resolving a dispute at the XII Congress on the venue for the following Congress and in drafting the Constitution for the Congress that was adopted at the XIII Congress [See Allen *et al*., 2021, Chapter 4, pp. 131 to 140]. Vivien Allen, as chair of the Continuing Committee, saw history first-hand in bringing about the first joint meeting with the International Rangeland Congress. Many others from around the world provided information, contacts, pictures, and insights that provided the wealth of information from which to write the History.

An excellent review of the book was written by Johannes Isselstein (2022) that begins by his quoting the often repeated saying "Knowing the past is the basis to shape the future."

It has been said many ways that a knowledge of history is critical to understanding and solving problems of the present and preventing problems in the future. With our global grazing lands, as with many other topics, it is essential that we preserve and learn from our history. As quoted by Ross Humphreys (2001), from Santayana (1920), in his presentation at the XIX Congress in Brazil in 2001, "Those who cannot remember the past are condemned to repeat it."

The History of our International Grassland Congress begins in 1927 with a meeting that became an International Congress. It was, however, built on an already evolving background of knowledge, experience, sharing of information, questions and emerging concerns (Cardon, 1952). The First World War had come and gone (1914 to 1918) leaving indelible impressions with key individuals, especially in Europe, regarding the role that grazing lands and grassland agriculture had played in national security and survival during the War. The work of Dr. Anders Elofson (Sweden), in cooperation with several estate owners, founded the Swedish Grazing and Ley Association. Extensive experiments were conducted in the field cultivation of forages helping to feed people and allowing them to remain on the land in spite of the war.

By the 1920's the war was over but Professor Friedrich Falke (Germany), Dr. A. Elofson (Sweden), Dr. A. Volkart (Switzerland), and Mr. Karl Schneider-Kleeberg (Germany), understood the values inherent in grazing lands and in their meetings to discuss their research and their mutual interests and concerns. These four men are acknowledged as

the founders of what would become the International Grassland Congress. They also recognized a general failure among others to understand the importance of grazing lands and their role in food security, and they sensed an urgency to do something about it.

Thus, in 1927, with the vision and leadership of Professor Falke, and with assistance from his Graduate Student, Mr. Richard Geith, a meeting was held in Leipzig, Germany, that was attended by sixteen scientists that represented seven European countries. Over the next few years, more meetings were held. The rapid growth in attendance from increasingly distant places validated the vision and the need to share information and to pursue research and education with an urgency that continued to increase. The value of grazing lands recognized during WWI was again demonstrated during WWII (1939 to 1945) where the work of Sir R. George Stapledon (Wales) with ley cropping and its contributions to food production was again of crucial importance to survival (Allen *et al*., 2021).

Following the first meeting in Leipzig, Germany, in 1927, 23 Congresses had occurred when *The History of the International Grassland Congress* was written and completed in 2020. The History contained in this current Annex provides information on each Congress occurring after the book was published. The Annex begins with the joint XXIV International Grassland Congress and the XI International Rangeland Congress held virtually[2] in Kenya, Africa, in 2021. It also includes the XXV International Grassland Congress held in Kentucky, USA, in 2023. These Congresses are each presented in a style similar to that used in the book (See Chapter 2, *From 50 Years Forward,* page 53 in Allen *et al*., 2021). The XXVI International Grassland Congress, to be held in 2027 in Leipzig, Germany, is the Centennial Meeting that will complete the first 100 years of this Congress. This Annex will continue to collect the history of each Congress as it occurs and selected collections will be published at appropriate intervals into the future, beginning with *The First 100 Years* in 2027.

Throughout the book, as well as this Annex, we have attempted to remain faithful to the language and manner of speaking of the people who came together in the International Grassland Congress. With few exceptions, information quoted from published sources has been presented exactly as published. No alterations were made unless done so by the original author or are indicated in brackets [ ] following the original word or phrase.

[2] In 2021, the global pandemic of coronavirus disease (COVID-19) prevented travel to and in-person attendance at this Congress.

During the time from the first Congress (1927) to the most recent Congress (2023), information and opportunities through these Congresses have touched many people, countries and regions of our world greatly increasing our knowledge of grazing lands and their importance. Some of the issues addressed at these meetings were local or regional in nature but many were international in their scope. Today, although much has been learned and accomplished, and much progress has been made, the motivation to recognize the importance of grazing lands felt by those at that first meeting in Leipzig, has taken on global importance of an urgency unimagined by the Founders of the Congress.

In today's world of rapidly escalating human populations with parallel demands for increased living space as well as increased quantity and quality of food and water, we are also challenged by a changing climate and losses of vital resources. These resources include clean water, our croplands, and just as important, our global grazing lands. Important to biodiversity, wildlife, domestic livestock, and food production as demonstrated during two world wars, grazing lands include both rangelands and pasturelands as well as forestlands and croplands with grazing or browsing potential. Their vegetation is generally composed of grasses, legumes, other forbs, and sometimes woody species and crop residues. Usually dominated by the grasses, they are essential for maintaining a habitable earth. Today, we know of the importance of our grazing lands in carbon sequestration. The reduction of carbon dioxide in the atmosphere has become a global priority to slow global warming. The need for carbon sequestration and climate resilience were recognized and were strongly featured concerns at the most recent IGC and IRC Congresses as measured by the numbers of papers presented on these topics. We know that our rangelands and pasturelands play a major role in sequestering this carbon by putting it back into long-term storage in soils through their extensive root systems. To use the words of William Davidson (2016), our grazing lands are our global "carbon vault" for safe storage. While no single solution is likely to solve global warming, the positive effects of grazing lands on carbon sequestration are a critical part of the overall solution.

The importance of grazing lands in food security was specifically pointed out in 1927 by Professor Friedrich Falke in Leipzig, Germany, at the very first meeting of what became the International Grassland Congress. Also pointed out in our history, croplands can quickly become 'dust bowls' without inclusion of grazing lands. At the seventh International Grassland Congress in New Zealand in 1956, Sir Enoch Bruce Levy (New Zealand) remarked that "the world's grasslands stand 'twixt a world of plenty and a world of famine; between a land surface of green oases and a land of desert; between surface soil stability and accelerated erosion" (Levy, 1956). In 1997, at the XVIII Congress in Winnipeg, Manitoba, and Saskatoon, Saskatchewan, Canada, Dr. Bert R. Christie (Canada) re-

minded delegates that our global grazing lands ensure stability of production and can be used for food production year after year, which does not apply to many agricultural crops.

This stability can be lost, however, when prolonged drought or mismanagement leads to overgrazing, soil compaction and increased erosion that reduce soil health and infil-

Smallholder dairy cattle herd grazing in pastures dominated by *Cenchrus clandestinus*. Photo courtesy of Joseph Mureithi, KALRO, Kenya.

Overgrazed rangeland in the cold semi-arid Zone in Africa. Photo courtesy of Joseph Mureithi, KALRO, Kenya.

tration of precipitation, thus, decreasing productivity. Examples can be observed globally. Far from being relegated to History, dust bowls are currently forming today including in the Sahelian Zone in Africa, south of the Sahara due to overgrazing, deforestation, water scarcity, and inadequate and unaffordable irrigation technologies that could minimize water use. This change is even more alarming considering Africa's rapidly growing population (Dr. Joseph Mureithi, personal communication).

China, with a growing population of both people and livestock, faces complex problems of maintaining grazing lands as well as a challenged water supply. The North China Plain's aquifer is being depleted leaving barren soil that is swept up by winds into dust storms. On the Qinghai-Tibetan Plateau, a combination of social and economic factors have led producers to increase animal numbers, resulting in widespread overgrazing and wind erosion. Issues of water scarcity are variously addressed but include geographic transfer of water to drier areas to increase urban food supplies. International water transfers occur through importation of crops and forages grown with water in countries with adequate water supply effectively importing that water to water-deficit countries. China is currently engaged in transformational restructuring of the way its extensive grasslands are used to provide ecosystem services for the population (Dr. Cory Matthew, personal communication).

Degraded rangeland in winter at Dawu County, Guoluo Tibetan Autonomous Prefecture, Qinghai Province, China (3,900 m above sea level). Photo courtesy of Prof. Yushou Ma.

The same site shown in previous picture in summer after restoration with *Poa pratensis subsp.* Pruinose, a race of bluegrass native to China. Photo courtesy of Prof. Xinquan Zhao.

Perhaps nowhere has the impact of loss of our grazing lands been more vividly documented then during a drought in the western USA in the 1930's. This period coincided with plowing the prairies to allow increased wheat (*Triticum aestivum* L.) production. Government encouragement and incentives to homestead[3] the area and to grow wheat resulted in large scale tillage of the grass-dominated prairies in the first 30 years of the 20th century. Rainfall and prices were favorable, leading to increased cropping, often with leveraged capital. Then the rains stopped. The land which had been turned upside down with the plow was turned into dust storms across the region. These storms de-

With proper management, the prairies provide feed for grazing animals, food for human use. stability of soils, valuable cycling of nutrients, improved water infiltration, carbon capture and sequestration, wildlife habitat, and other ecosystem services. Photo courtesy of Dr. Walter Fick, Kansas State University, USA.

The Dust Bowl of the 1930's in the western USA was the result of plowing up the native grasslands to plant row crops. Initially successful, drought exposed the fragile soils to the forces of the winds with devastating results to plants, livestock, soils and to the human inhabitants. Source: United States Department of Agriculture Images.

[3] The Federal Homestead Act of 1862 provided an area of public land in the Western United States (usually 160 acres; about 65 ha) granted to any US citizen willing to settle on and farm the land for at least five years.

posited the rich but fragile topsoil on the eastern coast of the USA, over 1,610 km (1,000 miles) away. The area affected extended from the Texas High Plains north as far as the Southern Prairies of Canada.[4] (Dr. Jimmy Henning, personal communication).

Without the native grasses to help hold the soil in place, soils became airborne and buried fences, crops, homes, towns, animals, and people with many people and animals dying from '*dust pneumonia*.' Because of the enormous impact of this drought, the highly successful Soil Conservation Service (SCS) was formed in 1933 as an Agency of the USDA. Now known as the Natural Resources Conservation Service (NRCS), its purpose is to help protect soils and other natural resources.

Throughout history, our grazing lands have been vulnerable to damage and to losses due to adverse weather, mismanagement, loss of keystone species, and encroachment of other species. This includes invasive plants, animals, and especially by encroachment of humans who have failed to recognize the importance of grazing lands and who continue to convert them to other uses. Today, as this Annex is being written in 2024-5, our grazing lands are ranked among our most vulnerable and endangered ecosystems due primarily to urban and industrial expansion. Losses of these lands are globally increasing raising numerous concerns. As reported by Seto *et al*., (2011), "the conversion of Earth's land surface to urban uses is one of the most irreversible human impacts on the global biosphere. It drives the loss of farmland, affects local climate, fragments habitats, and threatens biodiversity." Seto *et al*., presented a meta-analysis of 326 studies that used remotely sensed images to map urban land conversion. They reported a worldwide observed increase in urban land area of 58,000 km^2 from 1970 to 2000. The observed loss of 58,000 km^2 is an area nearly twice the size of Belgium, an area larger than 72 individual countries and it would rank as the 123rd largest country in our world today (Dr. Peter Ballerstedt, personal communication). India, China, and Africa experienced the highest rates of urban land expansion, but the largest change in total urban extent occurred in North America.

In the USA, 2,000 acres (809 hectares) of farmland are lost every day to development and other non-agricultural uses that jeopardize farming and make way for housing and other industries. Additionally, the demand for agricultural land is expected to increase by 60% by 2050. These lands are also essential for a wide array of ecosystem services on which our future depends.[5]

[4] Egan (2006).
[5] FARMS UNDER THREAT: THE STATE OF THE STATES Executive Summary https://farmlandinfo.org/wp-content/uploads/sites/2/2020/06/AFT_FUT_SoS_ExecutiveSummary.pdf

In 2022, 16.6 million hectares (50.4% of the total area of Germany) was used for agricultural production. In the period from 2018 to 2021, the daily reduction of agricultural land (a common indicator in Germany), and used for all other purposes including forests, waters, nature conservation areas, urban land and industry, was 117 ha d^{-1}. About 52 ha d^{-1}, or about 19 thousand hectares annually, was used specifically for urban and industrial sprawl. The actual government target for 2030 is a maximum reduction of 30 ha d^{-1} (BMEL, 2024).

Similarly in Africa, urban sprawl is taking a toll on agricultural lands including grazing lands as its expansion rate is higher than or equal to the urban population growth rate (Seto *et al*., 2011). For example, between 1995 and 2020 Kenya's Nairobi County lost 30.4% of its grasslands due to expansion of urban areas (Rael *et al*., 2025). Many more concerning examples exist around the world.

Once lost, these lands are difficult, at best, or more likely impossible to replace. We have long known their important roles. As recognition of the magnitude of their losses in these and in other countries continues to escalate, some steps are being taken to avoid further losses. For example, in the European Union, the European Environment Agency website contains a statement that the European Union has a 'sustainable development goal' that 'no net land area is taken for urbanisation by 2050'. A 'sustainable development goal' is needed globally but with the rate of losses of grazing lands, 25 years may be too long to wait to reach this goal. The designation of 2026 by the United Nations as *The International Year of Rangelands and Pastoralists* is an opportunity to promote the importance of both rangelands and pastoralists. Efforts to protect and restore grazing lands and other critical ecosystems by multiple organizations, agencies and individuals are growing as awareness of their importance and the impact of their losses increases.

In 2001, the Theme of the International Grassland Congress in Brazil was *Grassland Ecosystems: An Outlook into the 21st Century.* In addressing this theme in the opening Congress Session, Professor John Hodgson (New Zealand) stated that "The XIX International Congress is set in a time of unprecedented change, with increasing uncertainty about the long-term sustainability of established systems of land use. The major threats are the continuing rapid increase in the human population of the world, the pressure on land resources to meet food requirements, the effects of global warming on climate stability, and the consequence of these factors on land resource stability and food production potential. Overlying these threats is the impact of the global economy on land use policies" (Hodgson, 2001). Hodgson suggested that "In the past it (the IGC) has acted primarily as a medium for exchange of information and ideas about research and practice amongst grassland professionals," but this may be questioned as the "grassland profession may be seen as somewhat isolated and talking to itself." Hodgson questioned

"Which agencies are better fitted than the IGC to promote the importance of grasslands as a moderating force in facing, for example, the issues involved in enhancing world food supply, conservation of soil and vegetation resources, and amelioration of global warming?"

The way forward. We must listen to these voices throughout History that teach us the essential values of grazing lands, both rangelands and pasturelands as well as croplands and forestlands. We must now become the voices of today who "Tell the Story"[6] of the essentiality of our grazing lands to those who do not know, have forgotten, have been influenced by mis-information, or who choose to put other economically motivated priorities on land and water. As stated by Gretel Ehrlich, "We live in a culture that has lost its memory."[7] Can we re-examine our History and learn from it? Did you hear the four cattle producers at the Forum in Kentucky (XXV Congress, 2023; See page 61) when they said "We are not the Problem! We are part of the Solution!" "Tell the Story!"

Our grazing lands teach us the pathways to local, national and global security. The Founders of our Congress knew this and sensed an urgency to educate others to their importance. Today, that urgency to protect our grazing lands is magnified many times. The International Grassland Congress and the International Rangeland Congress have provided a highly successful means of communicating important information around our world for nearly 100 years. But as questioned by John Hodgson, are we talking only to ourselves? To ensure our global future, we must use and expand this collection of global knowledge, implement the solutions, and continue the research. But, if we are to be effective, today's concerns require a different and more inclusive approach to research and communication to include 'non-traditional listeners and participants' as well as those involved directly with our grazing lands. Such transformational research and education must not only target those actively involved but must also connect with the public, policy makers, agricultural industries, the media, our children and their teachers, and with others. A question addressed by Professor Hodgson in 2001 was whether the IGC should take on an advocacy role. And his reply, "We have never done that but who is better to do so?" Who indeed? We must "Tell the Story" that is validated and told by producers, history, and science, as well as the collective knowledge and experience within the International Grassland Congress and the International Rangeland Congress.

[6] See Producer Forum pages 59 to 61. **NOTE:** To listen to the Producer Forum, go to the International Grassland Congress website https://internationalgrasslands.org/ . Click 'Resources' then 'Access to Congress Recordings'. Scroll down to Producer Forum (it is near the bottom) and clink on the link.
[7] Ehrlich (1986).

As was recognized by the Founders of the International Grassland Congress in the early 1900's, today, we also recognize a general failure among others to understand the importance of grazing lands and their role in climate stability and food security, and we recognize a rapidly growing urgency to do something about it. We must protect our grazing lands and the solutions they hold against all threats to their survival. If we cannot remember the consequences that history has taught that others do not know or choose to ignore, then we have lost both our history and our future. Our continued existence depends on these resources and on our ability and willingness to protect them far into the future. "Tell the Story!"

The Konza Prairie located in the Flint Hills of north-eastern Kansas, USA. One of the best and last remaining examples of Tall Grass Prairie. Historically protected from development and cultivation by an underlying stratum of limestone rock, it is unsuitable for cultivation and has, thus, survived. Photo courtesy of Barbara Van Slyke, Konza Prairie Biological Station, Kansas, USA.

Acknowledgments

Our Reviewers

A good Reviewer is critically important to successful writing. It is usually true that the writers reach a point where they cease to usefully see what they have written. The viewing by those who have overlapping interests with the written content, but have not read it before, enables many errors to be identified – both technical and creative. This requires a significant investment of time and effort on the Reviewers part, but the results are rewarding to the Writer, the Editor, the Reader, and hopefully most of all to the Reviewer who has the satisfaction of knowing that something that was hopefully good, has been made even better by their efforts. We are truly grateful to our Reviewers. They are very important members of our team!

The following served as Reviewers for the *Annex to The History of The International Grassland Congress – 1927 to 2020*

Jimmy **Henning,** USA
University of Kentucky, Lexington

Johannes **Isselstein,** Germany
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Dana **Kelly**, Australia
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Duane **McCartney**, Canada
Agric Canada, Lacombe, Alberta

Joseph **Mureithi**, Kenya
Kenya Agricultural & Livestock Research Organisation, Nairobi

Others who helped with pictures, unpublished information, Congress details, and Technical issues and details

Walter **Fick**, USA

John **Fike**, USA

Jimmy **Henning**, USA
Photographer for the XXV Congress

Ian **Hooten,** USA

Krista **Lea**, USA

Yushou **Ma**, China

Cory **Matthew**, China

Joseph **Mureithi**, Kenya

Lora **O'Rourke**, USA,
wife of Jim O'Rourke

Paul **Ohlenbush**, USA

Barbara **Van Slyke**, USA

Xinquan **Zhao**, China

Nan **Zhibiao**, China

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The International Grassland Congress

Venues and Regions Represented[8]

Number	Location	Year	Region
1	Leipzig, Germany	1927	IX
2	Uppsala, Sweden, and Denmark	1930	IX
III	Zürich, Switzerland	1934	IX
Fourth	Aberystwyth, Wales	1937	IX
Fifth	Noordwijk, Netherlands	1949	IX
Sixth	State College, Pennsylvania, USA	1952	I
Seventh	Palmerston North, New Zealand	1956	V
Eighth	Reading, England	1960	IX
Ninth	São Paulo, São Paulo, Brazil	1965	III
X	Helsinki, Finland	1966	IX
XI	Surfers Paradise, Australia	1970	V
XII	Moscow, USSR	1974	X
XIII	Leipzig, German Democratic Republic	1977	IX
XIV	Lexington, Kentucky, USA	1981	I
XV	Kyoto, Japan	1985	VI
XVI	Nice, France	1989	IX
XVII	Palmerston North, New Zealand, and Rockhampton, Queensland, Australia	1993	V
XVIII	Winnipeg and Saskatoon, Canada	1997	I
XIX	São Pedro, São Paulo, Brazil	2001	III
XX	Dublin, Ireland, and United Kingdom	2005	IX
XXI	Hohhot, Inner Mongolia, China	2008	VI
XXII	Sydney, Australia	2013	V
XXIII	New Delhi, India	2015	IV
XXIV	Mombasa, Kenya	2021	XI
XXV	Covington, Kentucky, USA	2023	I

Note: Arabic Numbers were used for the first and second Meetings while Roman Numerals were used for the third Congress. From the fourth through the ninth Congress, the number of the Congress was written. At the tenth Congress, Roman Numerals were again used and have remained consistent from that point forward.

[8] Addendum to The International Grassland Congress, Venues and Regions Represented in *The History of the International Grassland Congress – 1927 to 2020*, page xiv.

Acronyms Used[9]

AFGC:	American Forage and Grassland Council
CBS:	Chief of the Order of the Burning Spear
CGH:	Chief of the Order of the Golden Heart
EBS:	Elder of the Order of the Burning Spear
FAO:	Food and Agriculture Organization of the United Nations
GDR:	German Democratic Republic
GPS:	Global Positioning System
GRASK:	The Grassland and Rangeland Society of Kenya
H.R.H.:	His Royal Highness
IGAD:	The Intergovernmental Authority on Development
IGC:	International Grassland Congress
ILRI:	International Livestock Research Institute, Kenya
IRC:	International Rangeland Congress
IYRP:	International Year of Rangelands and Pastoralists
KALRO:	Kenya Agricultural & Livestock Research Organization
MALFC:	Ministry of Agriculture, Livestock, Fisheries and Cooperatives
NOC:	National Organizing Committee
NZ:	New Zealand
SRM:	Society for Range Management
UK:	United Kingdom
UN:	United Nations
USA:	United States of America
USD:	United States Dollars
USDA-ARS:	United States Department of Agriculture-Agricultural Research Service
USSR:	Union of Soviet Socialist Republics
VoIP:	Voice over Internet Protocol (VoIP). A method for delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet. In some countries, restrictions apply.
WHO:	World Health Organization
WWI:	World War I
WWII:	World War II
ZALF:	Leibniz Centre for Agricultural Landscape Research

[9] Addendum to Acronyms and Words that Require Further Explanation in *The History of the International Grassland Congress – 1927 to 2020*, page xv.

Table of Contents

Special Recognition v

Introduction ix

Our Reviewers xix

Others who helped with pictures, unpublished information, Congress details, and Technical issues and details xx

Venues and Regions Represented xxi

Acronyms Used xxii

Table of Contents xxiii

The XXIV IGC and the XI IRC, Kenya – 2021 2

Acknowledgements 3

Congress Background and Organization 5

Managing the Impact of Covid 6

Opening Remarks 9

Topics and Content of the Congress 11

Congress Objectives and Attendance 15

Tours 16

Business Meeting 16

Concluding Sessions 19

Assessing the Impact of the Congress 21

Lessons Learned from the Congress 22

The XXV Congress, Covington, Kentucky, USA - 2023 27

Acknowledgements 27

Congress Background and Organization 28

Opening Remarks 30

Welcome Address 31

Promoting Grasslands' Role in the World of 2050 31

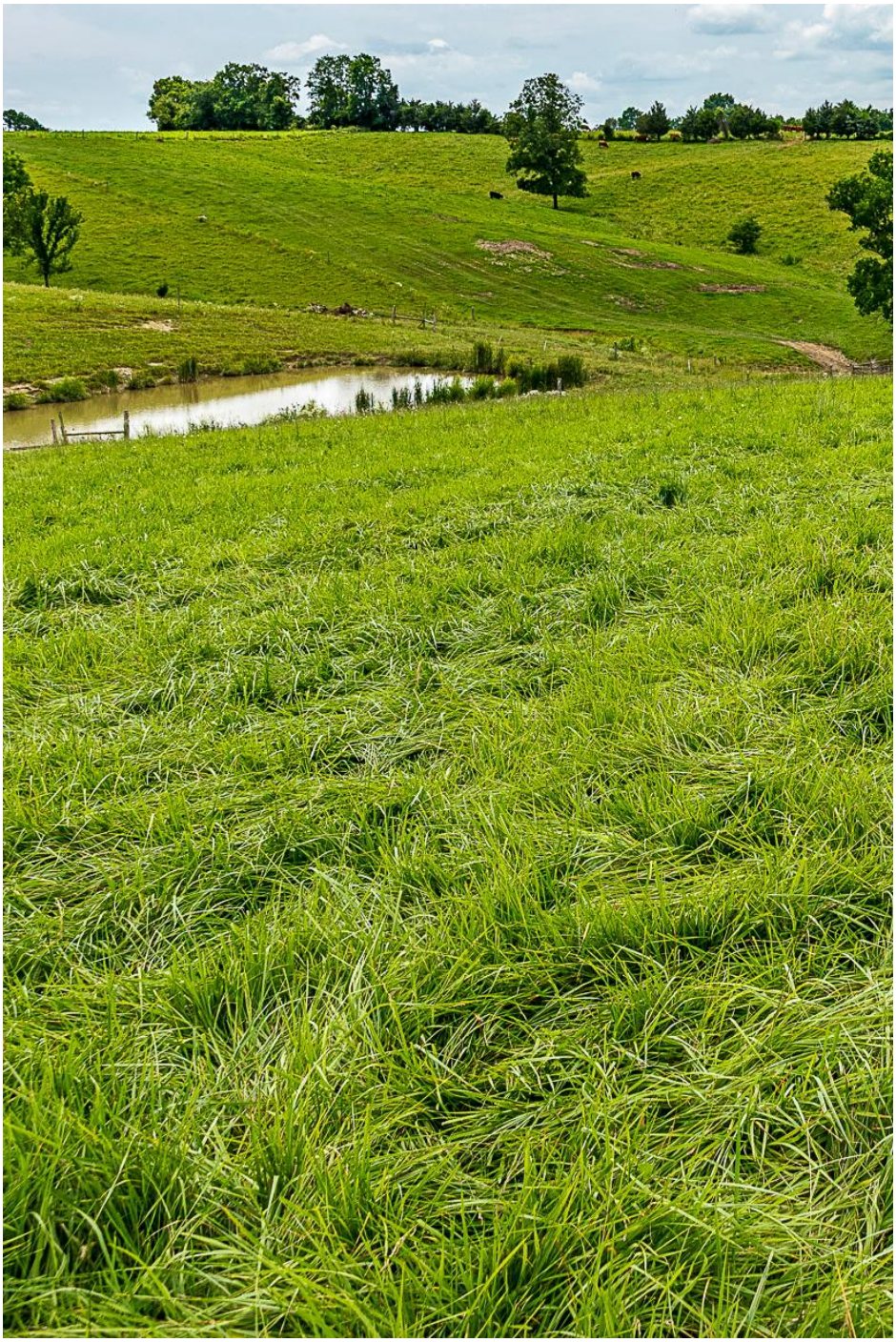
Topics and Content of the Congress 33

Communicating Beyond the Congress 37

Oral Presentations Summary 38

Tours 46

Pre-Congress Tours 47
Mid-Congress Tours 49
Business Meeting 53
Continuing Committee 55
Resolutions Committee 57
Producer Forum 59
Concluding Sessions 63
Awards Ceremonies 63
The Allen Illumination Award 63
Lifetime Achievement Award 65
Appendix 71
Appendix C-24 XXIV IGC and XI IRC – 2021 74
Appendix C-25 XXV IGC - 2023 89
Appendix G Congress Themes 103
Appendix N Words of Wisdom from Voices of the Past 104
Appendix O Tables 105
Literature Cited 109
About the Authors 115



Land not well suited for cropland can make excellent grazing land for livestock. Photograph courtesy of Jimmy Henning, University of Kentucky, USA.

The XXIV International Grassland Congress and

The XI International Rangeland Congress,

Kenya – 2021

From the Congress Report (2021).

The XXIV IGC and the XI IRC, Kenya – 2021

Acknowledgements

We are grateful to and appreciative of the leadership of the Organizers in Kenya who dreamed the dream and brought the Congress into reality against unprecedented odds. The impact of the Coronavirus global pandemic on the Congress was rivaled only by the impact of the Second World War. Both organizers and participants were challenged by new technologies necessitated by the impact of the Coronavirus.

Many contributed to the success of this second Joint Meeting of the International Grassland Congress and the International Rangeland Congress. We thank all those who, working together, brought this Congress that was held entirely online to a successful conclusion. Special thanks to **Joseph Mureithi,** Deputy Director General (Livestock) for Kenya Agricultural & Livestock Research Organisation (KALRO) and Co-Chair of the Secretariat for the Congress, **Primrose** N**abwire,** the wheel that kept everything running in Kenya, and to **Elkana Nyambati**, Secretary of the Secretariat, who had key involvement with all Congress Committees.

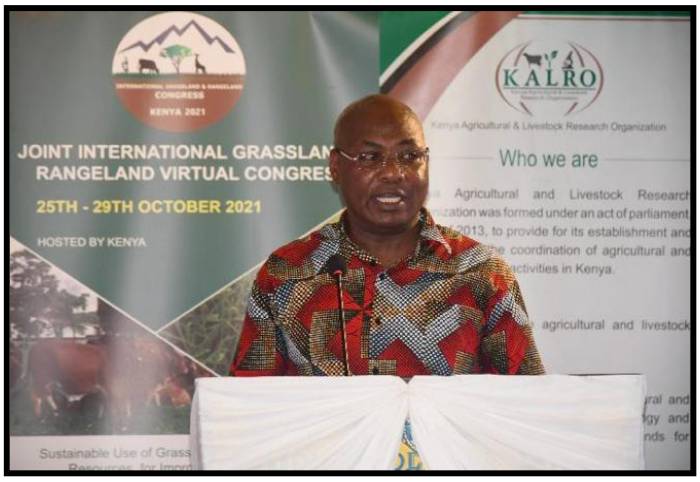
Acknowledgement of pictures used: Kenya cover design: Cattle herded at KALRO Research Station, Kenya, was photographed by Dr. Ray Smith, University of Kentucky, USA. Photo of zebras grazing in Kenya rangelands, courtesy of Pixabay https://pixabay.com/photos/landscape-kenya-africa-zebra-4391967/.

Other pictures used are in the Congress Report from Kenya (2021) unless otherwise designated.

Ankole cattle grazing in natural pastures in Bukoba, Northern Tanzania, a neighboring country to Kenya. Photo courtesy of Joseph Mureithi, KALRO, Kenya.

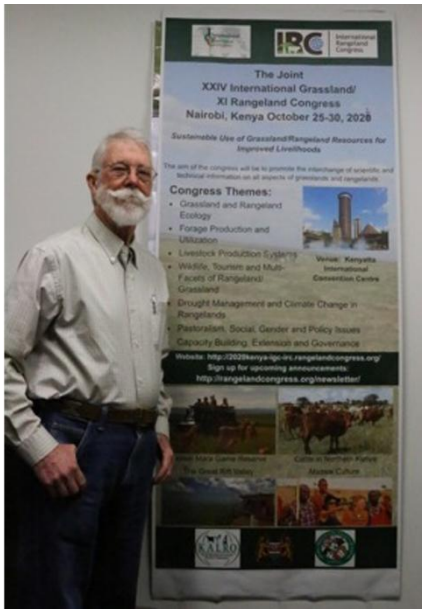
Congress Background and Organization

The International Grassland Congress (IGC) and the International Rangeland Congress (IRC) held their second joint Congress in Kenya from 25 to 29 October 2021. The two Congresses had met together for the first time in Hohhot, China, in 2008 and the success of that joint congress led directly to this second joint congress in Africa where there was much of great interest to both Congresses. This was also the first time that the IGC had been held in Africa (Region XI). Proceedings for this joint Congress are available online.[10]



Harry Kimtai, Chair of the National Organizing Committee, Principal Secretary, State Department of Livestock, Ministry of Agriculture, Livestock, Fisheries and Cooperatives.
From the Congress Report (2021).

The Congress in Kenya began with the leadership of Dr. David Miano [Mwangi], chair of the IGC Continuing Committee, following the Congress in Sydney, Australia, in 2013. His vision and leadership resulted in the successful bid for the Congress to be held in Africa. David initiated gathering his colleagues at KALRO and organized the team that came to the IGC Congress in India, in 2015, to accept the bid for the first IGC Congress in Africa. He then worked with Jim O'Rourke, IRC Secretary-General, Dana Kelly, President, IRC Continuing Committee, and Ray Smith, Chair of the IGC Continuing Committee, to spearhead the effort to develop a bid for the International Rangeland Congress. A delegation was brought to Saskatoon, Saskatchewan, Canada, in 2016 to present the successful bid for this to be a Joint Congress between the IGC and the IRC. We acknowledge and thank the leadership of the IGC and the IRC for collaborating to bring these two Congresses together in a second joint meeting. The



Jim O'Rourke, IRC Secretary-General
Photo by Con Marshall, Chadron State College, Chadron, Nebraska

[10] https://uknowledge.uky.edu/igc/24/

Building of Bridges between these two Congresses continues to demonstrate the synergism and global benefits originally envisioned by this collaboration between the two Congresses.

Managing the Impact of COVID

The bid to host the joint congress, with a venue in Nairobi, Kenya, was accepted by the IGC during the XXIII Congress in India (2015), and the bid to the IRC was accepted during the X IRC in Canada (2016). By December 2019, the world began to awaken to the emergence of a global pandemic that ultimately restricted travel and in-person meetings. Known as the Coronavirus Pandemic, or COVID-19, the seriousness of this virus and the restrictions put in place to combat it, ultimately forced the decision to delay the Congress from its originally scheduled date of 24 to 30 October, 2020 to 25 to 29 October 2021. The postponement was announced on 3 April, 2020 as follows:[11]

The Joint International Grassland Congress and International Rangeland Congress Secretariate Office, Kenyatta International Convention Centre, Nairobi, Kenya.

The National Organizing Committee (NOC; Table 1), together with the International Grassland Congress (IGC) and the International Rangeland Congress (IRC) Continuing Committees would like to express sincere thanks for the great interest and support you have shown towards the Joint XXIV IGC and XI IRC Congress. More than 1,000 abstracts have been received and reviewed and the process of full paper submission is on-going.

However, based on the current worldwide situation with the Coronavirus (COVID-19) pandemic and measures taken by many countries to minimize effects of this virus, the NOC, in consultation with the International Organizing Committees has decided to postpone the joint XXIV IGC and XI IRC Congress by a period of one year. This difficult decision has been taken after consideration of all available information from the WHO (World Health Organization) and various country ministries of health, and the international travel bans, and in some cases complete lock down. Registration to the Joint XXIV IGC and XI IRC Congress remains open.

The Congress is now scheduled for 23 to 29 October 2021, at the same venue - The Kenyatta International Convention Centre, Nairobi, Kenya.

[11] See also page 103 in *The History of the International Grassland Congress – 1927 to 2020*.

The NOC would like to clarify the following:

- All abstracts which have been accepted will continue to be processed, and full paper submission process will continue to take place. The new deadline for paper submission will be announced soon.
- For those who have already paid for registration/tours, their payments will remain valid until we hold the Congress.
- Concerning accommodation, delegates are advised to contact the hotels directly for alternative arrangements as per the respective hotel's policy.
- For questions regarding abstracts and full paper submissions, or any other concern, please contact the Congress Secretariate by email at: kenya2020-igc-irc@kalro.org and kenya2020igcirc@gmail.com (Note: these links are no longer active).

The NOC apologizes for any inconvenience caused by this postponement due to factors beyond its control. Following the 1-year postponement, the desire was to hold an in-person Congress but the reality of the continuing impact of COVID-19 necessitated planning for both an in-person Congress and a virtual Congress with a final and regretful decision that in-person attendance could not be held. This was the first time, in the history of either Congress, that delegates were not able to attend in person but did attend remotely online as an all-virtual meeting. Because of the dependance on virtual technology for this Congress, the official base for this joint Congress eventually moved from Nairobi to Mombasa to facilitate the required technology imposed on this Congress by COVID.

Thus, after unprecedented challenges, the International Grassland Congress and the International Rangeland Congress successfully held their second Joint Congress in Kenya from 25 to 29 October, 2021. History will show that Covid was defeated, the human spirit prevailed, and the passion for knowledge and the establishment of relationships with new colleagues and to further existing friendships and collaborations around the world proceeded undefeated.

Table 1. Membership and Affiliation of the National Organizing Committee of the Joint International Grassland Congress and International Rangeland Congress, Kenya, 2021.

Member	Organization	Affiliation
Principal Secretary Harry Kimtai	SDL-MALFC	State Department for Livestock-Ministry of Agriculture, Livestock, Fisheries and Cooperatives
Dr. Eliud Kireger	KALRO	Kenya Agricultural & Livestock Research Organisation
Dr. Joseph G. Mureithi	KALRO	Kenya Agricultural & Livestock Research Organisation
Dr. Elkana Nyambati	KALRO	Kenya Agricultural & Livestock Research Organisation
Prof. Jesse Njoka	UoN	University of Nairobi
Dr. An Notenbaert	CIAT	International Center for Tropical Agriculture
Dr. Foustine Wandera	KALRO	Kenya Agricultural & Livestock Research Organisation
Dr. Lance Robinson	Private	Private Rangeland Consultant, formerly International Livestock Research Institute
Prof. Moses Nyangito	UoN	University of Nairobi
Dr. Francesco Fava	ILRI	International Livestock Research Institute
Dr. Jane Wamuongo	KALRO	Kenya Agricultural & Livestock Research Organisation
Dr. Dereje Wakjira	IGAD	Intergovernmental Authority on Development
Dr. David Miano [Mwangi]	KALRO	Kenya Agricultural & Livestock Research Organisation
Dr. Samuel Mbuku	APSK/KALRO	Animal Production Society of Kenya/Kenya Agricultural & Livestock Research Organisation
Mr. Simon Onchiri	Immigration	Directorate of Immigration Services
Prof. Cecilia M Onyango	UoN	University of Nairobi
Mr. Davis Wambua	KICC	Kenyatta International Convention Centre
Mr. Patrick Ngicuru	SDL-MALFC	State Department for Livestock - Ministry for Agriculture, Livestock Fisheries and Cooperatives
Dr. Alice Murage	KALRO	Kenya Agricultural & Livestock Research Organisation
Dr. Iain Wright	ILRI	International Livestock Research Institute
Mr. Stanley Humaiya	SDL-MALFC	State Department for Livestock-Ministry of Agriculture, Livestock, Fisheries and Cooperatives
Dr. Michael Okoti	KALRO	Kenya Agricultural & Livestock Research Organisation
Dr. Patrick Watete	SDL-MALFC	State Department for Livestock-Ministry of Agriculture, Livestock, Fisheries and Cooperatives
Dr. Festus Murithi	KALRO	Kenya Agricultural & Livestock Research Organisation
Dr. George Keya	KALRO	Kenya Agricultural & Livestock Research Organisation
Mr. Stephen Odipo	KALRO	Kenya Agricultural & Livestock Research Organisation
Ms. Helen Omukoko	KTB	Kenya Tourism Board
Mr. Isaac Masinde	Internal Security	Ministry of Interior and National Administration
Ms. Florida Maritim	KALRO	Kenya Agricultural & Livestock Research Organisation
Mr. Moses Boit	KALRO	Kenya Agricultural & Livestock Research Organisation
Ms. Primrose Nabwire	KALRO	Kenya Agricultural & Livestock Research Organisation
Mr. Nathan Maweu	KALRO	Kenya Agricultural & Livestock Research Organisation

Opening Remarks

Harry Kimtai, CBS[12] and Principal Secretary, State Department for Livestock, Ministry of Agriculture, Livestock, Fisheries and Cooperatives in Kenya, served as Chair of the NOC. In a Preface to the Congress (2021a; Appendix C-24, page 74-75), Kimtai informed delegates that strong support was provided through the State Department for Livestock primarily because "rangeland and grassland cover over 80% of the country and provide livelihoods to over 10 million Kenyans. These lands support about 70% of the national livestock herd and about 85% of the wildlife that supports the country's tourism industry."

Dignitaries of the Congress. Pictured from left to right: Dr. Eliud K. Kireger, Director General KALRO, Professor Ray Smith, Chair, IGC Con tinuing Committee, University of Kentucky, USA, Professor Hamadi Iddi Boga, Former Principal Secretary State Department for Crops, Lawrence Omuhaka, Former Chief Administrative Secretary of Livestock in Kenya, and Harry Kimtai, Principal Secretary, State Department for Livestock, Ministry of Agriculture, Livestock, Fisheries and Cooperatives in Kenya. Picture courtesy of Primrose Nabwire.

Kimtai noted that the Congress enabled Kenya's "rangeland and grassland research stations to be recognized globally as having been at the forefront of breeding some of the best native pasture varieties in the world." Additionally, the Congress provided researchers the opportunity and "privilege to participate, share and exchange their experience, knowledge and information with the international community."

The Honorable Peter G. Munya,[13] Cabinet Secretary, Ministry of Agriculture, Livestock, Fisheries and Cooperatives of Kenya, opened the Congress saying "It gives me great pleasure to participate in this auspicious occasion of the opening of the Joint International Grassland Congress and Rangeland Congress, Kenya, 2021. The importance of grassland and rangeland to the economy of Kenya and indeed for the Horn of Africa cannot be over-emphasized. In Kenya the rangeland(s) cover over 80% of the land mass and are home to 70% of the livestock and 83% of the wildlife. Over 10 million people derive their livelihoods from the existing natural resources in these areas" (Munya, 2021).

[12] Chief of the Order of the Burning Spear (CBS). Award made by the President of Kenya 'in recognition of outstanding and distinguished services rendered to the nation in various capacities and responsibilities'.
[13] Hon. Peter G. Munya, Cabinet Secretary, Ministry of Agriculture, Livestock, Fisheries and Cooperatives (Kenya).

"I am glad to note that the congress gives attention to climate change issues and has a theme on drought and climate change. I hope the papers presented under this theme will underscore the urgency for all of us to unite in addressing climate change issues globally."

Professor Hamadi Boga[14] addressed the Congress reminding delegates that "Crop-livestock integration (is) one of management strategies that contributes to nutrient cycling that leads to sustainable productions systems. This system, when managed efficiently can contribute significantly to sustainable grassland and rangeland productivity. It is my hope and believe [sic] that during this joint Congress information sharing on crop-livestock integration shall be explored for overall agricultural productivity and improved livelihood" (Boga, 2021).

Dr. Dana Kelly[15] (Australia), President of the International Rangeland Congress Continuing Committee, welcomed delegates saying "…this Congress is a significant moment in history for both our organizations (Kelly, 2021; See Appendix C-24, page 76 for full address). Rangelands and grasslands are important to the world, as these regions cover about half of the earth's land surface area. The health of these landscapes is critical to the wellbeing of more than 500 million people, some of the most marginalized peoples in the world. Pastoralists and others who derive their livelihood from rangelands and grasslands are both users and stewards of the land. Their stewardship is critical for building resilient economies, achieving food and water security, and improving environmental conditions".

Dr. Dana Kelly, President, International Rangeland Congress Continuing Committee. (Provided by Dr. Dana Kelly).

[14] Prof. Hamadi Boga, Elder of the Order of the Burning Spear (EBS), Chief of the Order of the Golden Heart (CGH), Principal Secretary, State Department for Crop Development and Agricultural Research, Ministry of Agriculture, Livestock, Fisheries, and Cooperatives, Nairobi, Kenya.
[15] Adjunct A/Professor, Centre for Applied Climate Science, University of Southern Queensland, Australia.

Topics and Content of the Congress[16]

For this joint Congress, the theme was *Sustainable Use of Grassland and Rangeland Resources for Improved Livelihoods*.

From the Congress Report (2021).

Invited and offered papers were grouped into seven subthemes with the Session titles listed below. The program covered a wide range of agronomic and socioeconomic issues concerned with the production, utilisation and environmental impacts of grasslands and rangelands and their management throughout the world.

Range/Grassland Ecology

(1). Remote sensing, risk analysis and land management, (2). Rangeland monitoring and support systems, (3). Rangeland degradation and restoration, (4). Sustainable land use, (5). Grazing, soil nutrient and properties, (6). Community composition and ecological drivers, (7). Eco-hydrology and plant responses, (8). Fire ecology, plant responses and management, (9). Commons: old, current, and future challenges for rangeland what innovations in collective issues to face these challenges.

Forage Production and Utilization

(1). Temperate/tropical transition climate zones: locations for breeding forages with climate resiliency, (2). Recent advances in *Urochloa* grass research in Kenya, (3). Forage genetics and improvement, (4). Forages and environment improvement, (5). Forage evaluation and agronomy, (6). Forage legume ecosystem services in sustainable livestock systems, (7). Tropical forage genetic resources, (8). Water stress and water use efficiency, (9). Forage planning and management, (10). Forage and animal nutrition.

Livestock Production Systems

(1). Beef and dairy production systems, (2). Social economics of livestock production systems, (3). Sustainable management of grasslands/rangelands ecosystems, (4). Small ruminant production systems, (5). Challenges on livestock production and rangelands/grasslands utilization in southern South America, (6). Climate change;

[16] Addendum to Chapter 3 of *The History of the International Grassland Congress – 1927 to 2020,* page 105 to 108.

adaptations and resilience of livestock systems, (7). Utilization of grassland/rangeland.

Wildlife, Tourism and Multi-facets of Rangeland/Grassland

(1). Biodiversity, ecosystem services and ranching, (2). A revolution in conservation innovation by and with pastoralists: examples from Kenya, Africa and the globe.

Drought Management and Climate Change in Rangeland/Grassland

(1). Land use, carbon sequestration and greenhouse gas fluxes, (2). Droughts and degradation - social-ecological perspectives on tipping points in dryland rangeland, (3). Climate change impacts and mitigation.

Pastoralism, Social, Gender and Policy Issues

(1). Changes in rangeland property rights and land use in Central Asia and Western China, (2). Action Plan for the International Year of Rangelands and Pastoralists - part 1, (3). Local knowledge, local and global action, (4). Governance, investment, infrastructure and markets, (5). Action Plan for the International Year of Rangelands and Pastoralists - part. 2, (6). Developing environmental services payment schemes for grassland in China and Mongolia, (7). Gender and indigenous perspectives for sustainable rangeland: gendering and decolonizing pastoralist studies and rangeland conservation.

Capacity, Institutions, and Innovations for Sustainable Development in Rangeland/Grassland

(1). Participatory socio-ecological observatories for sustainable rangeland development, (2). Management, land use planning and ecosystem services, (3). Participatory monitoring and silvo-pastoral systems, (4). Accelerating the use of participatory action research for development in pastoral lands: challenges and opportunities, (5). Re-envisioning rangeland in the 21st Century: overcoming the marginalization narrative.

Table 2 Indicates the percentage allocation of papers to the subject categories used in Allen *et al.,* (2021). See pages 123 to 124.

Table 2. Percentage allocation of papers in Proceedings to subject categories, Kenya, 2021.

Topic	Papers presented, %
Plant and soil	27
Utilization and animal production	25
Land use systems	16
Environment	9
Socioeconomics and policy	6
Information and technology transfer	11
Other products[a]	6

[a] Includes papers with the main focus on provision of ecosystem services.

A welcome number of the Congress papers were cross-cutting and reported multi-disciplinary approaches which addressed production, environment, and social issues. The need to consider social-ecological systems was stressed. In contrast to previous Congresses, considerable attention was given to the importance of indigenous knowledge, social issues relating to livelihoods, gender and human and social capital and the need for effective engagement between scientists and policy makers.

Major foci were on degradation and desertification, drought and impacts of climate change. The positive effects of grassland on carbon sequestration and the need for climate resilience were strongly featured.

The proportion of papers that dealt with grassland agronomy and forage quality was less than in previous International Grassland Congresses. There was, though, considerable attention given to grazing management, including the use of adapted breeds and novel species, and the effects of tannins and polyphenolics on forage nutritive value. Progress was reported on the use of legumes, particularly in the tropics.

Many contributions dealt with ecosystem services provided by grassland and rangeland, particularly carbon sequestration and biodiversity. Several papers considered the importance of pollinators and bee-friendly systems, possibly a first for the Congress. However, little progress was apparent in developing payment systems for ecosystem services.

Although some papers discussed leisure, tourism and wildlife, little attention was given to use of grassland for biogas production or biorefining. The Proceedings for this joint Congress included 362 papers from throughout the world, as indicated in Table 3.

The country that had most papers in the authorship was USA (88), followed by Kenya (57), Germany (33), Australia (27), Brazil and South Africa (26 each), Japan (16), Mexico (14) and China and France (12 each). A total of 66 countries were represented in the authorship.

Table 3. Papers in Proceedings from International Grassland Congress Regions, Kenya, 2021.

	Region[17]	Papers with first author from region	Other papers with author from region	Total papers with author from region
I	North America	71	26	97
II	Central America and Caribbean	11	5	16
III	South America	45	10	55
IV	South Asia	14	2	16
V	Oceania	24	10	34
VI	East Asia	25	4	29
VII	Middle East	4	3	7
VIII	Mediterranean	19	4	23
IX	Europe excluding VIII and X	58	39	97
X	North Eurasia	12	6	18
XI	Africa excluding VIII	79	41	120
	Total	362		

[17] Regions are as defined by the International Grassland Congress. (See page 322 in *The History of the International Grassland Congress – 1927 to 2020*.)

Congress Objectives and Attendance

Key objectives of this joint Congress were to "promote the exchange of knowledge, showcase Kenyan research experience and stimulate interest and focus on the livelihood of people living in the grassland and rangeland in Kenya." A total of 980 persons attended the Opening Session and heard the Keynote speakers. Six hundred and seventy-five delegates attended the Congress representing 66 countries. Attendance by Region[18] was Region I (78), Region II (14), Region III (45), Region IV (39), Region V (33), Region VI (30), Region VII (14), Region VIII (23), Region IX (84), Region X (16) and Region XI (246). Numbers in parentheses indicate numbers of participants.[19]

Regions with the highest attendance were Africa (Region XI), followed by Europe (Region IX) and North America (Region I). There were 1,344 visits to the virtual exhibition booths that included multiple visits by some individuals. Differences in time zones presented challenges in viewing times requiring some delegates to stay up very late at night or having to get up very early in the morning. This probably limited participation in some regions of the world, with China, Australia and New Zealand being especially impacted. Another possible issue that may have limited participation was restrictions on Voice-over-Internet Protocol (VolP)[20] in some countries.

From the Congress Report (2021).

[18] Regions are as defined by the International Grassland Congress. (See page 322 in *The History of the International Grassland Congress – 1927 to 2020*.)

[19] The reader will note there is a discrepancy between total number of persons attending the Joint Congress and the total number attending by Region. This is due to the inability to identify some individuals by Region (Primrose Nabwire, Personal Communication).

[20] Voice over Internet Protocol (VoIP), also called IP telephony, is a method and group of technologies for the delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet. In some countries, restrictions apply (Wikipedia).

Tours

Seven virtual tours showcased work being done on the rangelands and grasslands of Kenya. These tours included:

- Pasture Breeding and Production for Enhanced Livestock Production and Rangeland Rehabilitation.
- East Africa's Drylands, Big Lands, Big Opportunities.
- National Parks of Kenya Tour.
- IGAD Protocol on Pastoral Transhumance.
- Management and Carbon Credits in Kenya.
- From Cows to Camels.
- The ILRI Tour.

Business Meeting

Dr. Ray Smith (University of Kentucky, Lexington, USA), served as Chair of the IGC Continuing Committee. In the IGC Business Meeting (Smith, 2021a), Dr. Smith announced that the next IGC (XXV) will be held in Covington, Kentucky, in 2023 with information posted on the IGC Website. Smith thanked the members of the Continuing Committee and suggested that current members be extended until 2023. This was necessitated because new members of the Continuing Committee must be nominated from participating delegates in attendance at the IGC (See Appendix F-5 in *The History of the International Grassland Congress - 1927 to 2020*; page 319).

Dr. Ray Smith, Chair, International Grassland Congress Continuing Committee.

Because this Congress was online, no one met that criterion. Thus, the Current Continuing Committee was approved to continue to serve until the XXV Congress in 2023 (See, page p. 18, (Resolution 6)). After the Congress, Dr. Derek Woodfield, representing Region V (Oceania), was elected by vote of the Continuing Committee members to succeed Ray Smith as Chair of the Continuing Committee.

Dr. Smith informed the delegates that the book, *The History of the International Grassland Congress - 1927 to 2020*, has been published. This comprehensive update was writ-

ten by Dr. Vivien Allen and Dr. Roger Wilkins as the primary authors with additional input from co-authors Dr. Garry Lacefield and Dr. Ray Smith. The book is available on the IGC website both as hard copy and as an electronic version. This History will continue to be updated by adding the Joint Congress in Kenya and subsequent congresses in an Annex as they occur.[21]

Smith also reported that "past Proceedings of the IGC are being collected and made available via a link on the IGC website. This was made possible through the University of Kentucky library system and the Forage and Grassland Foundation, Lexington, Kentucky. The Proceedings can now be searched using an author's name and keywords and are available for downloading at no cost."

Smith announced that discussions are underway proposing that Leipzig should be the venue for the XXVI Congress. The first meeting that became the International Grassland Congress was held in Leipzig, Germany, in 1927, thus, 2027 will be the 100th Anniversary.

Eight Resolutions were considered and carried during the Business Meeting (Smith, 2021b).

Resolutions 1 through 3 congratulated the Kenyan Organizing Committee for an excellent Congress in the face of unprecedented circumstances, expressed thanks to sponsoring organizations and requested that every reasonable effort be made to keep costs low to enable participants from as many countries as possible to attend the Congress. Carried: Unanimously.

Resolution 4 requested that ten dollars (USD) per attendee earned during the XXV IGC Congress should be provided to the IGC Continuing Committee as start-up funds for the next congress and to support early career researchers attending the congress. Carried: Unanimously.

This Resolution continues the tradition, begun in 2008 at the XXI Congress in China, to retain 10 USD per registration to be provided to the Continuing Committee as start-up funds for the next Congress. This policy has been followed at each succeeding Congress. Following the unanimous approval of delegates at the XXIII Congress in New Delhi, India, in 2015, use of this money was extended to help support early career researchers attending the congress.

[21] This Annex for the Congress Histories will be available on the International Grassland Congress website.

Resolution 5 asked that the Continuing Committee commission a study on the Global future of grasslands and present this at the 100th anniversary of the IGC in 2027. The study would involve all relevant stakeholders. Carried: Yes from 87% of those voting.

Resolution 6 That the term of the current IGC Continuing Committee members be extended until the next in-person IGC Congress 14-19 May 2023 in the USA because our constitution requires that "new members shall be nominated from the participating delegates in attendance at the Congress." Consultations with past IGC Continuing Committee Chairs provided the recommendation that new members should be nominated from those physically attending a Congress. Carried: Unanimously.

Resolution 7 That the IGC fully support the International Year of Rangelands and Pastoralist initiative (IYRP) for 2026 including providing representatives to the IYRP Global and Regional Support Groups. The International Grassland Congress Resolution 7 was carried unanimously. Of all the Resolutions passed at this Congress, this Resolution was potentially the most impactful as it encouraged and motivated people and governments around the world to get involved. The number of supporters of IYRP, in 2025, is 102 countries and 376 organizations. This is probably the largest Alliance ever formed of rangelands and related organizations in the world.

Resolution 8 That the incoming IGC Continuing Committee consider the need for updated Country Pasture Profiles and lobby FAO for resources to update and reinstate a full set of publicly available Country Pasture Profiles. If successful, IGC will:

- Identify potential authors to build on the previous work.
- Work with authors to develop suitable guidelines and specifications for this new series.
- Put together a business case for the publication of the Country Pasture Profiles as an e-book (the prior electronic versions could apparently not be cited as a scholarly work). Carried: Unanimously.

Concluding Sessions

J. L. Klotz and J. H. Bouton presented a paper highlighting messages from the Congress of particular importance for grasslands and D. L. Coppock, A. J. Ash and B. Irving presented a parallel paper focusing on rangelands. Key points from these summaries are highlighted here as follows:

Grasslands: In the Grasslands Summary (Klotz and Bouton, 2021), it was pointed out that, as with all previous IGC's, productivity, quality and persistence were emphasized but at this Congress the focus was primarily on aspects relevant to Africa and to the tropics in general. Carbon sequestration, forage resilience, adaptation and greenhouse gas mitigation were also addressed at this Congress. They pointed out that as new technological advances are deployed into global agriculture, these emerging concerns will continue to grow in global importance. Social, environmental, and economic issues remain ill-defined but continue in importance. With projected climate changes, including higher temperatures and inconsistent rainfall, research and outreach programs will increase in importance particularly in the tropics. In their concluding comments Klotz and Bouton said that "Fitting the current sustainability narrative to the science and not the other way around is important going forward. Finally, one must keep in mind how pastoralists and producers will be impacted with any future research projects and policy changes."

Rangelands: In summarizing key rangeland issues and the way forward, Coppock *et al*., (2021) pointed out that "stand-alone studies of livestock production are becoming rare compared to that of the past International Rangeland Congresses." More emphasis is now directed at understanding the fuller context of resource management and the improvement of human welfare. Few papers were presented that dealt with climate change and broad-scale climate adaptation. Instead, papers focused more on improving local drought responses with improving early warning signs in rangeland systems and integrating perspectives among producers and scientists. Invasive species remains a global topic with woody encroachments viewed as a major contributor to rangeland degradation. Importance of ecosystem tradeoffs and services, including carbon sequestration, wildlife, and tourism going forward, was pointed out but research remains in its infancy. Important issues of landscape conversion from rangelands to cultivation and the continuing growth of human population were addressed and it was pointed out "that losses of such key resources can be very negative for wildlife and associated values." "Based on our review the future for IRC stakeholders is clear: Continue the expansion of interdisciplinary social-ecological systems and action-based approaches and increase attention to climate

change adaptation/mitigation, ecosystem services, community-based development, human empowerment, market development, poverty mitigation and creation of effective policy frameworks."

A message from the Congress was that to meet sustainability goals and to reduce greenhouse gas production per unit of output, it will be critical to increase grassland production and improve animal performance. A global survey of producers indicated that feed shortages are the major constraint to animal production in Africa and Asia. The disciplines underpinning the production and utilisation of grassland remain of key importance, but increased research needs to be carried out in a systems context, have involvement of social scientists and effective contacts with policy makers and farmers.

From the Congress Report (2021).

Professor Ray Smith, IGC Continuing Committee Chair, addressed the Congress in his closing remarks saying "Now, speaking to all of my Kenyan colleagues and friends who are sitting in front of me (Note: The NOC Secretariate met in person in Mombasa during the week of the Congress). There have been profound changes in our world during the last two years, but you have and are rising above. Covid will not defeat you or any of us, just as the IGC leadership resurrected the organization after a 12-year break during and after WWII. You have risen to confront these formidable challenges and have overcome. Sure, you are disappointed not to be hosting delegates in-person in Kenya to experience the people, the culture, the vast and beautiful grasslands and rangelands. But you have given them a taste, an introduction, and reason to visit and spend time here in the future. And you have continued the legacy of both the IRC and the IGC. You have provided the platform for this Congress, the recorded presentations that are now available to all delegates and the permanent proceedings papers that will be available for generations of scientists. And although this Congress was virtual you have still helped create very real and lasting interactions between researchers from many countries (Smith, 2021c; See Appendix C-24, pages 79 to 84 for full remarks).

Thank-you. Asante-sana.

Assessing the Impact of the Congress

At the time this Annex is being written three years after the Congress took place, it is still early to assess the full impact of the Congress on Kenya or more widely, but important benefits are known already. This was the first opportunity for scientists, students, educators, and practitioners around the world to learn in-depth information about the challenges, opportunities, research in progress, and the importance of Kenya's grazing lands. These include both rangelands and pasturelands, as well as forage improvement through management and through plant breeding. Holding this as a joint congress was especially appropriate to this venue and the wider range of knowledge gained by the presence of both organizations, broadened and enriched the experience available to the delegates and to the host countries scientists and students.

Additionally, a very significant development arose directly from hosting this joint Congress. During the Congress, discussions were held regarding the formation of a Grasslands and Rangelands Society of Kenya (GRASK). These discussions continued after the closing of the Congress. As a result of these discussions, "a resolution was passed to create a national body to bring together researchers, professionals, practitioners and resource users, to work and positively impact on the important biomes of our grassland and rangelands." From this resolution, GRASK was formed. The process of forming GRASK was mediated through concerted efforts by the State Department of Livestock, the Kenya Agricultural and Livestock Research Organization and the Universities representative – the University of Nairobi." The Grassland and Rangeland Society of Kenya was formed as "a professional society that brings together researchers, professionals, practitioners and resource users to address the challenges facing grasslands and rangelands in Kenya and the IGAD region."[22] The Society unifies, stimulates and fosters focus and interest on grasslands and rangelands for their sustainable development to play the rightful role in national and regional economic development. As a professional Society, GRASK seeks to address the many challenges facing grassland and rangeland ecosystems chiefly; land degradation, loss of biodiversity, climate change and variability vulnerabilities which have negatively impacted food and nutritional security of the communities living in the Grasslands and Rangelands. Therefore, GRASK aims to foster sustainable management, utilization and conservation of the grassland and rangeland resources. The first Annual Conference for GRASK was held October 15 to 17, 2024. The theme for this Conference is "*Enhancing Community Resilience and Productivity of Grassland and Rangeland Ecosystems to Achieve Food Security.*" See website for more information. https://www.grask.or.ke/?page_id=15#.

[22] The Intergovernmental Authority on Development (IGAD) in Eastern Africa was created in 1996 with 8 member states.

A major impact of this Congress was the demonstration of the world-wide possibility of a successful electronic 'Zoom' Congress. The Kenyans were faced with an unprecedented situation because of Covid. By using these emerging technologies in communications, and rather than having to cancel the Congress, they successfully conducted this joint Congress and demonstrated the options and successes of a global virtual meeting. Elements of these technologies will likely be incorporated into future Congresses and meetings in increasingly valuable ways.

Lessons Learned from the Congress

The global pandemic necessitated use of a virtual platform to conduct this joint Congress. Going forward into the future, it may well be necessary to repeat this format in part or in whole, particularly for those unable for any reason to travel to a Congress. Additionally, as technology continues to improve, this may offer opportunities to enhance in-person attendance as well. From the first Meeting in Leipzig, Germany, in 1927 forward, the objective of the Congress was to exchange information, and to see and learn first-hand about the forages and grazing lands characteristics of the regions in which the Congress was held. The Kenyans were successful in achieving these objectives and should be both thanked and complimented for accomplishing this in the face of an international disaster.

The Head Table. From the Congress Report (2021).

Thus, a key lesson learned was the importance of being adaptable. Every Congress has needed to be flexible in its planning and in meeting challenges as they arose during the Congress itself. The Kenyans and the organizers of this Congress exemplified the fact that flexibility led to success.

Lessons learned are also listed in detail for each of the Sub-Committees (Congress Report, 2021). Lessons learned from this Congress should be of much value for the future.

In the closing of the Congress, NOC Chair, Harry Kimtai, noted that the Congress enabled Kenya's "rangeland and grassland research stations to be recognized globally as having been at the forefront of breeding some of the best native pasture varieties in the world." Additionally, the Congress "provided researchers the opportunity to participate, share and exchange their experience, knowledge and information with the international Community."

"I am encouraged that as we bring this congress to a close that there is great hope for 'Sustainable use of Grassland and Rangeland Resources for Improved Livelihoods' which was the theme of the Joint Congress. I now wish to declare this Congress officially closed (Kimtai, 2021b)."

"ASANTE- SANA!"

From the Congress Report (2021).

The XXV International Grassland Congress,
Covington, Kentucky, USA - 2023

The XXV Congress, Covington, Kentucky, USA - 2023

Acknowledgements

Dr. John Baylor - The XXV International Grassland Congress was dedicated to the memory of Dr. John Baylor (1922 to 2013). A native of Belvidere, New Jersey, USA, he served in the US Air Force during WWII. John received the Ph.D. in 1955 from Pennsylvania State University. He was Executive Director of the Atlantic Seedsmen Association (1987 to 2002) and Director of Marketing, Beachley Hardy Seed Company (1983 to 1991). He served as the first President of the American Forage and Grassland Council (AFGC) from 1968 to 1970 and as the Secretary-Treasurer of this organization from 1971 to 1986.

Dr. John Baylor (Provided by Dr. Garry Lacefield)

Dr. Baylor was an organizer of the Ninth International Grassland Congress in Sao Paulo, Brazil, in 1964. He served as Chairman of the Governing Board for the XIV Congress that was held in Lexington, Kentucky, USA, in 1981. When the final accounting was completed for that Congress, a significant residual fund remained. At this time, there was no mechanism to retain such monies to be used to assist the following Congress. Each Congress was responsible for its own funding. Dr. Baylor, with support from Warren Thompson (University of Kentucky, Lexington, USA) suggested investing these funds with returns on that investment to be used for the benefit of future Congresses and related needs. This became the *Forage and Grassland Foundation* which continues today to help fund young scientists to attend International Grassland Congresses, to assist the Congresses with specific expenses, and to fund other appropriate opportunities for selected grasslands projects including the publication of its history. This highly successful program has made possible many things of lasting importance to the Congresses, the delegates, and to our global grasslands.[23] For his many contributions to Grassland Agriculture, Dr. Baylor received the American Forage and Grassland Council Merit, Medallion and Distinguished Grasslander Awards.

[23] For additional information on the Foundation, See *The History of the International Grassland Congress – 1927 to 2020*, page 57.

Tina Bowling – Secretary to the International Grassland Congress Secretariat and Executive Director of the American Forage and Grassland Council, was integral to the XXV Congress. She worked closely with a small group to develop the bid to host the Congress and took leadership of all the logistical aspects of the Congress from registration, tour organization, the convention center, hotel arrangements, paper submission, the proceedings, and more. Tina's hand was on all aspects of the Congress and although she is not one to solicit credit, the success of the Congress was a direct result of her efforts over a 5-year period. When Covid aftermath issues caused a significant reduction in sponsorship revenue, Tina made difficult but essential budget adaptations to ensure that the Congress remained solvent. She also assumed greater and greater responsibilities to save costs. For example, she handled the paper submission process and many of the editorial duties. Her vast experience with conferences and conventions permitted efficient savings without compromising venue quality or integrity.


Tina Bowling

Dr. Jimmy Henning - Extension Professor, Plant and Soil Sciences, University of Kentucky, Lexington, Kentucky, USA, served as official photographer for the XXV Congress. Thus, we now have for the first time, an extensive photographic documentation of this Congress. Unless otherwise indicated, all pictures used in the writing of the history of the XXV Congress in this Annex were taken by Dr. Henning including pictures used on the cover page for the XXV Congress. Our history is greatly enriched through this visual history, and we envision this being the first for creating photographic histories of future Congresses. Much appreciation is expressed to Dr. Henning for his outstanding contributions.


Dr. Jimmy Henning

Congress Background and Organization

This was the second time that the International Grassland Congress had been held in Kentucky and the third time that it had taken place in the USA. The Sixth Congress was held in State College, Pennsylvania, in 1952 and the XIV Congress was held in Lexington, Kentucky, in 1981. Covington, Kentucky, was the venue for the XXV Congress, held May 14 to 19, 2023. Because COVID prevented holding an in-person meeting in Kenya in 2021, the 2023 Congress in Kentucky was the first time in 8 years that delegates had the opportunity to meet in person.

Dr. Ray Smith (Kentucky, USA) served as Congress President and Chair of the Organizing Committee. Over 650 delegates attended the Congress representing more than 50 countries. One hundred and fifty-six volunteer papers were presented and there were 493 poster presentations. Thirty-one exhibits were on display for delegates to see the newest industrial technologies, published materials, forage genetic progress and other information available in many different aspects of the forage industry.

Dr. Ray Smith, President of the XXV International Grassland Congress.

The overall theme of this Congress was *Grasslands for Soil, Animal and Human Health* (See page 103). The offered papers presented addressed five sub-themes as follows: (1) Grassland Ecology, (2) Grassland Production and Utilization, (3) Livestock Production Systems, (4) Grassland Sustainability, Innovations, and Initiatives, and (5) Grassland Policies, Social Issues, and Ecosystem Services.

It is interesting to note the evolution of the themes that our Congresses have selected to represent their current concerns over the years that the Congresses have been held. Although no themes were identified until the XII Congress in Moscow in 1974, the topics they discussed initially expressed concerns for increasing food production, as well as breeding for improvement of both livestock and forages.[24] These concerns have remained a priority continuing through the most recent Congresses. More recently, intensifying, diversifying, and integrating forage, crop, and livestock production systems, have received increased emphasis. Their value as a global resource and their role in carbon sequestration while protecting soil health `and the environment have become increasingly urgent messages in the search for more sustainable food production systems that support both human and environmental health. In this year of 2024, when popular opinions too often ignore the environmental and human health benefits derived from grazing ruminants, the Theme and

At the Oregon Forage Seeds exhibit, Dr. Garry Lacefield, University of Kentucky, and Dr. Don Ball, Auburn University Alabama, discuss forage improvement with Dr. Matt Poore, ruminant nutritionist, North Carolina State University.

[24] See pages 323 to 324 in *The History of the International Grassland Congress - 1927 to 2020*.

the papers presented were a particularly important message to be heard from the global stage of the International Grassland Congress.

Opening Remarks

President Smith addressed the Congress saying "We are here today because we believe that grasslands are important" (See Appendix C-25; Page 89; for full Address). In elaborating the importance of our global grasslands, both historically and currently. Smith quoted John James Ingalls who described grass as "the forgiveness of nature – her constant benediction" and who also stated that "If its harvest should fail for a single year, famine would depopulate the world" (Ingalls, as reprinted in 1948).[25]

Northern Kentucky Convention Center, Covington, Kentucky, USA, where the XXV Congress was held.

"Ecologically, grasslands are defined as areas where the vegetation is dominated by grasses and grass-like species. For most of us here, we think of grasslands as 'grazing lands'. From the *Terminology of Grazing Lands and Grazing Animals*, the vegetation in grasslands includes grasses, legumes and other forbs, and at times woody species. We have native grasslands, cultivated grassland, naturalized grasslands, and many other ecosystem types. They are all grasslands. Grasslands in all their forms cover over 1/3 of the land surface of the world."

[25] Original quotation came from the Kansas Magazine in 1872 and is reprinted in part in the 1948 Yearbook of Agriculture (Edited by A. Stefferud, 1948).

Welcome Address

Promoting Grasslands' Role in the World of 2050

Dr. Peter Ballerstedt addressed the Congress regarding the essentiality of and the anticipated challenges to our global grasslands over the next 30 years (See Appendix C-25; Page 94; for full Address). He reminded the audience that at the first meeting of the Congress in 1927, Professor Falke (President of that first meeting) stated that "feeding a population [of] a country by itself is the basis of public wealth, productivity and general well-being" pointing out that lack of sufficient food was a major factor in National Security. Dr. Ballerstedt contrasted this with the current status where in some parts of the world, people are calorically over-fed but are nutritionally undernourished. This form of malnutrition also compromises physical health and national security.

Dr. Ballerstedt further pointed out that predictions generally agree that by 2050, the global population will exceed 9 billion people requiring a doubling of food production to meet demands but that this food must be of improved quality as well as quantity.

Dr. Peter J. Ballerstedt, Forage Ambassador, Barenbrug, USA.

Further, this must be done on our existing land base. Our global grasslands will play an increasingly major role in protecting our soils and environment while providing a valuable livestock feed source, not directly consumable by humans. As feed for ruminants, high-quality animal-source proteins and other nutrients are produced that improve human nutrition while addressing concerns about soil quality and stability, environmental issues, and ecosystem services. Dr. Ballerstedt pointed out that grasslands are one of our most crucial but endangered ecosystems as both conversion to crop production and urban and industrial sprawl increasingly take more of our arable lands out of agricultural use forever. The future of humankind depends deeply on understanding, managing and sustaining our grasslands.

Dr. Ballerstedt closed by speaking directly to the delegates saying we have been talking to ourselves when we must find ways of communicating to a wider audience. "I am here to tell you that what you are doing is the most important thing that we can be doing. We need to let more people know about our work and why it matters. Many people are in-

terested but they don't know that this Congress exists." "We have some really good news and part of what I hope we can do is find ways for the Grasslands Congress to make itself better known."

Strategic spraying of a mixed-grass hay field. Use of Drones allows precision application of crop protectants and fertilizers that minimize waste. They are adapted to rough terrain, and avoid damage to plants, compaction of soils and the possibility of increased erosion of soils that can result from traditional ground-based equipment. They contribute to reducing undesirable environmental impacts for an enhanced sustainable agriculture. Photo courtesy of The Mike Robinson Family, Belvidere, Tennessee.

Topics and Content of the Congress[26]

Three plenary and five keynote papers were presented to the whole Congress, whilst the five sub-themes of the Congress were addressed in thematic sessions, oral presentations of offered papers and poster presentations.

The plenary papers

(1). 'Harnessing biodiversity for soil health', by Richard Bardgett (UK).
(2). 'Animal health in a sustainable One Health context', by Sara Place (USA).
(3). 'The roots of humanity's future', by Frederic Leroy (Belgium).

The keynote papers

(1). 'Biodiversity and ecosystem functioning under climate change in alpine grasslands', by Jin-Shing He (China).
(2). 'Diverse use for diverse services – ways to sustainable grassland utilization', by Johannes Isselstein (Germany).
(3). 'Reconnecting grazers to grasslands and grasslands to crop-landscaping', by Paulo de Carvalho (Brazil).
(4). 'Grasslands at a crossroads: contemplating the status of grassland ecosystem services', by Amy Ganguli (USA).
(5). 'Changing worlds – social challenges in the grasslands', by Dana Kelly (Australia).

There were 19 thematic sessions. These were convened by individuals nominated by the Congress organisers and included four to seven invited contributions together with, in some cases, a panel discussion. Some 20 sessions comprised oral presentations selected from volunteer contributions to the Congress. These too were organised into subject areas, as were the contributions in the poster sessions. The Proceedings included 440 papers from throughout the world, as indicated in Table 4.

Not surprisingly the country that had most papers in the authorship was USA (176), followed by China (53), Germany (32), Brazil (31), New Zealand (25), India (22), Australia (17), South Africa (14), Canada (13), and Ireland (13). A total of 55 countries were represented in the authorship. Compared with other recent Congresses, notable fea-

[26] Addendum to Chapter 3 of *The History of the International Grassland Congress – 1927 to 2020,* page 105 to 108.

tures were the high participation from China and Brazil, together with USA (host to this Congress) and Germany (host for the next International Grassland Congress).

Table 4. Papers in Proceedings from the XXV International Grassland Congress Regions, USA, 2023.

	Region[27]	Papers with first author from region	Other papers with author from region	Total papers with author from region
I	North America	173	16	189
II	Central America and Caribbean	4	1	5
III	South America	51	13	64
IV	South Asia	25	4	29
V	Oceania	35	7	42
VI	East Asia	57	1	58
VII	Middle East	6	3	9
VIII	Mediterranean	2	1	3
IX	Europe excluding VIII and X	50	17	67
X	North Eurasia	3	2	5
XI	Africa excluding VIII	34	7	41
		440		

The topics of the thematic sessions are indicated below:

Grassland ecology

(1). Restoration of native grasslands for environment and production.
(2). Legumes for a changing climate.
(3). Soil organic carbon storage and soil health.
(4). Weed and scrub management.
(5). Remediation of grasslands invaded by annual grasses.

Grassland production and utilization

(1). Alfalfa for warm regions of America.
(2). Secondary metabolites and nutritive value.
(3). Progress in breeding and management of clovers.

[27] Regions are as defined by the International Grassland Congress. (See page 322 in *The History of the International Grassland Congress – 1927 to 2020*.)

Livestock production systems

(1). Equine grazing systems.
(2). Extending the grazing season.
(3). Enhancing grazing systems in southeast USA.
(4). Grass cover crops to improve system efficiency.
(5). Tall fescue[28] (*Schedonorus arundinaceus* (Schreb.) Dumort.) endophytes.

Grassland sustainability, innovations and initiatives

(1). Social media, research and extension.
(2). NIR technology.
(3). Plantains in farming systems.
(4). Training professionals for forage agriculture.

Grassland policies, social issues and ecosystem services

(1). Enhancing diversity, longevity and ecosystem resilience.

The percentage of papers in the 2023 Congress Proceedings that corresponded to the specific topics according to Allen *et al*., (2021) are given in Table 5.

Table 5. Percentage allocation of papers in Proceedings to Subject Categories, XXV Congress, USA, 2023.

Topic	Papers presented, %
Plant and soil	38
Utilization and animal production	29
Land use systems	10
Environment	10
Socioeconomics and policy	4
Information and technology transfer	8
Other products[a]	1

[a] Includes papers with the main focus on provision of ecosystem services.

[28] Note: *Schedonorus arundinaceus* (Schreb.) Dumort. Classification Tall Fescue at the time of the XXV International Grassland Congress. (Long classified as *Festuca arundinacea* Schreb.).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Communicating Beyond the Congress

Two topics were discussed at the XXV IGC that have the potential to encourage increased visibility and communication of information reported during the recent XXV IGC Congress. The first was an announcement from Grass and Forage Science, the journal sponsored by the British Grassland Society and the Official Journal of the European Grassland Federation[29] to the invited speakers at the Congress. Grass and Forage Science offered the opportunity for expanding invited papers, for publication in a special issue of the journal. This had been done following the Congress in Kenya in 2021. Thus, the June 2022 issue of Grass and Forage Science was a special issue that included four selected papers from the Joint XXIV IGC/XI IRC in Kenya. In addition, this special issue included a book review (Isselstein, 2022) on *The History of the International Grassland Congress - 1927 to 2020* (Allen *et al*., 2021). This offers the opportunity for authors to reach a larger audience and from a highly creditable platform with information that is much needed around the world. It would be highly desirable to see this succeed and to become a feature of future Congresses.

The June 2024 issue of Grass and Forage Science has now been published.[30] The guest editor, Serkan Ates, has contacted selected speakers of offered presentations to encourage submission of more good papers out of the meeting. So that publication was not delayed, a Special Section in the June 2024 issue was published with selected topics presented at XXV IGC (2023). Additionally, a special issue is being prepared where additional presentations will be collected, comparable with the June 2022 special issue of the Grass and Forage Science. This follows the model where four selected papers from the Joint XXIV IGC/XI IRC in Kenya were published.

The second topic is the announcement of the new journal Grassland Research. This journal is published by John Wiley & Sons Australia, Ltd. on behalf of the Chinese Grassland Society and Lanzhou University. The first issue of this journal was published March 1, 2022. This open access journal publishes research in all areas of grassland science. A Special IGC XXV Issue of this new journal, containing selected papers presented at the XXV International Grassland Congress, will be published during 2025.

The publishing opportunities offered by both journals will make valuable contributions to getting critical emerging information on grasslands into the hands of those who need it. It is to be hoped that this is the first of long-standing relationships with both Grass

[29] https://www.europeangrassland.org/en/index.html
[30] https://onlinelibrary.wiley.com/journal/13652494.

and Forage Science and Grassland Research. Both the IGC and the IRC offer unparalleled sources of global information on all aspects of our global Grazing Lands.

Oral Presentations Summary

Authors: S. Ray Smith, Echo Gotsick, Jen Weinert-Nelson, Alayna Jacobs, Chris Teutsch, Will Fleming, Derek Woodfield, James Klotz, Jeff Lehmkuhler, Greg Halich, Brittany Davis, Brittany Hendrix, and Krista Lea.

This paper will give an overview of the XXV International Grassland Congress thematic, keynote, and plenary sessions. The theme of the XXV IGC Congress meeting was ***Grasslands for Soil, Animal, and Human Health***. We had many people attending, presenting, and participating in all these sessions. Within a month after the conclusion of the Congress, the proceeding's papers presented at the meeting were made available on the IGC website. By the end of 2023, all papers were available for download through any search engine at https://internationalgrasslands.org/

The three plenary speakers each focused on one of the main themes of Congress: soil, animal, and human health. The first plenary speaker was **Dr. Richard Bardgett** on the theme of ***soil health***, and he emphasized harvesting biodiversity for soil health. One aspect of his presentation was about sowing mixed plant communities and how more diverse root systems can enhance the resistance of key microbial mediated processes to drought. A main point was that diverse ecosystem and the interactions of various root systems within the micro-community will enhance resistance to drought.

Dr. Jin-Shing He was the first of five keynote speakers. He focused on the sub-theme of grassland ecology with a specific focus on ***biodiversity and ecosystem functioning***. His main emphasis focus was the grasslands of the Tibetan plateau in China and Dr. He gave several examples of research from this region. One example was from the 1980's showing a growth curve with plant production from early, middle, and late season cool season plants. Then Dr. He compared this to plant growth in the 2010's, when the vegetation grew earlier and faster, but the growth period was compressed. His study showed that increasing temperatures occurred in the 2010's versus in the 1980's. He postulated that there may be some advantage for an earlier and compressed growth period if producers are harvesting stored forage, but in a grazing system having vegetation that grows earlier and faster may be a disadvantage. When the growth periods are compressed, the grasslands are losing production for a majority of the season, particularly the middle and end of the season.

There were 19 thematic sessions during this meeting. The following include a few highlights from these sessions. On Monday, May 15th, **Dr. Pat Keyser** organized a session called ***Grassland Ecology, Achieving Resilient Sustainable Grasslands Through Restoration of Ecological Norms***. He discussed how wildlife and soil resources have declined over time. Over a 100-to-150-year period in the eastern USA, there has been a conversion of native warm season grasslands to non-native pasture species. Restoring those areas requires the development of strategies. This session had six speakers, and each talked about strategies that could be used to restore native grassland. They also spoke about promoting native warm season grass establishment, which requires highlighting opportunities for grazing that are profitable for producers. If planting native grasses is not going to be profitable for producers, then a yearly payment would need to be paid for maintaining this native vegetation. Profitability was one of the main themes and focuses of this session.

The next thematic session was organized by **Dr. Jennifer Tucker** and colleagues and was titled ***Alfalfa in Warm Climate Regions***. Speakers focused on growing alfalfa in the southeastern USA rather than shipping hay from the central and western USA. Much of the market for alfalfa in this region is for dairies and horse owners, but the mindset is that alfalfa cannot be grown in hot humid climates. During this session they discussed how this common misconception is incorrect. Alfalfa can be grown successfully in this region and can be integrated into cropping, livestock, and integrated systems. Producers valued the higher forage quality achievable with alfalfa and it's ability to provide an extended grazing season. The speakers were optimistic that alfalfa could fit into these systems and a big emphasis was put on partnerships that can be developed and adapted to this region.

USDA-ARS and University researchers organized a thematic session on equine grazing systems, entitled ***The Keys to Sustainability and Horse Welfare***. The main emphases were the latest concepts and their practical application in equine systems. In Florida an example was provided of using a species that has rarely been discussed for horse grazing. Rhizoma peanut (*Arachis glabrata)* is a perennial peanut that is an excellent legume, very well adapted to the climate of South Georgia, Florida, and other coastal states, and can fit into an equine grazing system. This species does not have to be relegated for cattle production. **Dr. Jennifer Weinert-Nelson** discussed ***the grazing horse microbiome*** and the research that is being conducted to understand the relationship between poor nutrients, hindgut microbiome, and grazing horse metabolism. There were highlights during this session on equine rotational grazing research and outreach initiatives, particularly highlighting what is happening in programs at the University of Florida and at the University of Kentucky.

Another thematic session was conducted on ***understanding social media and digital resources***. The main point was how to translate science so that it is applicable to producers in the field. Integrating social media into research is one way of translating science. Most research professionals that work with producers know that they do not want to read manuscripts. So how can we effectively translate the results? Speakers in this session spoke about increased transparency and interaction with producers through social media posts and using it as a tool, particularly to get early adoption by producers. An example was given of Phil Mosel, an alfalfa producer in Georgia, who has now become an advocate for extension information and regularly posts on social media to influence other producers.

One of the last thematic sessions to take place on Monday was the **NIRS consortium thematic session**. This session provided ***basic information on NIRS*** and how it can be as accurate as wet chemistry for forage analysis. The speakers spoke about how the consistency of sample preparation was essential to optimize the use of NIRS equations. In addition, they talked about the importance of the material being at the same moisture content when it goes into the NIRS machine. In essence, ensuring material is dry before you scan it can make a difference in the quality of analysis. There are also a number of handheld NIRS units that show promise for use in developing countries where labs are not available. There are significant limitations to these units because of the sample preparation, sample presentation, equations for these units, difficult software interface, and durability. All those considerations need to be taken into consideration before handheld units can be used with confidence.

The final thematic session on Monday afternoon was on plantain [*Plantago lanceolata*], the title of this session was ***A Journey from Weed to Delivering Multiple Values in Farm Systems***. Plantain is a broadleaf plant, particularly populous in the eastern United States, and generally considered a weedy species. Forage analysis shows good quality, high protein, good digestibility, but this plant is typically not eaten by livestock. Dr. Bill Rumball, a plant breeder in New Zealand, started breeding plantain for improved growth and palatability. These improved varieties have proven to be an invaluable part of New Zealand's pastures. They are realizing that this former weed reduced nitrogen leaching losses by up to 60% and nitrous oxide emissions by up to 50%. That is something that was not thought of when these varieties were being developed 20-30 years ago. There is also a reduced nitrogen concentration in urine patches when plantain is in the system. They are finding that root exudates from plantain inhibit sheep urine nitrification in soil.

On the morning of Tuesday May 16th, the first plenary speaker was **Dr. Sara Place**. She spoke about ***animal health in a sustainable context***. Dr. Place highlighted the value of having animals on the landscape in grasslands. One could argue that we do not need livestock on the land because they take up acres that should be used for food production. Dr. Place discussed the fact that there is a lot of land across the world that should not be cropped without severe land degradation. In recent decades a popular argument is that ruminant livestock are not good for the food system because the pounds of feed per pound of product. Dr. Place related that finishing beef for the last few months on grain can require over 12 pounds of feed per pound of meat. A broiler chicken is 1.6 pounds of feed per pound of meat. Using that statistic there is a huge amount of feed to grow a pound of beef, but this does not take into account the majority of the feed for beef cattle is forage based. A better perspective is to consider pounds of human edible feed, particularly corn and soybean fed to beef cattle. Using this parameter USA grain finished beef consumes just 1.6 pounds of human edible feed per pound of gain. Broiler chickens require 1.4 pounds of human edible feed per pound of gain and pork 2.0 pounds. When you look at the net protein contribution from each of those animals, or the meat from those animals, values greater than one mean there is more high-quality protein generated than used. Net protein contribution is 2.66 with grain finished beef, 0.86 with chicken, and 0.71 with the pork. That means that monogastrics, poultry and pigs, are consuming more high-quality protein or human edible protein than they are producing. In essence, society is getting a lot more out of beef animals from a standpoint of human edible protein.

Dr. Johannes Isselstein, spoke on the diverse use of grassland systems in his keynote address on grassland production and utilization. He showed a painting from 200 years ago in Europe that highlighted the importance of grassland ecosystems and cattle being an integral part of that ecosystem. Grasslands and ruminant livestock create a symbiotic relationship in those environments. Dr. Isselstein highlighted his long-term grazing experiment studying ***the effect of cattle and grazing intensity on grassland ecosystem services***. He spoke on different grazing intensities and long-term stocking averages. His main point focused on stocking rates, livestock gain per unit area, forage residual height, and how all these fit into ecosystem services.

Dr. Paulo Carvalho, in his keynote presentation on ***livestock production systems*** emphasized ***reconnecting grazers to grasslands***. In one of his first slides, he gave an example of how grazing animals can enhance soil health. Like many of the talks, particularly the keynotes, he spoke about the benefits of grazing animals. They are not detrimental to the environment, which is heard a lot in the popular press. Dr. Carvalho overviewed a study from work in Brazil published in Applied Soil Ecology, that showed that if only lime was applied to pastureland, then soil gram-positive bacteria dropped by

29%, actinomycetes dropped by 21%, and microbial biomass dropped by 27%. There was no grazing, but lime was added to increase pH. When grazing animals were introduced into the system without lime or fertilizer, in this example sheep, there was a 29% increase in saprophytic fungi. When grazing was incorporated with recommended lime and fertilizer there was a 140% increase in the arbuscular mycorrhizal fungi.

The first thematic session on the second day of the congress was entitled ***The Role of Legumes in the Anthropocene Era,*** otherwise known as the current era. Legume incorporation can increase forage biomass, reduce nitrogen fertilizer, and also reduce nitrogen emissions and mitigate methane emissions. Legume responses to climate change may vary due to interactions between factors and elevated CO_2 and temperature. Legume breeders should consider epigenetic impacts on plant phenotypes and response to environmental changes. Speakers emphasized that forage legumes can be very important in the common era, and there are major detriments to just relying on nitrogen fertilizers for forage production.

Dr. Michael Flythe from the USDA-ARS-FAPRU lab at the University of Kentucky, organized the thematic session, ***The Good, the Bad, and the Ugly of Secondary Metabolites*****.** Secondary metabolites refer to products that are being produced by the plant, or in some cases, by fungi or bacteria associated with the plant that are not necessary for growth. Good examples of these are isoflavones and condensed tannins. These compounds can have significant effects on livestock growth, nitrogen partitioning and methane emissions, but this depends on the creativity in presentation and delivery of those compounds to livestock. The compounds also have the potential to create improvements in the nutrient density of animal products. The work being done at the University of Kentucky in red clover shows that some isoflavones cause vasodilation sufficient to negate the vasoconstriction caused by toxic tall fescue. In other plant species, compounds like condensed tannins lead to greater bypass protein and greatly reduced chances of bloat. There are many benefits of secondary metabolites. Ergot alkaloids were given as examples of what Dr. Flythe would call "the bad, and ugly" secondary metabolites. Those compounds have profound negative effects on animal growth and performance. Livestock can also have lifelong alterations resulting from ergot alkaloids during gestation and continued residual effects throughout their life.

Dr. Greg Halich at the University of Kentucky organized a thematic session on ***extending the grazing season***. This session started with a researcher from Canada, **Dr. Vern Baron**, who spoke about ***swath grazing***. In western Canada, there's about six months of the year that the ground is covered in snow, or the soil is frozen, so there is no forage growth. Extending the growing season is a difficult practice to implement during these harsh winter months. About 30 years ago, some innovative producers decided to make

late season hay cuttings, but rather than bale they would just let the "hay" stay in the field and graze the swaths over winter. Alternately, they tried planting cereal crops like wheat in the middle of the summer. Then in October when cold weather began the wheat was still green and growing. The wheat was then cut, put in a swath and left in a field to be frozen and grazed by animals overwinter. These practices became known as "swath grazing" and revolutionized cattle production in western Canada. Swath grazing would be more difficult in a state like Kentucky because the swath would be rained on overwinter and would deteriorate and mold. Alternatively, bale grazing provides an option to extend grazing by putting bales in the field in the fall, string electric fence between those bales, and rotating livestock every few days. The animals are provided with sufficient forage, and the soil is getting the benefits of animal manure and urine spread over the entire field. Another presenter in this session spoke about alternative forages, such as brassicas, that provide rapid high-quality biomass and increase production per unit area while extending the grazing season.

Dr. Carol Williams from the University of Wisconsin organized a thematic session titled ***Diverse Perennial Circular Systems***. A more simplified version of this title would be diverse perennial forages. If perennial forages exist in a system, then it is a perennial system. They are diverse and they continue to work in recycling the nutrients in pastures. If perennial forages are used in crop rotations, they provide living mulch. The main point of the session was to highlight the importance of forages and particularly perennial forages. The unique title was meant to capture the imagination of attendees.

Another thematic session on Tuesday was on ***variety testing***. With the southeastern United States becoming warmer and wetter, several talks focused on the need to have more testing of forage varieties and reverse the decline in testing in recent years. Researchers were encouraged to look for resilient varieties, and that both yield and persistence should be a requirement of forage variety tests. Variety testing coordinators were challenged to consider accelerated stand loss protocols, like close continuous grazing. Regional collaborations should be pursued with forage variety testing similar to initiatives with grain crops. The limitation is that there are not as many companies in forages, so profits and profit margins are lower than with grain crops.

A memorable thematic session focused on the lifelong contributions of **Dr. Norm Taylor** at the University of Kentucky entitled ***Clovers Around the World***. Dr. Taylor was a clover breeder at the University of Kentucky for close to 60 years. Many of the researchers attending this symposium knew Norm, and how he devoted his life to collecting clover genetic resources from around the world and to clover genetic improvement. One talk focused on these germplasm resources and how they were donated to the USDA germplasm bank, to be maintained for future plant breeders. Talks were also giv-

en on the full range of clover genetic resources including red clover, white clover, and annual clovers for forage systems and for cover crops.

Another thematic session focused on ***soil health and carbon sequestration***. Grasslands are a major source of carbon sequestered in the soil. Speakers emphasized that crop production systems around the world for centuries have been making use of the carbon and other nutrients built up through the proper management of grasslands. Many talks were given about carbon credits, and that evaluations need to be made not just on a one- or two-year basis, but a decade- long basis. To develop a viable carbon market, short- and medium-term pastures should be integrated into cropping systems to maximize carbon sequestration.

Dr. Frédéric Leroy gave the third plenary lecture on grasslands and human health. He entitled his presentation ***The Roots of Humanities' Future***. He emphasized the value of animal source foods and animal source protein. Dr. Leroy contrasted the belief of some that humans do not need animal source protein, but that sufficient protein can be obtained solely from plant-based products. Dr. Leroy made the point that it is very difficult to have a balanced diet just from plant sources. A recent report from the FAO showed that diets with minimal animal source foods led to an increase in calories consumed and a 50% reduction in protein. He spoke about public health priorities. Right now, in the United States, the recommendations are to limit protein consumption, particularly red meat consumption. There may be some benefits to these recommendations, but they have led to an increase in metabolic syndrome, an increase in obesity, high blood pressure, hypertension, and insulin resistance. Dr. Leroy ended with the rhetorical question, "when we speak about healthy eating, are we talking about what's really best for people or is it just promoting the agenda of a small group?"

Dr. Amy Ganguli provided a keynote presentation entitled ***Grasslands at a Crossroads: Contemplating the Status of Grassland Ecosystem Services.*** She emphasized that scientists should endeavor to translate research into something that people can grasp. She spoke about grazing and ecosystem service delivery and the global drylands where grazing sustains the livelihood of billions of people. When researchers speak about maintaining grasslands, they should talk about the value of these ecosystems for more than just the livestock that live there. Dr. Ganguli highlighted a study showing there are 327 dryland regions in 25 countries across six continents. The study discussed the effect that grazing pressure and ecosystem services has on these regions.

Dr. Dana Kelly gave the last of the keynotes and she spoke about ***social challenges in the grasslands.*** One of the examples she gave was gender, and the need for gender equality worldwide. Half of farmers are women, and although it varies between coun-

tries, there is often discrimination. Forty percent of the world's countries have constraints on women's rights to own property. Even though women are farming the land and are raising a lot of the livestock, they may not be able to own the property that they are using. Women landholders in Latin American make up less than 25%, and in the Middle East and North Africa make up less than 5%. The size of women's land holdings in Bangladesh, Ecuador, and Pakistan are typically half the size of men. Dr. Kelly spoke about innovations for small farmers and helping women farmers. She also gave a number of examples of other social challenges in the grasslands. She emphasized that grassland agriculture is not all about production and it is not all about maintaining the ecosystem, but there are a number of social issues that need to be addressed.

Dr. Lynn Sollenberger from the University of Florida led a thematic session about ***preparing the next generation of grassland scientists***. When he spoke about his own experiences, he highlighted the value of mentorship. Mentorship is positively associated with a wide range of productivity measures and career achievement. Dr. Sollenberger discussed how high-quality student mentorship leads to continued success of the student even after they leave university. The other panelists for this session spoke about carefully choosing your mentor since much of the success a student has is based on the style and supportiveness a mentor gives. As a mentor, building a development plan based on the individual will create a healthy environment for them to thrive. The development plans should be based on the student's strengths and weaknesses.

One of the last thematic sessions was on ***livestock production systems and revisiting the nutrient value of forages to the animal and to the agroecosystem***. One example from this thematic session was that management approaches can be developed to integrate grasslands into farming systems and provide ecosystem services essential for the sustainability of agriculture.

A thematic session was organized by **scientists with Corteva**, where they spoke about ***enhancing grasslands through weed and brush management***. Biomass productivity and livestock capacity can be increased through management of problem weeds. Average daily gains can also be increased. If a pasture contains weedy plants, then that is going to be a problem for grazing livestock. When weeds are controlled grassland system resiliency is improved. Presenters emphasized that controlling grassland weeds and brush does not have to happen through herbicides but can happen through management. Integrated strategies should be used, and one speaker gave examples of new precision technology that includes drones and artificial intelligence for spot spraying to improve the efficiency of weed control. In essence, the drone applicator goes over the field and when it sees weeds, or even specific species of weeds, the sprayer activates in that one spot and sprays the weed rather than the whole field.

The final thematic session was ***Restoring Ecological Function on Rangelands Degraded by Invasion of Annual Grasses***. Speakers overviewed a broad range of native grasslands and their diverse ecosystems, and then they provided several examples. One of the main emphases of this thematic was the growing prevalence of weedy or invasive annuals competing with native perennials. One of the worse examples is cheatgrass (*Bromus catharticus* Vahl.) which is crowding out native grasslands in the Western United States. There is potential value in using pre-emergent herbicides to control these annuals and allow the native perennials to have a better chance. Areas where invasive annuals have been successfully controlled saw an increase in wildlife, pollinators, and beneficial plants, and biodiversity in general. Re-establishment of a grassland, particularly managing invasive annuals on a perennial grassland, is exceedingly difficult. Therefore, emphasis should be placed on being proactive, and focusing on the most productive grasslands first, then move into degraded areas. In summary, when a grassland site is slightly overgrazed, then proactive management will ensure that it never becomes fully degraded.

At the XXV IGC Congress, there were about 120 thematic presentations, 8 plenary and keynote presentations and almost 200 oral volunteer presentations plus many poster presentations. One example of the many excellent volunteer oral and poster presentations was given by **Christian Morano**. He explained how his research group had identified ***grazing personalities associated with individual cattle in the steep rugged rangelands of southern New Zealand***. With GPS trackers and genotyping for a grazing gene, researchers were able to categorize animals into short range grazers, medium range grazers, and long-range grazers. They proposed that these categories could be used as a cattle selection tool. If the long-range grazers were selected, then there would be a more efficient use of the pasture. If the short and medium range grazers were selected, they would remain close to the water system, the long-range grazers resulting in less effective use of the whole system.

Tours

Since the first Meeting in 1927, in Leipzig, Germany, tours have been a vitally important part of each succeeding Congress. At the XXV Congress, there were both Pre-Congress and Mid-Congress tours. **Pre-Congress** tours were available to delegates during the 10 days before the Official Opening of the Congress and are detailed below. In addition, **Mid-Congress** tours took place on Wednesday, May 17, 2023, and were available to all delegates wishing to participate (See below). Excellent organization was provided by

staff who traveled with the tours. They provided information to delegates about what they were seeing which helped to make these tours both enjoyable and instructive.

Pre-Congress Tours

The Subtropical Region. The focus of this tour was on grass-based operations and agro-tourism venues in the sub-tropical parts of Florida, Georgia, South Carolina, and North Carolina. Lisa Baxter and Justin Burt served as tour Guides and provided excellent information to the delegates about where they were traveling and what they were seeing.

This tour began in Florida with a tour of Deseret Ranch. This operation has focused on raising high-quality calves and increasing the productive capacity of the land for more than 60 years. From Florida the tour continued into Georgia where a highlight was a riverboat tour of the Okefenokee Swamp, one of the seven wonders of the state. The group then visited the University of Georgia, Tifton Campus, and associated farms (including the Aleaha Beef Station). Tifton is recognized globally as a major agricultural research center and is the location of the world-renowned plant breeding programs responsible for hybrid bermudagrass such as Coastal and Tifton 85. Dr. Glen Burton, known globally for his work with hybridizing bermudagrasses, conducted much of his research at this station. The tour then moved into North and South Carolina to tour Yon Farms and the Piedmont Research and Education Center, South Carolina. Yon Family Farms, a family-owned operation whose primary purpose is to raise high-quality Angus, SimAngus, and Ultrablack cattle. Their operation is forage based and focuses on producing cattle for their customer base which is made up mainly of progressive commercial cattlemen. The Piedmont Research and Education Center is comprised of 930 ha (approximately 2,298 acres) and provides land resources, equipment and livestock for cattle, sheep, and agronomic activities. The tour's last stop was in North Carolina and included the Biltmore Estate and Mountain Research and Education Center in North Carolina. The Biltmore Estate is a 250 room French Renaissance chateau and was home of George and Edith Vanderbilt. It was built in 1895 in the Appalachian Mountains of North Carolina. The estate is still family owned and self-sustained by offering tours, development of a winery, and other innovative concepts. Tours of the farm, grounds, and gardens were offered. The Mountain Research and Education Center in North Carolina has various soil types and elevations ranging from 792 to 975 meters (2,598 to 3,198 feet), providing the ideal location for research studies to address the needs of mountain farmers with programs in horticultural, alternative and forage crops, tobacco, Christmas Trees, and beef cattle.

The Central Grasslands. Vanessa Corriher-Olson and Paul Beck were the Tour Guides for this route providing delegates fascinating information. This tour began in South Texas on the King Ranch. This historic ranch includes 333,866 hectares and highlights the vast array of forages found in this sub-tropical region of the United States. The King Ranch is known globally for their cattle and horse breeding programs as well as their wildlife management programs. They collaborate broadly with universities and various agencies providing opportunities for research and testing of management strategies. Over the course of over 160 years, King Ranch has led some of the first cattle drives, developed the Santa Gertrudis and Santa Cruz breeds of cattle, bred some of the finest Quarter Horses, and produced champion Thoroughbreds - all under its iconic Running W® brand. King Ranch is a major agribusiness with interests in cattle ranching, farming (citrus, cotton, grain, sugar cane, and turfgrass), luxury retail goods, and recreational hunting.

Additional stops in this part of Texas included the Caesar Kleberg Wildlife Center, the Serpentarium part of the National Natural Toxin Center, and South Texas native grasses at Texas A&M University.[31]

In the Hill Country of Texas, the tour stopped at Hillingdon Ranch, a family operation using registered Angus cattle, fine wool sheep, Angora goats, and whitetail deer as tools to manage the native plants adapted to the ecoregion, a commercial cow-calf operation, and Texas A&M AgriLife Research and Extension Center[32]. The AgriLife Research and Extension Center is home to research programs encompassing pasture utilization & forage quality, annual ryegrass and small grains, forage legumes, animal physiology and horticulture. The last stops in Texas were a replacement bred-heifer operation North of Dallas.

The tour in Oklahoma began with the Chuck Coffey Ranch. Chuck is described as a "fearless pioneer" in trying new things that will protect soil and grass, and is widely known for his generosity in sharing time and knowledge to benefit others. The Coffey's cooperate with state and local agencies on innovative grazing strategies that has sped up the return of perennial grasses to their landscape. In addition to providing the forage for their herd of 800 to 1,000 beef cows, the ground cover provides wildlife habitat, adequate fuel for prescribed fires, and reduces soil erosion from wind and water.

[31] Texas A&M University (Texas A&M, A&M, or TAMU) is a public, land-grant, research university located in College Station, Texas, USA.

[32] https://agriliferesearch.tamu.edu/research-capabilities/research-centers/

The tour included a visit to Oklahoma City, a visit to the Fort Reno USDA-ARS Central Plains Research Station, and a visit to the Klemme Range Station. Major research trials conducted at the Klemme Range include studies on: stocker cattle, patch burning, cow-calf, pasture and forage improvement, livestock management research, and education programs. The primary commodities located in the Rolling Red Plains Area are wheat, range and cattle. The Rolling Red Plains extends from south of the Red River to north of the Oklahoma-Kansas border consisting of approximately 3.8 million ha, which occupies a significant portion of Western Oklahoma excluding the Oklahoma Panhandle. A stop in Lawton, Oklahoma, provided a visit to the Museum of the Great Plains and the Comanche National Museum.

Mid-Congress Tours

Kentucky Tours - From Farms to Bourbon.

The tour of Kentucky highlighted the various ways forages are utilized throughout the state. Four tour options were offered as follows:

Research Tour: This tour highlighted current forage and grassland research being conducted by University of Kentucky faculty and the USDA-ARS scientists located on campus. This tour included an overview of equine nutrition research relating to the ability of horses to utilize forages and the relationship of forage composition to digestibility and palatability. Stops included UK Spindletop/Maine Chance Research Farm, UK Oran Little Research Center Farm, Anderson County Farm, and Central Kentucky Thoroughbred Horse Farm. After these tours, delegates enjoyed a locally catered supper before they headed back to Covington.

Thoroughbreds to Bourbon Tour: The tour began at Keeneland, Lexington Kentucky's thoroughbred racetrack and sales facility. Here delegates learned the history of Keeneland and got an overview of operations for both racing and sales led by local guides for an up close and personal experience. After lunch, the group visited Lexington Brewery and Distillery for a tour and tasting. Their day ended with a drive through the University of Kentucky's research farms. The group enjoyed supper before they headed back to Covington.

Thoroughbred Horse Farm and Beef Cattle Farm Tour: This tour gave delegates an insider's view of the Kentucky thoroughbred industry as well as experiencing two highly successful beef pasture operations. The day began with a tour of Spendthrift Farm, one of Central Kentucky's premiere thoroughbred horse

farms and home to some of the world's most famous (and fastest) racehorses. From here the group traveled to visit two of Central Kentucky's top beef cattle farms, Timberlawn Farm and Clark Family Farms. After the beef tours, they enjoyed a locally catered supper before returning to Covington.

Commercial Hay Production and Native Seed Production Tour: From Covington, the delegates traveled approximately three hours to Hart County, Kentucky, where they toured two operations that highlight the diversity of Kentucky agriculture. They visited the Geralds' Farm, a family-operated, commercial-scale hay farm in the rolling land of middle Kentucky. A short distance from Geralds' Farm is Roundstone Native Seed, a family-owned and operated business that is one of the largest native seed providers in the Eastern US. After this visit, they traveled back through the Lexington area where they stopped for supper and then they returned to Covington.

Ohio Tours - From Urban to Milk

Green Acres - An Urban Farm Providing Education from Grass-Fed Cattle to Vegetable Production Gardens: A short 30-minute drive from Covington is Green Acres a non-profit private foundation established in 1988 by Louis and Louise Nippert. The farm comprises nearly 243 ha. This farm was converted from a grain operation to a cattle farm using modified rotational grazing that resulted in lush green pastures. Greenacres produces and sells grass fed Black Angus beef, chicken, turkey, lamb, pork, eggs, honey, and a variety of seasonal produce at their farm store. The farm is managed with a "Positive Impact Farming" model with a goal of creating a positive impact to the land through the use of proper agriculture production management systems. There, delegates saw a recently constructed low stress cattle handling facility designed by Dr. Temple Grandin. Twin Oaks Dairy is known for "Producing Milk in a Responsible and Sustainable Manner by Setting the Highest Standard on Milk Quality, Animal Welfare and Land Stewardship." Twin Oaks Dairy milks over 2,300 cows, and sustainability and conservation are at the forefront. This family-owned dairy has 520 ha and over 30 employees.

Indiana Tours - From Dairy to Bull Testing

Dairy, Commercial Beef and Small Ruminants: The first stop of the tour to southwestern Indiana to Dubois County was Lindauer Dairy in Ferdinand, Indiana, a family dairy since 1933 with 400 dairy cows. A second stop was made at Fischer Farms in Birdseye, Indiana, a family owned 303 contiguous ha operation

all focused on producing top quality beef. Stop three was at the Southern Indiana Purdue Agricultural Center, one of the eight regional farms that make up the Purdue Agricultural Center system.

Commercial Hay, Small Ruminants and Commercial Beef: This tour took delegates to Borden, Indiana to visit the Brock Kiesler Farm, where cropland was converted to perennial forages with a focus on making small square bales of quality hay. The group then visited Southern Indiana Purdue Agricultural Center. The last stop was Fischer Farms in Birdseye, Indiana, a family owned 303 contiguous ha operation all focused on producing top quality beef.

Custom Grazing, Angus Seedstock and unmanned aerial vehicle (UAV) Technologies/Cover Crops: The tour to Batesville, Indiana, took delegates to visit Dave and Shirly Nurhing,. This family-owned operation had been converted to grazing in the 1980's. The operation has been home to a cow/calf operation, stocker cattle, and custom grazing (stockers, dairy heifers, cow/calf pairs). Delegates then traveled to Stewart Select Angus in Greensburg, Indiana, and a herd of 200 registered Angus cows that have been on a performance testing program since 1962. The final stop was at the Southeast Purdue Agricultural Center.

Seed Coating, Sheep, and Bull Testing: Delegates on this tour travelled to New Albany, Indiana, to Summit Seed Coatings. Summit is a state-of-the-art seed coating facility with production plants in both Indiana and Idaho. Then to Howell Road Farm Limited Liability Company in Washington County, Indiana, home of Walker Family Hair Sheep. The Farm focused on beef cattle production until October 2015 when the first five hair sheep ewes were purchased. By 2018, the farm was completely converted to a flock of Katahdin and commercial hair sheep. The final stop for delegates was in Bedford, Indiana, at the Indiana Bull Evaluation Program which is an independent organization that works in cooperation with Purdue University and the staff at the Feldun Purdue Ag Center to conduct 2 bull tests each year.

Business Meeting

Derek Woodfield (New Zealand), Chair of the Continuing Committee, opened the Business Meeting congratulating those involved and acknowledging the tremendous time and effort required to host an International Congress. The short time that occurred between the 2021 Congress and the 2023 Congress placed additional unique challenges on the hosts. Fund raising was particularly challenging because of this and is appreciated.

Dr. Derek Woodfield, Chair, IGC Continuing Committee.

Woodfield announced that the venue for the XXVI International Grassland Congress will be Leipzig, Germany, for this 100th Anniversary of the International Grassland Congress. This will be a landmark event in the History of our Congress as this is the same location where the first meeting, organized by Professor Friedrich Falke of Leipzig, was held in 1927. It is entirely appropriate that this 100th year of our Congress be celebrated in Leipzig!

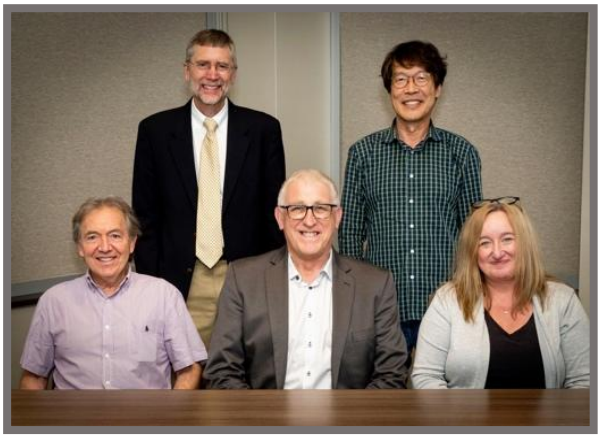
Dr. Woodfield informed the delegates that the Continuing Committee has accepted a proposal to create a permanent Secretary of the Secretariat position and will seek sponsorship to cover the costs. This has been an identified need at many points during the history of this organization but to date, has met with little success.[33] Hopefully this can be accomplished.

[33] For the history of this position, See *The History of the International Grassland Congress – 1927 to 2020* (Allen *et al*., 2021). The need for such a position was discussed at many of the early Congresses. Challenges to filling such a position were also discussed at these Congresses.

Continuing Committee

Membership of the Continuing Committee met with unprecedented challenges during the Joint Congress in Kenya and in Kentucky. Because the previous XXIV Congress had been held as a virtual Congress, due to the Global COVID Pandemic, the normal rotation of Continuing Committee membership could not occur. This was according to the Constitution, as new Continuing Committee Members are elected from within a pool who are physically present at the Congress. Thus, Continuing Committee members during the Kenya Congress (2021) were extended through the XXV Congress in 2023 when the new election of members could occur. As pointed out by Derek Woodfield, Chair, this situation, as well as normal attrition, contributed to the need to fill eight positions during the XXV Congress. These positions have now been filled (See Appendix Table O-2d; page 107).

During the Congress, the idea was put forth that there was value in creating an opportunity for past and present members of the IGC Continuing Committee to get together and talk. This was done for the first time during the XXV Congress in Kentucky. It was highly recommended that it become an opportunity at future Congresses. At previous Congresses the members of the current Continuing Committee have met to address various issues, and this should also be continued as needed. This gathering of both past and present members, however, was an opportunity to benefit from the wisdom and experiences of previous Committee Members. Experiences and concerns about serving on the Continuing Committee could be discussed and it is hoped that by discussing such issues, the present Continuing Committee members can at least begin the process of resolving issues. Such challenges include:



The 2023 Continuing Committee (CC) members present at time of photo. Seated, left to right: Fernando Ortega Klose (Chile) Chair, XXVI IGC CC; Derek Woodfield (New Zealand), Chair, XXV IGC CC; Tina Bowling (USA), Secretary of the Secretariat. Standing: Ray Smith (USA), Chair, XXIV IGC CC; Joung Kyong Lee (South Korea), Representative of Region VI (2015 to 2027).

1. Difficulties in communicating among the Committee Members during the years of their responsibilities as well as ensuring members attendance at the next Congress whether or not their term expires at that Congress.

2. Financial help to Committee Members to enable them to attend the Congresses that occur within their term of responsibilities.
3. Ensuring that Resolutions passed at the previous Congress are addressed and carried out appropriately in a timely manner.

Seated, front row, left to right; Gavin Sheath (New Zealand), Chair, XXI- IGC CC; Vivien Allen (USA), Chair, XX IGC CC; Jim O'Rourke (USA), President, VIII IRC CC. Standing, back row: Ray Smith (USA), Chair, XXIV IGC CC; Fernando Ortega Klose (Chile), Chair, XXVI IGC CC; Johannes Isselstein (Germany), IGC CC Region 9 (2005 2013); Derek Woodfield (New Zealand), Chair, XXV IGC CC; Serkan Ates (Syria), IGC CC Region 7 (2015-2023); Piotr Golinski (Poland), IGC CC Region 10 (2008-2015); David Miano [Mwangi] (Kenya), Chair, XXIII IGC CC; Joung-Kyong Lee (South Korea), IGC CC Region 6 (2015-2027).
Photograph courtesy of Jimmy Henning, University of Kentucky, USA.

Resolutions Committee

This Committee was chaired by Dr. Fernando Ortega (Chile). Nine Resolutions were presented that were endorsed by the delegates and submitted to the Continuing Committee for action. They are as follows:

Resolution 1: That the members of the XXV IGC congratulate the USA Organizing Committee for their efforts in putting together an excellent Congress. The congress plenary session was informative and the volunteer oral and poster presentations provided an excellent overview of grasslands around the world. Also, the thematic sessions were a perfect complement.

Resolution 2: We thank the sponsoring organizations for their financial and in-kind support of the XXV IGC, particularly given the global financial situation post COVID. Sponsorship is a critical component in minimizing registration costs for delegates.

Resolution 3: The XXVI IGC Organizing Committee make every reasonable effort to enable participants from as many countries as possible to attend by keeping costs low (including a range of accommodations), providing delegate sponsorship, supporting early career researchers attending the congress and make every effort to promote the Congress Internationally.

Resolution 4: That €20 per attendee earned during the XXVI IGC Congress should be provided to the IGC Continuing Committee as start-up funds for the next congress and to support continuing committee activities between Congresses.

Resolution 5: The Continuing Committee should commission a study on the Global future of Grasslands and present this at the 100th anniversary of the IGC in 2027. The study would involve all relevant stakeholders.

Resolution 6: That the IGC Continuing Committee fully support the International Year of Rangelands and Pastoralists initiative for 2026 including encouraging participation in the Regional Support Groups.

Resolution 7: That the IGC Continuing Committee consider bringing IGC and IRC closer together, given the many topics that are common to both groups. (Pat Cardon spoke in support of this resolution.)

Resolution 8: That the incoming IGC Continuing Committee reviews the existing Constitution relating to the nomination and appointment of Continuing Committee members in order to strengthen regional representation and contributions to IGC affairs. (Gavin Sheath spoke in support of this resolution.)

Resolution: 9: That the XXVI IGC Organizing Committee consider including human nutrition and metabolic health topics in their program and, in preparation, make connections with appropriate scientific and professional groups. (Peter Ballerstedt spoke in support of this resolution.)

All resolutions were endorsed by attendees and will be actioned by the IGC Continuing Committee.

Producer Forum[34]

An outstanding Producer Forum was held that had been organized by Dan Glenn, Managing Director of Deep Grass Graziers, Fitzgerald, Georgia, USA, and Grace Vehige, of the National Cattlemen's Beef Association. Four producers participated in sharing details about their forage and livestock systems that represented four distinct regions and eco-

From left to right: John Ferry (Utah), Dan Glenn (Georgia), Jerry Doan (North Dakota), Gene Lollis (Florida), and Jerry Huth (Wisconsin).

systems within the USA. Each of these producers has been nationally recognized for their commitment to ranching in a way that benefits their businesses and their ecology. As one listened to each presentation, it was easy to see why they have been recognized by prestigious awards.

The producer panel included John Ferry of Corinne, Utah, Jerry Doan of McKenzie, North Dakota, Gene Lollis of Lake Placid, Florida, and Jerry Huth of Oakfield, Wisconsin, and the forum was moderated by Dan Glenn. Each producer presented an overview of their forage and livestock operation and discussed its challenges and opportunities as well as how cattle and forages provided solutions to solving these challenges. John Ferry discussed training his cattle to selectively graze the invasive grass Phragmites (*Phragmites australis* subsp. *australis*)[35] that was particularly problematic to the wildlife populations including birds. His results were a valuable feed for the cattle, the return of desirable forage species, improved water quality and quantity, and a vast improvement in wildlife habitat.

[34] Written in collaboration with Dan Glenn, Managing Director of Deep Grass Graziers, Fitzgerald, Georgia. USA.
[35] Subspecies verified by Jen Wright, Wildlife Biologist, US Fish and Wildlife Service.'

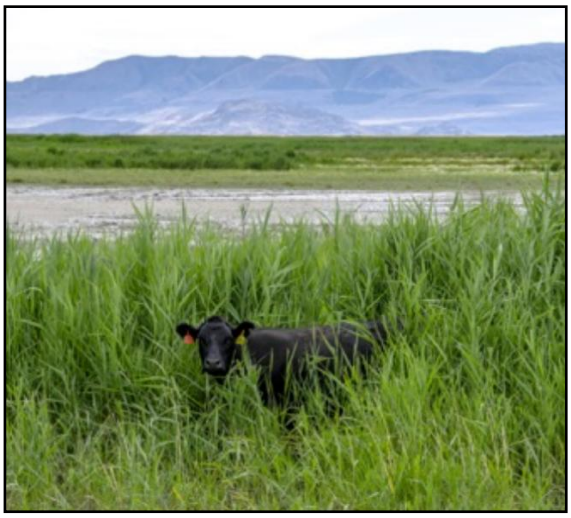
More than one producer emphasized that regardless of their location, spraying herbicides often kills the good and the bad, including valuable plant species and beneficial soil organisms. Strategic grazing management can shift the ecosystem in desirable directions while protecting desirable plants, improving soil health, healing fragile soils and can accomplish multiple goals for wildlife, water quality and quantity, environmental enhancement as well as economic profitability.

There were many challenges addressed by these producers that related to their specific ecosystems, but common concerns included soil health, loss of open space and grasslands, and the importance of water quantity and quality. Strategies that led to profitability differed by the varying opportunities but effects of cow size, calving season, markets, and reducing inputs and supplementations were discussed. Innovation, incentives, and diversification provided opportunities for their children to return to the ranch or farm if they desired and to become a part of the overall operation. This also addresses the key challenge of keeping land in agriculture by preventing the need to divide and sell it when the need to pass it to the next generation occurs. Loss of land to uses that permanently remove it from grasslands were identified as one of the major concerns for the future. Water quality and quantity, wildlife habitat, integrating livestock into the overall strategy for protection of land and water and profitability were crucial objectives discussed. Also emphasized was the need to educate the public about the benefits of grasslands and cattle and how they play major roles in protecting and improving the environment and providing healthy foods to a continuously growing population. We must 'tell the story' of the positive effects of what cattle grazing can do. The story must be told broadly to the public, to policy makers, to educators, and others who influence decisions concerning land use.

The producer is in a unique position to find solutions and to ask the right questions to further the progress of industry and academia in their supporting roles. As expressed by one producer, "Let me help you accomplish your goals." Some of this has been done, but more is not only possible but is highly desirable. Such opportunities are valuable for furthering research and education and translating that research into real-time uses. This also provides much needed opportunities for demonstrating to the public the essentiality of finding ways to produce foods for humans and feeds for livestock that are compatible with environmental stewardship goals while meeting profitability needs for individuals, families, and communities. Listen to the words of wisdom from these producers who are the ones with "boots on the ground." Hear their concerns that open space is disappearing. We are losing the grasslands while water supply and quality are declining. Learn why, in spite of much popular opinion to the contrary, they say that

“Cattle are the ultimate tool to environmental integrity – our most useful tool.” “Listen to the Land.” “We must play a greater role in policy decisions.”

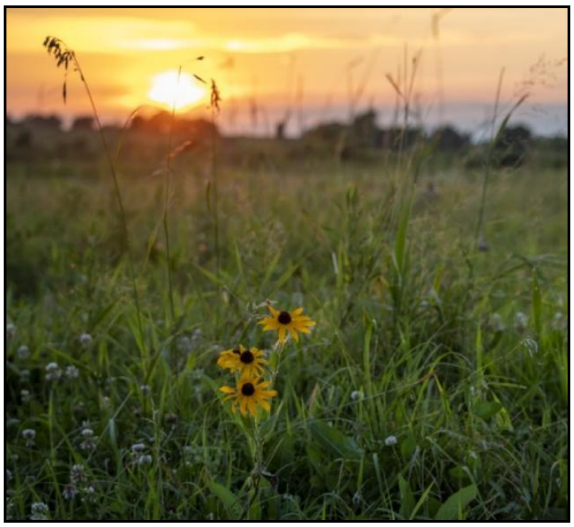
“We must Educate the Public, Influence Policy” and “Tell the Story!” “Healthy soils lead to healthy grasslands that lead to clean water and healthy cattle which lead to healthy people.” “We are not the problem! We are part of the solution!” “TELL THE STORY!”



Cattle grazing Phragmites improves wildlife habitat and water management in Utah (John Ferry).

Micro- and macro-organisms return to soils with well managed grazing of North Dakota prairies (Jerry Doan).

Cattle successfully integrated with grasslands in Florida where water concerns and loss of open space are escalating (Gene Lollis).



Cattle and grazing management lead to the return of native grasses and forbs in Wisconsin Prairies (Jerry Huth).

NOTE: To listen to the Producer Forum, go to the International Grassland Congress website https://internationalgrasslands.org/. Click ‘Resources' then ‘Access to Congress Recordings’. Scroll down to Producer Forum (it is near the bottom) and clink on the link.

Concluding Sessions

Awards Ceremonies

The Allen Illumination Award

Presented by the American Forage and Grassland Council

The Allen Illumination Award, presented by the American Forage and Grassland Council (AFGC), was created in 2008 by Bill Tucker, then president of AFGC, to recognize those, who through innovative approaches, have illuminated in others a greater depth of understanding and appreciation for the many values that Forages and Grasslands provide.

From left to right: Dr. Vivien Allen, Dr. Peter Ballerstedt, and Dr. Garry Lacefield.

Other Awards presented by the AFGC recognize exceptional contributions in research, education, forage production, and industry. The Allen Award of Illumination goes beyond excellence in these specific areas by recognizing those who illuminate in others the role of Forages and Grasslands in addressing challenges to humanity.

This award was presented in 2023 to Dr. Peter Ballerstedt during the Congress banquet. Dr. Ballerstedt is recognized for his world-wide efforts to illuminate in others a greater understanding of and passion for the role of grazing animals in providing needed nutrition to humans while protecting and improving soil health and playing a major role in removing carbon from the atmosphere and restoring it safely back into soils.

International Grassland Congress
Lifetime Achievement Award

Dr. Vivien Allen receives Lifetime Achievement Award[36]

The inaugural International Grassland Congress Lifetime Achievement Award was presented to Dr. Vivien Gore Allen during the XXV International Grassland Congress in Covington, Kentucky, May 2023. The banquet announcement was greeted with an immediate, enthusiastic standing ovation for a very surprised recipient. She was also presented with an incredible book of letters from those whose lives she has touched.

Dr. Ray Smith, Congress President, presents first Lifetime Achievement Award to Dr. Vivien G. Allen.

Vivien's passion for grasslands began as a child on their family farm and continued through College at the University of Tennessee, Martin Branch.

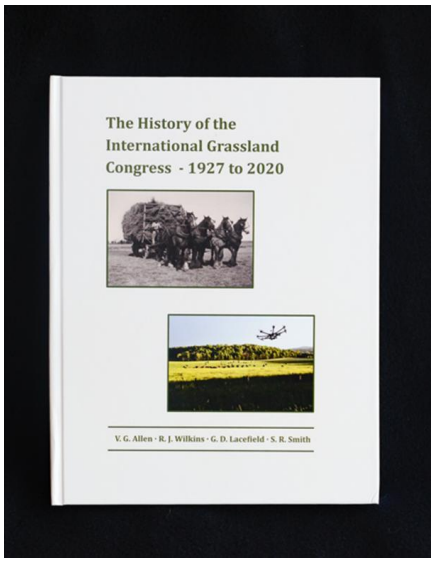
There, she received the first 4-year degree granted to a female in General Agriculture. After her PhD from Louisiana State University, with a major in Agronomy and Animal Science, she joined the faculty at Virginia Polytechnical Institute in a forage research and teaching position. Following a very productive program, she was offered the prestigious Thornton Distinguished Chair at Texas Tech University where she became Director of the Forage-Livestock Research and Teaching Program centered on integrated crop-livestock systems. During her career she traveled to almost every state and over twenty countries.

Dr. Allen has been a leader in many grassland groups and organizations. She was the first female elected to the board of directors of the American Forage and Grassland Council and their first female President. She was the second female President of the Crop Science Society of America. She was

[36] Written by Dr. Garry Lacefield and Dr. Ray Smith, University of Kentucky, USA.

the lead organizer that brought together the AFGC and the Society for Range Management for their first joint National Conference in 1998. Vivien attended her first IGC in Lexington, Kentucky, USA, in 1981 and attended all congresses through her retirement. She was the first female appointed to the IGC Continuing Committee and was the first female to chair that Committee. While serving in this position, she played a major role in bringing together the IGC and the International Rangeland Congress for their first joint Congress for their first venue in Hohhot, Inner Mongolia, China. She was the inspiration, editor and senior author of *An International Terminology for Grazing Lands and Grazing Animals* (2011). This international publication was a collaboration between the IGC and the IRC with the writing committee appointed jointly by both these organizations. The Forage and Grassland Foundation, as well as both the International Grassland Congress and the International Rangeland Congress, provided financial support for its publication. It has now been translated into seven languages and is the standard for scientific publications.

Dr. Allen has been involved on many IGC committees, projects, and programs. One project where she has shown the greatest passion and dedicated the most time has been *The History of the International Grassland Congress - 1927 to 2020*. She served as senior author and along with her co-authors and many international contributors completed a 376-page hardcover comprehensive history. In addition to the hardcopy content, it also is available electronically. With Dr. Allen's leadership, Congresses occurring after 2020 will be summarized and will be electronically available on the website as an "ANNEX."



Dr. Allen's career has taken her from the family farm, around the world and now full circle back to the farm. She has excelled as a farmer, internationally recognized researcher, innovative teacher, administrator, author, and forage-grassland leader. She has inspired hundreds in the importance of grasslands, and many are now serving in leadership roles. As a result of Dr. Allen's leadership, inspiration, passion, and contributions the American Forage and Grassland Council created a new award, "The Vivien Allen Illumination Award," in her honor. Dr. Vivien Allen has contributed more, over a longer period, and in more ways to IGC than anyone we know. We congratulate Dr. Allen on this prestigious, inaugural, International Grassland Congress Lifetime Achievement Award.

Invitation to the XXVI International Grassland Congress – 2027, Leipzig, Germany

The 100th Anniversary of the Congress!

On behalf of the entire organizing team and Prof. Dr. Frank Ewert, the IGC 2027 Congress Chairman, Dr. Joana Bergmann (Head, ZALF grassland group "Sustainable Grassland Systems" based in Paulinenaue Research Station) and Dr. Jürgen Pickert (formerly at ZALF and Co-Author of this Annex) extend the invitation to all participants to join the XXVI International Grassland Congress in Leipzig, Germany, in June 2027.

Dr. Joana Bergmann and Dr. Jürgen Pickert present Invitation to the 100th Anniversary of the International Grassland. Congress.

As Leipzig was the cradle in 1927 for what became the International Grassland Congress, as well as the venue of the Congress in the year of its 50th Anniversary in 1977, it is a wonderful opportunity to acknowledge this long and rich history by celebrating the 100th Anniversary at the same place. Leipzig is a city of 600,000 inhabitants in eastern-central Germany, within less than two hours by car from the German capital Berlin. As in 1977, the Congress will take place in the Kongresshalle am Zoo in the city centre, a stone´s throw away from the Leipzig University campus where the first congress was organized by Professor Friedrich Falke and Richard Geith in May 1927.

The organizing team IGC 2027 is led by the Leibniz Centre for Agricultural Landscape Research and the German Federal Research Organizations Julius-Kühn-Institute and Thünen-Institute. They are supported by the German Agricultural Society and the Grassland Associations of Germany, Austria and Switzerland and by numerous

researchers from universities, research and advisory organizations as well by grassland farmers.

The overarching theme of the congress will therefore be **100 Years of Grassland Research - Ways to the Future**. The congress itself will acknowledge grassland history and hopefully pave the way to the next 100 years by covering all topics and questions regarding efficient grassland management for healthy food, as a renewable resource for bioenergy and a primary commodity, mitigation of climate change, preservation of biodiversity and improvement of agricultural landscapes. Our three focus topics to do so will be: *Rethinking of Agricultural Landscapes, Implementing of Novel Techniques,* and *Facing Future Challenges*. We invite contributions to about 40 different sessions, clustered under different themes.

Grassland in Germany, Austria and Switzerland is used mainly for cattle husbandry. Sheep husbandry is mainly for meat and for landscape maintenance on drier sites, in the uplands, and on the dikes. Grassland use by horse keeping in the vicinity of the bigger cities and by wild-animal husbandry is slowly but steadily growing. Biogas production from slurry, maize and also grass, you will find all over the country.

The three countries you will visit during the congress and the tours have excellent collaboration among universities, federal research institutes and state research and advisory organizations where grassland and forage is an important topic. Researchers, advisors and also farmers cooperate in sections of the German Plant Sciences Society and its Association for Grassland and Forage, in the committees for grassland and forage and for forage conservation of the German Agricultural Society and in the grassland associations of Germany, Austria and Switzerland.

We are planning eight different mid-congress tours around Leipzig within one day that will focus on very different topics. We will visit grassland farms as well as experimental stations, projects and infrastructures of the Universities of Halle, Jena and Leipzig, the Saxon Agricultural state Institute, the German Agricultural Society, the Helmholtz Center for Environmental Research, the Julius Kühn-Institute and the Thünen-Institute.

Five different tours are planned for either before or after the congress: a northwest tour to the maritime coastal region at North Sea around the cities of Hamburg, Bremen and Oldenburg, a northeast tour into the continental region between the German capital Berlin and the Baltic Sea coast, a tour through the central uplands and Alps foothills and two tours will enter the grasslands in the hilly areas in the Alps of Bavaria, Switzerland and Austria.

The organizers are sure that a personal IGC 2027 visit in Leipzig will provide the participants with current knowledge and future perspectives on all topics connected to grasslands and show interesting grassland management options in different farms located in beautiful landscapes and regions of a long, long culture and history.

Appendix

Using the model set by *The History of the International Grassland Congress – 1927 to 2020*, the following is a collection of additional information that is presented within the categories used in the original book. The designated letter identification of each Appendix continues to add information relevant to that particular Appendix in the book. Thus, it is an addendum to the original Appendix. Only Appendices that include additional information are presented in this Annex.

Appendix C History through Remarks Given by Presidents, Chairs of the Continuing Committees, and Selected Other Addresses.

The following collection of key speeches from each Congress are quoted exactly as printed in the Congress Proceedings, thus, no additional indicators of quotations are included.

Appendix C-24[37, 38] XXIV IGC and XI IRC – 2021

XXIV International Grassland Congress/XI International Rangeland Congress, Mombasa, Kenya, 2021

Preface (Kimtai, 2021a)

Harry Kimtai, CBS, Principal Secretary, State Department of Livestock, Ministry of Agriculture, Livestock, Fisheries and Cooperatives, Kenya and Chair of the National Organizing Committee.

I would like to thank the President of IRC Continuing Committee and the Chairman of IGC Continuing Committee for having given us an opportunity to host the Joint International Congress. This was the first-ever joint Congress held in Africa in its 100-year history and the first virtual Congress in the history of both IGC and IRC congresses. The State Department for Livestock committed to supporting the Congress mainly because rangeland and grassland cover over 80% of the country and provide livelihoods to over 10 million Kenyans. This area supports approximately 70% of the national livestock herd and about 85% of the wildlife that supports the country's tourism industry. However, the rangelands lack the basic foundations for social and economic development and are often food and nutrition insecure.

Rangeland and grassland face many challenges, including but not limited to uncontrolled grazing, soil erosion, land degradation, climate change, droughts and floods, encroachment from crop production and human settlement. Also, there is inadequate and fluctuating availability of fodder and water to support both livestock and wildlife. Additionally, low modernization of the rangeland causes Kenyan pastoralists, the major players in those areas, to suffer losses from drought and consistently produce livestock including cattle, small ruminant and camels, below their potential.

The theme of the Congress was "Sustainable Use of Grassland and Rangeland Resources for Improved Livelihoods." The theme aligns with the Big Four Agenda of Kenyan eco-

[37] Addendum to Appendix C 'History through Remarks and Selected Other Addresses' in *The History of the International Grassland Congress – 1927 to 2020,* page 191.
[38] Also, as stated in *The History of the International Grassland Congress - 1927 to 2020*, page 191, this collection of key speeches from each Congress is quoted exactly as printed in the Congress Proceedings, thus, no additional indicators of quotations are included in this section.

nomic development strategy, which includes the food and nutrition security pillar. Livestock is a key enterprise in the rangeland and grassland of Kenya and it is the main source of milk, meat and other livestock products. The beef demand in Kenya is expected to increase by over 170% by 2050 due to increasing number of Kenyans in the middle-income bracket. It is against this background that my department supported this Congress.

I am impressed to note that [this] Congress has enabled our rangeland and grassland research stations to be recognized globally as having been at the forefront in breeding some of the best native pastures varieties in the world, such as *Brachiaria* [*Urochloa*][39] *ruziziensis*, *Pennisetum* [*Cenchrus*][35] *clandestinum* and *Chloris gayana*, among others. In addition, our researchers had the privilege to participate, share and exchange their experience, knowledge and information with the international community. I, therefore, expect that the proceedings from this forum will document successes, challenges, lessons learnt, and outcomes of this unique Congress, which will go a long way in enhancing the sustainable utilization of the grassland and rangeland resources in Kenya.

The total number of delegates who attended the Congress online was 675, and the total number visiting the virtual exhibition booths were 1,344. The MALFC had the highest number of visits (226), followed by 'Welcome to Kenya' (224) and KALRO (203), indicating the interest the delegates had in the host country and hence the publicity that Kenya received. There were excellent online discussions, and people followed the Congress through social media platforms, including YouTube. I wish to appreciate the conference's NOC for coordinating the process to its conclusive and successful end. I also would like to take this opportunity to thank Protel Studios Limited, who within a very short time provided a virtual platform on which the Congress was ran quite successfully.

Finally, I would like to thank all those who contributed to the success of the Congress by providing financial support and presenting well-researched papers in line with the Congress theme.

[39] The genus names for *Pennisetum clandestinum* and *Brachiaria ruziziensis*, have been officially changed.

Opening Remarks

Dr. Dana Kelly, President of the International Rangeland Congress Continuing Committee (2021).

Welcome to the Joint International Grassland and International Rangeland Congress, hosted by Kenya. This is the first time there has been a joint international Grassland and Rangeland Congress in Africa. So, this congress is a significant moment in the history for both our organisations.

Rangelands and grasslands are important to the world, as these regions cover about half of the earth's land surface area. We have rangelands and grasslands across the world: in much of Africa, in the Arctic, Australasia, Central Asia and Mongolia, eastern and southern Asia, the Middle East, North America, South American, the Caribbean, and even in Europe.

The health of these landscapes is critical to the wellbeing of more than 500 million people, some of the most marginalised peoples of the world. Pastoralists and others who derive their livelihoods from rangelands are both users and stewards of the land. Their stewardship is critical for building resilient economies, achieving food and water security, and improving environmental conditions. In Africa, rangelands and grasslands occupy almost half of the continents inhabited surface and are home to 40 per cent of continent's population. These regions support an estimated 50 million pastoralists and up to 200 million agropastoralists. However, many forces threaten the productivity and ecological integrity of these lands and their caretakers.

Rangeland degradation world-wide is a significant issue. Misunderstanding of rangelands is widespread; a common conception is that these lands are wastelands with little value, which need to be repaired, improved, or developed. This problematic notion of rangelands informs policies which are implemented in rangeland regions in many countries. The lack of understanding about complexities and regional nuances in rangeland means that the pastoralists who live here, have ended up as some of most marginalised and disadvantaged people in the world.

International Year of Rangelands and Pastoralists

One initiative that will help overcome this lack of understanding is the proposal by the Mongolian Government. While economic, social and institutional issues of rangelands are beginning to be recognised in some parts of the world, rangelands and pastoralists are often not a major consideration in government policy around the world. The proposed International Year of Rangelands and Pastoralists is an opportunity to promote messages about the importance of pastoralists.

The United Nations decision about whether or not an International Year of Rangelands and Pastoralists will happen, is likely to occur later this year. Please use your networks to encourage the government in your countries to support the International Year of Rangelands and Pastoralists – not only the Departments of Agriculture, also Departments for the Environment, forests and range management, and Departments of Foreign Affairs. Many of you may have contacts in pastoralists organisations, scientific and research organisations – all of these organisations can write and support the International Year of Rangelands and Pastoralists.

I would like to call on people around the world to step up. We need individuals, communities, organisations and governments to support an International Year of Rangelands and Pastoralists.

This Congress will also increase our understanding of rangelands and grasslands. It is appropriate that this Congress is in Kenya – rangelands and grasslands are particularly important here, comprising 80% of this beautiful country, and are home to about 10 million people. These regions support 70% of the national livestock population and 90% of the wildlife, which is key to the tourism industry. There is a strong history of scientific research.

The Kenyans are bringing us a very exciting Program! The theme of the joint Congress is "Sustainable Use of Grassland and Rangeland Resources for Improved Livelihoods", which is particularly topical at the moment. Much of Kenya is currently facing drought as the short rains are late, on top of previous dry seasons. Other countries in East Africa are in a similar position, with a La Nina weather pattern causing low rainfall. Government policies and funding are needed to support pastoralists in the short term, and strategies are needed to improve livelihoods in the rangelands in the longer term.

One of the seven themes at this Congress focuses on "Drought management and climate change". Other themes focus on livestock, forage production as well as social and institutional issues. At this congress, the combined "people" related themes have one the

largest number of papers (with about 60 papers). Ecological aspects of rangelands and grasslands also feature strongly (with about 40 papers). The balance of disciplines represented in presentations has changed over the years. The focus is more interdisciplinary, with a wider scope of topics now than 10 years ago.

The presentations, panel sessions and videos provide insights from both scientist's perspectives, and importantly, insights from pastoralist's perspectives. I am delighted that we have pastoralists from rural Kenya talking in Plenary sessions. It is not common that pastoralists present their views at an international rangelands and grassland congress. We tend to hear more from scientists at these congresses, yet it is vital that we hear from the people who actually manage our rangelands and grasslands. Congratulations to the organising committees for bringing us these different perspectives about rangelands and grasslands.

This congress is all virtual, another first for both the IGC and IRC. We all certainly wish we were able to meet face-to-face. We appreciate the time zone challenges of the online format; and thank those of you who are getting up very early or staying up very late. One of the benefits is that this format does allow people from remote villages to join in, some of these people would not be able to attend an international congress in person.

Welcome to all of you, to people from all over the world. I hope that you enjoy the exchange of ideas and find something of particular interest to you in this excellent program!

Closing Remarks

Ray Smith, Chair of the International Grassland Congress Continuing Committee (Smith, 2021c).

I want to start by highlighting two significant accomplishments of the IGC Continuing Committee during the last two years. As you all know, the IGC and the IRC Proceedings are a permanent record, a permanent legacy of research in grasslands and rangelands. They will outlive us all. Now, not only are past Proceedings available through libraries around the world, but we have the past five Proceedings available as a searchable database. Anyone around the world can simply google an author's name, and keywords from one of their Proceedings papers and the paper will be available for viewing or downloading. If this simple search does not work, then add International Grassland (or International Rangeland for the Joint Congresses). A record of the number of downloads will also be provided for author's vitaes. The International Grassland Congress recently obtained copyright permission from Wageningen Academic Publishers for the XX International Grassland Congress in Ireland (2005) to be included in the searchable database, previously this Proceedings could only be purchased as a hard copy or e-book. The Proceedings site has been developed by the University of Kentucky library system, hence the name UKnowledge. To reach the main site go to https://www.internationalgrasslands.org/ and click on publications or google International Grassland Proceedings. We are working towards all the Proceedings being on this site in coming years, even translated copies of the first two Proceedings which are in German.

A comprehensive IGC history was released in early 2021 *The History of the International Grassland Congress - 1927 to 2020*. The IGC Congress began with an invitation letter that Dr. Friedrich Falke sent to 50 grassland scientists in mainland Europe and the subsequent gathering and tour for 16 of these scientists in Germany in 1927. There are many details from these early years of IGC that we would not know without the publication of this history. The history includes information from every IGC Congress and other significant events in grassland research during the last 93 years. Many supplemental documents are also included in the appendix including short biographies of the six most influential men during the first 20 years including: Dr. Falke (Germany), Dr. Anders Elofson (Sweden), Professor Albert Volkart (Switzerland), Sir R. George Stapledon (United Kingdom), Dr. ir. Derek Siewert Huizinga (Netherlands), and Professor Richard Geith (Germany).

The history began as an idea by Dr. Garry Lacefield (USA) and myself soon after the XXIII IGC in India. We felt like an update and expansion of the IGC History by Dr. Ross Humphreys in the late 1990's was in order. Dr. Lacefield talked with Dr. Vivien Allen about working with us on the history, based on her long-term connection with IGC including serving as Chair of the Continuing Committee from 2001-2005. She also chaired the International Forage and Grazing Terminology Committee that published *An International Terminology for Grazing Lands and Grazing Animals* in 2011. This was a collaborative effort with both the International Grassland Congress and the International Rangeland Congress. Dr. Allen began to discuss details of the IGC history with Dr. Roger Wilkins (UK) who played a prominent role in writing the initial IGC Constitution in 1978 and the revised version in 2001. As the months passed, Drs. Allen and Wilkins became the primary authors of the history and used their many worldwide grassland contacts to source information that would have been unavailable to the average IGC member. The resulting almost 400-page book is a compelling read to anyone interested in grasslands. It can be ordered from the IGC website (internationalgrassland.org) as a hard copy book or downloaded as a pdf document.

As I stand here in Kenya today, I want to say that one of the highlights of my professional career has been working with such an outstanding group of scientists, administrators, and staff at KALRO (Kenyan Agricultural & Livestock Research Organization), at the Kenyan Ministry of Agriculture, Livestock, Fisheries and Cooperatives (MALFC), and other organizations in Nairobi. They have been patient with me ever since my first Congress planning visit in 2016. They have been patient as I mispronounced their names. They have been patient as I broke nearly every formal meeting protocol, often breaking in when chairs of committees had the floor.

I'm sure if I was Kenyan, I would have been demoted. But they just smiled and nodded their heads and gave me the floor.

I flew into the country at least every year either on my own, or with Dana Kelly (IRC Chair), Jim O'Rourke (IRC Secretary-General), and once with Derek Woodfield from the IGC Continuing Committee. We expected them to break away from their many job responsibilities for several weeks before and after our visits. And, to my knowledge, none were paid more than their regular salary. But they were expected to do more. And to a man and to a woman they rose to the occasion. Thank-you.

This Congress in Kenya all started with Dr. David Miano [Mwangi] and his leadership as chair of the IGC Continuing Committee after the IGC Congress in Sydney, Australia, in 2013. He showed vision and leadership in working with colleagues to bid for the Congress to be held in Africa for the first time. David initiated gathering his colleagues at

KALRO. He organized the team that came to the IGC Congress in India to accept the bid. He then helped spearhead the effort to develop a bid for the International Rangeland Congress and brought a delegation to Saskatoon, Saskatchewan, Canada, in 2016 to present the bid that this be a Joint Congress. Thank-you David. It's been an honor to succeed you.

There are many, many people I'd like to thank, on behalf of myself and Dana Kelly. We have worked with 3 Principal Secretaries of Livestock, but the longest with Harry Kimtai, chair of NOC Principal Secretary State Department for Livestock. He personally led most of our 15 NOC meetings. He always made us feel welcomed each time we visited with him in his office. Thank you.

We'd like to thank the Director General of KALRO, Dr. Eliud Kireger, Vice Chair of the NOC for his support of a joint Congress. I remember the first time we met in February 2016. I was very nervous as I entered his office, trying to remember the protocol I had been told to follow.

Both of these men made the extraordinary effort to accompany the Kenyan delegation to the Society of Range Management meetings in Denver, Colorado, USA, in February 2019. They participated in the meetings and manned the Congress booth. And they joined with us as we cheered on Dr. Ernest Bogo when he dressed as a Swahili warrior with a tall Gallagher fencepost as a spear. I assume the airlines wouldn't permit a real spear. Little did we know that Covid would soon devastate the world. But they stayed committed and supported the Congress during these tumultuous and unpredictable times.

We'd like to thank the government of Kenya for their tremendous financial support. Cabinet Secretary, Ministry of Agriculture, Livestock, Fisheries and Cooperatives, the Hon. Peter Munya gave his full support for the Congress.

We want to give a special thanks to Dr. Joseph Mureithi, Deputy Director General (Livestock) for KALRO and the Chair of the Secretariat for the Congress. He gave much of the administrative oversight for the activities of the Secretariat. Over all these years, Dr. Mureithi has provided great foresight and leadership. He also attended to many tasks large and small, even personally lining up drivers to pick us up from the airport. He is now a close friend. Thank-you Joseph. And my invitation to host you and your wife Grace in our home in Kentucky in 2023 is very genuine.

We want to thank Dr. Elkana Nyambati, the Secretary of the Secretariat, for his key involvement with all of the Congress committees. When we would head back from Kenya

after one of our week-long trips, we would both get emails from Elkana late at night as he followed up on all the tasks that we had come up with during our visits. Thank-you Elkana.

We want to give a special thank-you to Primrose (Nabwire). She was the wheel that kept everything running. From receiving and distributing proceedings papers to reviewers, to handling registrations, to recording and typing meeting minutes, to calling the Principal Secretary's office to line up meetings, and about a million things more. You may think I'm exaggerating but I'll bet if you count all the emails that Primrose has answered during the last few years, it would add up to a million (or at least several hundred thousand).

There are so many others to thank, especially the leadership of the Secretariat. Thank you, Florida Maritim for chairing the publicity committee and Stephen Odipo for being the secretary. You both worked long hours for this Congress, especially in the last months. Thank you, Simon Onchiri for chairing the local arrangements committee and Cecilia (Onyango) for being the Vice-chair. Thank you Elkana for serving as secretary to this committee. You all worked so hard lining up the Congress venue, hotels, and all the other aspects for a physical meeting, and then you had to shift gears and line up details for a virtual Congress.

Thank you Patrick Watete for chairing the tour committee, Oliver (Wasonga) for serving as co-chair, and Michael Okoti for being the secretary. You spent many long hours planning and conducting reconnaissance trips for some amazing pre- and mid-Congress tours around Kenya and even to Tanzania. I know that Dana and Jim really enjoyed their reconnaissance trip south into Tanzania, and we wish we had been able to run this for Congress. More recently you worked with Stephen and others to develop virtual tours. Thank-you.

We want to thank Patrick (Ngicuru) for serving as chair of the finance committee and Festus (Murithi) for serving as secretary. This was a critical role you played, and you both showed diligence with the many permutations of the budget and the paperwork involved. And thank you George (Keya) for chairing the fundraising committee and Alice for serving as secretary. We want to give a special thank-you to Professor Moses (Nyangito) for chairing the publications committee, Dereje (Wakjira) and Lance (Robinson) for serving as co-chairs, and to Jane (Wamuongo) for serving as secretary. Lance, thanks for your commitment for working so diligently with the committee even after moving back to Canada from Kenya. You and the entire team handled 1,000 abstracts and arranged for each one to be reviewed. Then you fielded over 600 full-length paper

submissions and had all of them reviewed and some re-reviewed. Then you worked with the program committee to make sure all of this would fit into a program.

And we want to give an extra thank-you to Professor Jesse Njoka for so capably chairing the program committee and An Notenbaert for serving as co-chair. Professor, you put in so much effort on the initiative for a Traditional Knowledge Forum. The forum may not have been held at this Congress but the groundwork that you and Dana laid sets a valuable foundation for it to be held at future Congresses. Thank you Foustine Wandera for serving as secretary of the program committee. And serve you did. I know you had many late, late nights working on the 3rd, 4th, 5th, …..10th versions of the program. In-person, hybrid, in-person, virtual, maybe hybrid, and then finally virtual. Thank you.

Thank you Caroline for helping in recent months and Protel for the tremendous work you did over the last few weeks and especially the last few days. We also want to thank all those that were heavily involved early on and have since retired or moved on to other positions. Thank you all.

You'll notice I used many first names. This is not the professional protocol in Kenya, but I was very deliberate in doing this to show the close working relationship Dana and I have had with all of these individuals over the last 5 years. I'll make sure to add last names to my written transcript that has the permanent proceedings, but to me, I'll always think of you fondly by your first names.

We want to thank Dr. Jim O'Rourke, permanent Secretary-General of the International Rangeland Congress. He has been the backbone of the IRC organization for years, going back to 1978 when he was one of those who helped start the International Rangeland Congress. He started his official duties with IRC in 1995 as a member of the Continuing Committee, then as President of the Continuing Committee and now as Secretary-General. Jim, it has been great working together all these years and I have fond memories of Dana, Stephanie and I sitting with you at the Jacaranda hotel with your Tusker beer in hand and sharing stories of being a young range scientist in Tanzania and all your adventures during those years. Even driving all the way to Nairobi for groceries. And most of all Jim, thank-you for raising the majority of the outside sponsorship that allowed so many delegates to attend this virtual Congress at no charge. And I thank-you on behalf of all those attending right now because of you.

I have several more thank-you's. A huge thank-you to Dana Kelly. Officially, Dana and I share the same position leading our Continuing Committee. She as President of the IRC Continuing Committee and me as Chair of the IGC Continuing Committee. But that's just the surface. Dana, it has been a pleasure and a joy working with you over the last 5

years. I've seen you show grace and leadership, even under tremendous pressure. I've seen you show extreme politeness and I've seen you show forcefulness when necessary. I have seen you provide incredible vision for IRC over the years and leadership for initiatives like the International Year of Rangeland and Pastoralists. I have so appreciated working with you professionally, but even more knowing you as a dear friend to Stephanie and I. Thank-you Dana.

And a special thank-you to my wife Stephanie. We have been married 38 years and have 4 grown children and now 7 grandchildren. You stood by my side through grad school and 30 years of a very demanding professional career. And little did you know when we were in India, and I told you I'd been nominated to chair IGC that it meant working double and triple overtime from my day job at the University of Kentucky. Thank-you Stephanie. Thank you also to Dana's husband, Mark, as he has supported her work on the Congress over the years.

Now, speaking to all of my Kenyan colleagues and friends who are sitting in front of me (Note: the NOC Secretariate met in person in Mombasa during the week of the Congress). There have been profound changes in our world during the last two years, but you have and are rising above. Covid will not defeat you or any of us, just as the IGC leadership resurrected the organization after a 12-year break during and after WWII. You have risen to confront these formidable challenges and have overcome. Sure, you are disappointed not to be hosting delegates in-person in Kenya to experience the people, the culture, the vast and beautiful grasslands and rangelands. But you have given them a taste, an introduction, and reason to visit and spend time here in the future. And you have continued the legacy of both the IRC and the IGC. You have provided the platform for this Congress, the recorded presentations that are now available to all delegates and the permanent proceedings papers that will be available for generations of scientists. And although this Congress was virtual you have still helped create very real and lasting interactions between researchers from many countries. Thank-you. Asantesana.

Lastly, Dana and I want to thank all of you around the globe. Thank-you for your perseverance and patience with the postponement of the congress, with delays, with extensions, with communication issues. Thank-you for sticking with us and helping move all of us forward toward even greater significance in our profession fields, influence on policy, and most significantly in our efforts to improve the lives of those residing on the rangelands and grasslands of the world. Thank-you.

Harry Kimtai, Chair of the National Organizing Committee (Kimtai, 2021b)

Ladies and Gentlemen This Congress was conducted through plenary concurrent sessions, and also panel discussions in order to enable scientists, practitioners and policy makers participate and contribute to the matters in their hands. We had sessions on range/grassland ecology; forage production and utilization; livestock production system; wildlife and tourism; biodiversity, ecosystem services and ranching; incorporating education in building capacity of the pastoralists to manage rangeland/grassland; among others. The Continuing Committees of the International Rangeland and International Grassland Congresses, entrusted Kenya to host the joint congress and we are indeed grateful. Their decision is justified by the high level of participation witnessed in the Congress and to the many very fruitful discussions that were held and the resolutions reached. I believe, if the resolutions are adopted, we shall have sustainable Rangeland and Grassland where livestock, wildlife and pastoralists co-exist in complex interrelationships that finally will give rise to economically vibrant ecosystems.

Ladies and Gentlemen Kenya and the horn of Africa is currently facing severe drought which is attributed to the effects of global climate changes. The region has keenly followed the proceedings of the Congress and is eagerly waiting to receive the formal proceedings to tease out potential lessons and solutions that can assist cope with the effects of climate change. Such lessons will also include those on improving pastoralists' way of life and on addressing environmental degradation. Specifically, based on those lessons, national policies and strategies will be revised to sustainably develop and utilize grassland and rangeland in order to contribute to our national economies. The Kenyan Government is more than ready to support our researchers to continually promote the interchange of scientific and technical information, create awareness on all aspects of grassland and rangeland in Kenya, working together with other countries. I want to believe that this scientific research will not only be an exchange of information between the researchers alone but will improve sustainable utilization of the rangeland and grassland for improved livelihood and welfare of the wildlife not only in Kenya but also contribute to improvement all over the world. We therefore need to create a lot of awareness along those lines.

Ladies and Gentlemen As we draw the curtain on this year's Congress, may I offer my gratitude first to the office of the Cabinet Secretary, Ministry of Agriculture, Livestock, Fisheries and Cooperatives under Hon. Peter Munya for its support towards the successful organization of the Congress. Secondly may I thank my colleague Prof. Hamadi Boga, Principal Secretary, State Department of Crops and Agricultural Research; Direc-

tor General, Kenya Agricultural and Livestock Research Organization, Dr. Eliud Kireger; the President of the International Rangeland Continuing Committee, Prof. Dana Kelly; and Chairman of International Grassland Congress Continuing Committee, Prof. Ray Smith. I also wish to thank the entire membership of NOC and the NOC Secretariate for working tirelessly to make this congress a resounding success under very challenging conditions of the global COVID 19 pandemic. I thank all those who submitted oral papers, posters, virtual exhibitions and all those who participated in plenary sessions. Finally, I thank all the sponsors who supported this Congress. I am encouraged that as we bring this congress to a close that there is great hope for "Sustainable Use of Grassland and Rangeland Resources for Improved Livelihoods," which was the theme of the Joint Congress. I now wish to declare this Congress officially closed.

ASANTE SANA!!!

Eliud Kireger, Director General, Kenya Agricultural and Livestock Research Organization (KALRO), Nairobi, Kenya (Kireger, 2021)

The Cabinet Secretary, Ministry of Agriculture, Livestock; Fisheries and Cooperatives;
The Principal Secretary, State Department of Crop production and Agricultural Research;
The Principal Secretary, State Department of Livestock;
The Chairperson International Grassland Congress Continuing Committee;
The President of International Rangeland Congress Continuing Committee;
Distinguished Delegates;

Ladies and Gentlemen Livestock and human population are rising in the rangeland as frequent droughts and floods are causing death of livestock and human lives in many tropical regions. Increasing productivity in these regions in order to sustain these populations, is to be done while at the same time reducing degradation. In order to effectively contribute to the growth of the agriculture sector, KALRO works in the rangeland and grassland to develop technologies, innovations and management practices that aims to increase productivity and reduce degradation.

Ladies and Gentlemen The rising livestock populations, increased settlement and degradation has affected the livestock feed security, mainly grass and forage-based sources. Kenya has a long history of grassland/rangeland research and development in East Africa, dating back to early 19th Century, culminating in the setting up of the Grassland Research Station in Kitale in 1950s. Many of the grass species developed in this station have found their way to other tropical countries such as Brazil and Australia where they have been greatly improved making those countries leading beef producers globally. The KALRO is now implementing a programme to repatriate some of these forages back to Kenya to boost the livestock industry.

During the launch of the African Green Revolution Forum (AGRF) of 2021 Conference, the president went ahead and declared drought as a national disaster in Kenya. In order to deal with the perennial feed shortages, KALRO has introduced, through its Arid and Rangeland Research Institute (ARLRI), a re-seeding program, where grasses, mainly indigenous and introduced, are used to improve the rangeland. The Institute has enabled farmers to produce enough grass for their livestock, stock more in form of hay and sell to other farmers. In the coastal lowlands and highlands, which are currently experiencing droughts, *Brachiaria* grass has been introduced. The resilient grasses sequester carbon and have an additional benefit of reducing greenhouse gases.

Ladies and Gentlemen Today, we in KALRO have adopted the 'Climate Smart Agriculture Strategy, 2017-2026' in developing technologies, innovations and management practices. Technologies we develop are climate smart, in order to sustainability increase income and productivity. The theme of the Congress "Sustainable Use of Grassland and Rangeland Resources for Improved Livelihoods" therefore share KALRO's desire to build resilience and increased agricultural productivity and improving livelihoods of the people living within the rangeland and grassland.

Ladies and Gentlemen Ensuring food and nutrition security in the region depends not only on improved forages and animal breeds, but also on education of the communities and having vibrant seed systems. In partnership with private sector, including mass media, KALRO has repackaged knowledge from research and delivered to farmers directly on print, TV or radio media or through county extension service. In terms of providing quality forage seed, KALRO works with farmers and the Kenya Plant Health Inspectorate Services (KEPHIS) to produce seed to enable farmers establish own pastures. KALRO is also a major source of superior animal breeds, for example Boran and Sahiwal bulls and superior camel breeds for the very arid rangeland.

Ladies and Gentlemen The unpredictable weather is still a challenge and KALRO, working with Kenya Meteorological Department (KMD), has introduced ICT based advisories, which not only give weather predictions, but have components on existing markets for livestock products. Among them is the Kenya Agricultural Observatory Platform (KAOP).

Finally, KALRO has had the privilege of being part of the organizing team for the congress, and offers to participate by sharing its experiences, beliefs and approaches to tackle adverse effects of climate change the productivity of grassland and rangeland in Kenya.

THANK YOU.

Appendix C-25[40] XXV IGC - 2023

XXV International Grassland Congress, Covington, Kentucky, USA, 2023

Presidential Address: Importance of Grasslands (Smith, 2023)

Dr. S. Ray Smith, Department of Plant and Soil Sciences, University of Kentucky, Lexington, Kentucky, USA: Congress President and Chair, XXV International Grassland Congress Organizing Committee.

We are here tonight at the XXV International Grassland Congress and the theme for the week is *Grasslands for Soil, Animal and Human Health*. As you will read in the recently compiled History of IGC, we have been meeting since 1927. This is the first time we have gathered in-person in 8 years. It is good to see all of you. Eight years, that's the longest break except WWII. I want to thank our Kenyan colleagues for keeping IGC going during the Covid pandemic by hosting our virtual Congress in 2021, joint with the International Rangeland Congress. I know that travel and visa restrictions and economics made this trip difficult for many of you and I commend you for making the effort to be here. For those colleagues that are only able to read my words, I look forward to meeting with you at the next Congress in Germany in 2027.

Introduction

Ecologically, grasslands are defined as areas where the vegetation is dominated by grasses and grass-like species. For most of us here, we think of grasslands as "grazing lands." From the *Terminology of Grazing Lands and Grazing Animals* the vegetation in grasslands includes grasses, legumes and other forbs, and at times woody species. We have native grasslands, cultivated grassland, naturalized grasslands, and many other ecosystem types. They are all grasslands. Grasslands in all their forms cover over 1/3 of the land surface of the world.

Grasses and grasslands are important. As John Ingalls said in 1872, "Grass is the forgiveness of nature - her constant benediction. Forests decay, harvests perish, flowers

[40] Addendum to Appendix C 'History through Remarks and Selected Other Addresses' in *The History of the International Grassland Congress – 1927 to 2020*, page 191.

vanish, but grass is immortal. Its tenacious fibers hold the earth in place and prevent its soluble components from washing to the wasting sea. It yields no fruit in earth or air and yet, should its harvest fail for a single year, famine would depopulate the world" (Ingalls, 1948).

Grasslands are important to the entire world, to forming agricultural soils, to domesticated livestock, to wildlife, to all grazing animals, to the human population, to the worldwide ecosystem. We are here today because we believe that grasslands are important. From the concluding chapter of the IGC History: "Grasslands have historically and justifiably been viewed as a solution to major challenges. They can contribute to a healthy, stable, and fertile soil, water catchment and quality, clean air, biodiversity of plants, animals, and other biota in both native and imposed grasslands, in addition to providing an economical feed source not directly consumable by humans. Through the animals that graze forages, food, clothing, power to transport heavy burdens, and a source of wealth are provided to humans (Burton, 1986). To many peoples of the world, grasslands provide home, heritage, livelihood and a 'sense of place.'"

The positive role of the grazing animal in maintaining the health and sustainability of the ecosystem is well documented. Long-term row crop monocultures have advantages of specialization and economies of scale but are shown increasingly to negatively impact soil health and quality, wildlife, biodiversity, and other natural resources. Bert Christie (IGC President in Canada, 1997) reminded us that without grasslands, the "bread-baskets of today can become the dust bowls of tomorrow" (Allen *et al.,* 2021).

Why we are here?

Let me take a few moments to describe why grassland scientists and practitioners from around the world have been gathering for almost 100 years. It all started when Professor Friedrich Falke, a well-known German scientist, sent a letter of invitation to 50 grassland scientists in mainland Europe. The purpose of the meeting was to (in his words) exchange knowledge and practical experience in grassland agriculture in central Europe and develop natural food sources for livestock and to increase their production. The subsequent gathering and tour for 16 of these scientists occurred in Leipzig, Germany in 1927. And they decided there was value in continuing to meet. And they did meet, and scientists and students and practitioners from more and more countries joined them year after year, and we continue to meet today.

The IGC was formed to provide a forum for the exchange of knowledge, ideas, and experience among those working with grasslands and their uses. As described by Dr. P. V. Cardon (President of the Congress in 1952) it is "an opportunity for free and open dis-

cussion of commonly recognized but unsolved problems; … a forum where findings, ideas, and experiences (can) be exchanged," and "where a mingling of minds" can "generate more potent activity." From the beginning, the Congress has been about information-sharing and networking. Within the Congress setting, younger scientists have the opportunity to meet and learn from scientists who are already well-known for their accomplishments. New ideas and perspectives have been generated. Participants have been able to establish lifelong networks with peers and gain valuable experience presenting their work on a global stage (Allen *et al.,* 2021).

Ray Brougham, President of the XVII Congress in New Zealand and Australia in 1993 said "We are here to review the grassland regions and resources of the world and to review progress made in their development and improvement, their management and productivity, their utilization, their degradation where this is occurring and their sustainability. We are also here to ensure that mechanisms of technology transfer and in particular information on wise use and practices associated with productivity increases are transferred to the practitioners, the farmers, the pastoralists, the managers, the policy makers, and the governments that are responsible for the world's grassland resources" (Allen *et al.,* 2021).

Vivien Allen stated in the IGC History that "While grassland research and content of the IGC have traditionally been concerned with use of grassland for livestock production, a much more multifunctional approach has been taken to grassland as we have moved into the 21st Century. This is reflected in an increased percentage of papers devoted to environment, socioeconomics and policy, land use systems, and information and technology transfer."

Accomplishments of past International Grassland Congresses

The congress has been responsible for some significant progress in grassland research. One example relates to efforts to overcome tall fescue (*Festuca arundinacea* Schreb.)[41] toxicity from the widely planted endophyte-infected[42] Kentucky 31 variety. New Zealand researcher Garry Latch met University of Georgia researcher Joe Bouton at the 1989 Grassland Congress in Nice, France. Bouton learned about Latch's safe endophytes and they developed a collaboration to insert these new endophytes into Bouton's Southeastern US adapted tall fescue varieties. This collaboration led to the entire novel endophyte tall fescue industry which has provided safe and persistent tall fescue varieties for livestock producers across the US and around the world. I could relate numer-

[41] Classification of tall fescue at the time this research was being conducted.
[42] Refers to the grass *Festuca arundinacea* infected with the endophyte fungus Neotyphodium coenophialum (Morgan-Jones and Gams), which produces ergot alkaloids, including ergovaline, that is toxic to livestock.

ous similar examples of collaborations that have developed as a result of attendance at IGC Congresses.

What are the Expected Accomplishments from IGC 2023?

We expect new collaborations and linkages amongst you who are attending together with a synergy of new ideas and further development of existing ideas. Just based on the themes and titles from some of the sessions, the research presented at the XXV IGC will lead to breakthroughs in accurate methods to measure the carbon capture potential of perennial grasslands. It will show new methods of recycling nutrients in grazing systems. It will show the critical value of livestock for sustainable cropping. It will emphasize to us that there are many forbs that aren't weedy species at all but valuable for forage quality and other benefits. It will show that secondary metabolites of forage plants show tremendous potential as natural nutraceuticals for livestock. It will show us how to more effectively train the next generation of grassland scientists and the tremendous opportunities of social media for grassland education.

The XXV IGC will emphasize to us that many grassland issues have social components which we have often ignored. In her keynote on Thursday, social scientist Dana Kelly will emphasize that food security is more than simply growing more food, which is what many of us are involved in. The distribution of food and supply chains are a social challenge, linked to governmental trade policies and institutional operations. Gender inequities are social challenges, stemming from cultural perceptions which are often reinforced or reflected in policy. Social, scientific, practical; these are just a few of the expected accomplishments of this Congress.

What the IGC Continuing Committee is Putting in Place for the Future?

The IGC Continuing Committee is putting into place several things for the future. We are developing an Archive of IGC documents and materials for future generations with the assistance of Dr. Ruth Bryan, the Chief Archivist at the University of Kentucky.

As you know, our proceedings are a permanent record, a permanent legacy of research in grasslands. They will outlive us all. Now, not only are past Proceedings available through libraries around the world, but we are cataloging all the Proceedings papers from past Congresses into an easy to find format, that can be discovered as individual papers with any search engine. In the 3 years since the initiation of this project we have almost 170,000 downloads of IGC papers from 209 countries. Authors can go into the system and find the number of downloads for each of the papers they have authored. Currently we have all the proceedings papers back through the XIX Congress in Brazil in

2001. We are working towards all the Proceedings being on this site in coming years, even translated copies of the first two which are in German. Go to the IGC website under publications to find the Proceedings repository or simply google IGC Proceedings. I want to formally recognize Kyle Bachman-Johnson with the University of Kentucky library system and her predecessor Adrian Ho who started the project. Cara Montello is a current University of Kentucky student who has been working over the last year to upload papers.

The IGC Continuing Committee authorized the writing of a comprehensive history of IGC which was released in early 2021. The lead author is Vivien Allen, past IGC CC Chair, joined by Roger Wilkins (author of the IGC constitution); Garry Lacefield and myself (Ray Smith). There are many details from these early years of IGC that we would not know without the publication of this history and the investigation of the authors and individuals like Jüergen Pickert from Germany. The history includes details from every IGC Congress and other significant events in grassland research during the last 93 years. Take time to go through it while you're here. We have a few copies available for purchase or you can download the pdf or order a hard copy and have it shipped directly to you. The authors have just completed an Annex to the History which highlights the Joint Congress in Kenya. These are printed and available on the registration table and will soon be available on the IGC website.

The Continuing Committee has also worked with the International Rangeland Congress to hold two Joint Congresses in the last 15 years. Let's support the IRC by attending their next Congress in June 2025 in Adelaide, Australia. With our Proceedings, Archive, and IGC History projects we are building on our past as we prepare for the future.

What is the legacy of IGC? What is our personal legacy?

For those of us with families we are creating a legacy for our family; We are all creating a legacy within our chosen field of study; Whether we believe it or not, whether we feel adequate or not; We are creating a legacy in students, colleagues, farmers, ranchers, pastoralists, in all who come across our paths. Let us here today and here this week, commit to creating a positive, forward-looking, truth-seeking legacy - a legacy of personal and scientific integrity for grasslands. That is what our predecessors have done and that is what we must strive to do.

Let me conclude with another quote from the concluding chapter of the IGC History. "The founders of the International Grassland Congress initiated a Congress that survived and grew because it filled a critical need. Their vision and passion for a brighter and more secure future for humankind through solutions found in the grasslands is

more relevant today than it was nearly 100 years ago. The International Grassland Congress remains vital to these issues and to the nurturing of the new generations of grasslanders who will address these critical challenges and opportunities into the future." Again, on behalf of the US International Grassland Congress Organizing Committee, I welcome you to the XXV International Grassland Congress.

Welcome Address: Promoting Grasslands' Role in the World of 2050
(Ballerstedt, 2023)

Dr. Peter J. Ballerstedt, Forage Ambassador, Barenbrug USA, Member of the International Grassland Congress Program Committee

I want to use the word *grasslands* in two ways. I want to address the roles of both the grassland biome and this organization in the world of 2050. Our theme for this Congress is *Grassland for Soil, Animal and Human Health*. This is not a new concept. It goes back to the very first Congress where Professor Falke said "…feeding a population (of) a country by itself is the basis of public wealth, productivity, and general wellbeing." This sounds like a matter of national security. Well, these are some interesting times we live in. Three quarters of US residents who are between the age of 17 and 24 are not eligible for service in the armed services because they are overweight, have a history of drug use, or because of legal issues. The most common of these reasons is being overweight. Overweight and obesity have become a national security issue in the United States.

That is one of the challenges the United States faces between now and 2050, a mere 27 years from now. Based on actuarial tables, it's likely that I won't live to see 2050, but it is likely that today's young students and young professionals will. This will be within their professional lifetimes as they serve grassland agriculture in all those aspects that Dr. Smith listed. What is that world going to look like? Numerous forecasts and pronouncements have been made:

- The world population will reach more than 9 billion people.
- Food production will need to double. Reducing food waste will be critical, but not sufficient.
- Demand for animal protein will increase 66%. The food supply will have to be of higher nutritional quality. This is likely an underestimate, as discussed later.

- This terrestrial food production must take place on essentially the same land area utilized today. The highest-class cropland is already in production, and agricultural lands are under significant pressures discussed later.
- Seventy percent of humanity will live in urban areas.
- Global population will become an increasingly aging population.
- Most of humanity, including 66% of children, will live in the tropical regions of the world. That is only about a third of the land mass.

A quote from the XXII Congress "The future of humankind depends deeply on understanding, managing and sustaining grasslands" (Kemp and Michalk, 2013). I agree in principle, but I am not interested in sustaining humanity. I am interested in increasing human flourishing.

We in the Congresses have been talking to ourselves, but I can assure you we need to talk to the 98% of the American population that does not understand what you do and why that matters. What is your elevator speech for answering why our work is important? We have some good news and part of what I hope we can do is find ways for the Grasslands Congress to start making itself better known. Making the work we are doing better known as well, because I think it is critically important. Secretary Brannan told the VI Congress, in part "I do not have to tell any of you that a grassland agriculture is a sound agriculture and that a grassland program is a program in the people's interest. We all know that. We all know that for farmers a good grassland program means lower production costs and higher income. For consumers it means better diets. For the nation with such a program it means greater assurance of a permanent food supply (Brannan, 1952)."

But in today's world, there are people we need to tell! For example, there are a whole lot of people in the world that do not know the difference between agricultural and arable land. How can we reach them? Here's an example: Imagine that the earth's land area fits within the boundary lines of a soccer field. All the agricultural land would not even make it to the center circle. The arable land would only make it to the penalty spot within the penalty area. As my friend Dan Glenn said, "Yes, but the spot's getting closer and the goalie's getting nervous." Globally we are losing arable land, and so proposals to eat more human-edible crops must come from increased yields from the arable land, not the non-arable lands. Well-managed ruminant animal agriculture is the best food-producing use of the non-arable agricultural lands.

Too many issues today are framed as us-versus-them or either/or. Livestock agriculture is thoroughly integrated with crop agriculture. The story of agriculture is that of humanity's manipulation of their environments to increase the production of biomass. Most of this biomass is not human edible. One study from Europe sug-

gests that for every kilogram of "vegan food," four to five kilos of inedible biomass were produced. How are we going to make best use of this resource?

Grasslands and livestock are essential components of our global cropping and food systems. The opportunity we have is the growing interest in soil health and related issues. Their interest in these topics, some of which are better supported than others, gives us an opportunity to build bridges. We can, for example, point to the essential role of forages as cover crops within these systems or as short rotation pastures for livestock. These are not new concepts to us, of course, but they are to the wider public! Thomas Chamberlain's quote resonates with a wide audience. "When our soils are gone, we too must go unless we can find some way to feed on raw rock" (Chamberlain, 1908).

One could make the case that, in a sense we are eating rocks as we mine rock phosphate. Increasing awareness of the role of well-managed grasslands, integrated cropping-livestock systems, and system fertilization in soil and ecosystem stewardship, for example, will increase the public's appreciation of and support for the essential work this Congress represents. Another quote published 40 years after Chamberlain's:

"Essentially, all life depends upon the soil. There can be no life without soil and no soil without life. They have evolved together" (Kellogg, 1948).

Another quote, also from 1948:

"Grassland is a good way to farm and to live the best way I know of to use and improve soil, the very thing on which our life and civilization rests" (Anderson, 1948).

Since 2010 I have joined communities from disciplines outside of agriculture that are interested in what the International Grassland Congress represents. My challenge to the members and the Continuing Committee is to get better at building bridges with disciplines outside those traditionally associated with the Congress.

As Dr. Smith mentioned, grassland agriculture is multifaceted, including resource conservation, ecosystem services, cover crops and soil health, integrated cropping livestock systems, and agroforestry in addition to pasture and rangeland management, and hay and silage production. Ultimately, however, it will involve the conversion of inedible biomass, primarily by ruminants, into food of highest nutritional value for humans while providing numerous ecosystem services.

The world's grasslands are our most endangered biomes. Approximately 50% of our temperate grasslands and 16% of our tropical grasslands have been converted into cropland or lost to urban development. In the US, almost 80% of the native prairie has been converted. One of our greatest natural resources, the tall grass prairie, was converted into today's corn belt. Subsequent stewardship has resulted

in degradation of soil and other issues. The point is not to blame. There were valid reasons that led to the decisions which led to the present situation. Let us focus on how we can do better with what we now know. The good news is that we can have healthy people and healthy soils thanks to ruminant animal agriculture. We know this. How can we tell the rest of the world?

Dr. Nikki said:

"Grassland science, which is deeply connected to food production, land utilization and environmental conservation is charged with a heavy responsibility of being a science for human existence" (Nikki I, 1985).

True, but let us begin to focus beyond mere human existence towards increasing human flourishing. By fostering human flourishing, we will minimize human impact. In addition, it is a moral imperative for those of us who've been given this opportunity. This expanded vision may increase the public's appreciation of our mission.

A critical point is that the word "food" is not univocal and that, therefore, neither are the phrases "food systems" and "food production." As anyone trained in animal nutrition knows, all feed isn't the same. One might assume the same for those trained in human nutrition, but that would frequently be an incorrect assumption. If calories per hectare is the metric of interest, then growing sugar cane might be the best option. But calories from carbohydrates and calories from fats differ in their metabolic effects. Most public health and nutrition messaging and food system-related conversations still treat protein, whether it comes from plants or animals as if it's nutritionally equivalent. The Food and Agriculture Organization has recommended that the individual amounts of digestible essential amino acids should be treated as individual nutrients.

Today's public is, for several reasons, poorly informed about grassland agriculture. Too many are confused about which end of the ruminant the enteric methane comes out of, not to mention hydroxyl oxidation of methane to carbon dioxide. These are difficult subjects to communicate, but our messaging must improve. Perhaps we can engage with professions trained in rhetoric and communication and make wider use of tools like social media.

Better communication of more sophisticated metrics of sustainability could significantly shift the public's understanding and policy conversations. For example, the Sixth Assessment of the Intergovernmental Panel on Climate Change, Working Group 1 stated:

"…expressing methane emissions as CO_2 equivalent emissions using GWP-100 overstates the effect of constant methane emissions on global surface temperature by a factor of 3 to 4 over a 20-year time horizon…"

They also reported that the Global Warming Potential of "fossil methane" has been underestimated by a similar factor. This ought to change the conversation about ruminant agriculture's impacts. In a paper still in review, the authors estimated that the impact of enteric methane from beef cattle systems in the US has been overestimated by more than 12 times. How might this information change public perceptions? Have we been talking about the right things? I don't think so. Where are the voices promoting this information?

Sustainable food systems require livestock in general and ruminants in particular. Food production cannot be replaced with food processors. When forage fiber and cell contents are upcycled via ruminants into meat and milk, food of highest nutritional quality is created for human use out of a resource that was not human edible. On the other hand, when grains, pulses, or nuts are processed, we are taking a human-edible resource, and processing it into a human-edible product. No process is 100% efficient, so the food supply is decreased. The processing of plant-source foods can reduce the nutritive value of the product relative to its ingredients. Only recently has the application of appropriate qualitative tools to accurately assess this problem begun. Precision fermentation has been advanced as a replacement for livestock agriculture, with claims of lower "climate impacts" and purported health benefits. A recent report, however, suggested that 'lab-grown meat' might be 25 times worse in its climate impact than beef. Its nutritional qualities and health impacts remain untested.

Someone can be overfed but undernourished. Undernutrition is not synonymous with caloric deficit. Malnutrition today looks a little different than it did in the 1960s & 70s. The World Health Organization estimated (pre-pandemic) that 825 million are calorically undernourished while 2.6 billion are overweight or obese. This is all malnutrition. Protein energy malnutrition is by far the most lethal form of malnutrition. Children are the most impacted. Of all children under five years old:

- Over half are deficient in micronutrients (e.g., iron, vitamin A, zinc) vital for healthy development.
- Nearly a quarter are stunted. This is not merely shortened stature; it involves impaired brain development.
- Seven percent of all children are wasted – they have low weight for their height.
- Six percent are overweight.

This has a massive impact on a nation's economic development potential. These human beings will be limited in their ability to reach their potential because they were not fed properly while they were children. But malnutrition is not confined to the low- and middle-income countries.

Sixty percent of US adults live with at least one chronic disease. Forty percent have two or more. Ninety percent of US health care spending, approximately $4.1 trillion USD, goes to treating chronic diseases. Seventy-three percent of global deaths and 60% of the global burden of disease is due to chronic diseases, with an estimated cost of $47 trillion USD by 2030.

A growing consensus strongly suggests that there is a root cause to chronic diseases like cancer, circulatory diseases, gastrointestinal diseases, and endocrine, nervous, skeletal, and urinary disorders. Virtually every chronic disease has some significant linkage, if not causal relation to hyperinsulinemia (chronically elevated insulin) and insulin resistance (HI/IR). This is malnutrition and it is a global issue, occurring in all income-level countries. Half of the adults in China, India, and USA have HI/IR. Eighty percent of those who have HI/IR live in low and middle-income countries. It is a myth that these metabolic disorders (e.g. obesity, Type 2 Diabetes, etc.) are the result of prosperity. Obesity is a symptom of, not the cause of or risk factor for metabolic syndrome.

What could be accomplished with $4.1 trillion USD, to say nothing of $47 trillion USD? Imagine the progress that could be made on all the pressing issues of today and tomorrow. What is the role for the International Grassland Congress in advocating for greater investment in providing proper nutrition rather than treating disease? Those of us trained in animal husbandry and herd health know that herd health begins with nutrition. Many in the realm of public health, unfortunately, don't recognize this. Many promote "plant-based" and vegan diets, despite clear evidence of humans being harmed by too little animal source foods in their diets.

The failure to understand and incorporate this fundamental concept has led to, at best, ineffective policies. High-quality scientific evidence, however, suggests that these policies have exacerbated the problem. Clearly, no progress has been made in reducing the incidence of Type 2 Diabetes and related metabolic disorders. Research in animal agriculture isn't prioritized, in part due to the mistaken belief that animal source food "over-consumption" is the cause of these diseases.

This intellectual failure results in the worldview exhibited by the former Director-General of the World Health Organization. She and her colleagues can see what's happening, but they can't imagine how to stop it. "We've tried everything we know to address it and it's not working." they seem to think. Scientists should think "Maybe we were wrong. Maybe we should try something else." But the majority of

people in the communities of human nutrition and food policy seemingly think "if we just try harder, if we just talk louder, if we dictate what people eat, it will work." This delusion then contaminates research, conversations, and policies regarding food systems.

Let me ask you all a personal question. Are you part of the 7? Are you part of the 93? What does that mean? One study estimated that only 7% of adult Americans exhibited optimal cardio-metabolic health. Regardless of whether they were at an "ideal" body weight or not, it turns out that weight is a poor health metric. According to the study, you do not have optimal cardiometabolic health if you have:

- Abdominal obesity: a waist circumference >101 cm (>40 inches) in men and >89 cm (>35 inches) in women
- Elevated serum triglycerides ≥3.9 mmol/L (≥150 mg/dL)
- Depressed HDL cholesterol <1 mmol/L (<40mg/dL) in men, <1.3 mmol/L (<50mg/dL) in women
- Blood pressure of 130/85 or more
- Fasting blood glucose >5.6 mmol/L (>100 mg/dL) or an HbA1c > 5.7
- Or you are taking medications for any one of these conditions.

If any one of these is true for you, you do not have optimal cardiometabolic health. But please do not despair. The good news is that most can treat these conditions with proper lifestyle interventions. Therapeutic carbohydrate reduction is well documented in scientific literature as an effective means of restoring metabolic health. Of interest to us and the industries we support, a reduced carbohydrate diet is one that does not restrict animal sourced foods. So just as appropriate grassland management can be part of the solution to many pressing environmental and economic issues, the products of grassland agriculture can be part of the solution for this issue of malnutrition and chronic disease. How might greater awareness and appreciation of these facts increase support for grassland sciences?

"Where there is no vision, there is no hope" (George Washington Carver).

On the one hand we have the slow-motion disaster perspective of some, lacking vision and without hope. On the other hand, let us offer the world a different vision. Just as Professor Borlaug and his colleagues launched the "green revolution," we need a "ruminant revolution" if the needs of the world of today, let alone 2050 are going to be met. Professor Borlaug is said to have saved a billion people from starvation, when that was a quarter of humanity. We now have 40% of 8 billion people in the world that are suffering from malnutrition. We need this ruminant revolution to sustainably increase the productivity and efficiency of our global ruminant agriculture systems while stewarding our precious resources. Let us work on this be-

cause I guarantee you that there are people interested in this goal. We must build bridges to foster the mid-century world. Norman Borlaug's quote should still inspire us:

"I personally cannot live comfortably in the midst of abject hunger and poverty and human misery, if I have the possibilities of - even in a modest way, with the help of my many scientific colleagues, of doing something about improving the lives of these many young children" (Norman Borlaug[43]).

There are still a billion people in the world that have no access to electricity. There are still 2 billion people in the world that burn dirty biofuels, including a billion that burn dung. What happens to the nutrients in the dung they burn, let alone the particulate pollution and the respiratory disease that causes?

At the XIX Congress in 2001 Professor Humphreys said "I envision the central role of grassland congresses as that, of assisting scientists working in specialists' areas to conceptualize their work in wider interdisciplinary context" (Humphreys, 2001).

Let's stop building silos and start building lighthouses. Many people are interested in the work we do, but they do not know we exist. These are just some suggestions that I would offer as some multidisciplinary investigations:

- What constitutes a "healthy" diet for the metabolically well and ill
- The vital role that animal source foods play in human and health
- The causes of noncommunicable diseases
- The essential role of ruminant animal agriculture in sustainable food systems
- A science-based assessment of environmental, societal, and economic impacts of the burden of noncommunicable diseases as well as animal source food production
- A fresh perspective and approach toward communicating this information to the public

I hope that this Congress starts conversations that will lead us forward to our one hundredth anniversary in 2027 in Leipzig, Germany.

There are people today that are working to achieve drug-free remission of Type 2 Diabetes. If the average adult American with type two diabetes could eliminate their medication use, that would lower their carbon footprint 29% more than if they shifted from a high meat to a vegan diet and remained on it for the rest of their life. Few remain on a vegan diet. They are not sustainable, in that sense of the word.

[43] This quote is from a list published by "African Journal of Food, Agriculture, Nutrition and Development." https://ajfand.net/Volume14/No4/borlaugquotes.html#gsc.tab=0

In October of 2022, I had the honor of moderating the environmental section of The International Summit on The Societal Role of Meat. The April 2023 issue of Animal Frontiers presents papers from that event, and I encourage you to read them. In addition, The Dublin Declaration of Scientists on the Societal Role of Livestock has been posted at https://www.dublin-declaration.org/. Please read it. If you can support it, please consider signing.

Thank you for attending this XXV International Grassland Congress. Thank you for your attention. I sincerely hope that this Congress will be a meaningful experience for us all.

Appendix G Congress Themes[44]

Themes from the International Grassland Congresses

For the complete list of Congress Themes prior to 2021, See Appendix G in *The History of the International Grassland Congress – 1927 to 2020*, page 323.

XXIV IGC - XI IRC Mombasa, Kenya 2021

Sustainable Use of Grassland/Rangeland Resources for Improved Livelihoods

XXV Covington, Kentucky, United States 2023

Grasslands for Soil, Animal and Human Health

[44] Addendum to Appendix G 'Congress Themes' section of *The History of the International Grassland Congress – 1927 to 2020*, page 323 to 324.

Appendix N Words of Wisdom from Voices of the Past

For the complete list of Words of Wisdom of the Past to 2021, See Appendix N in *The History of the International Grassland Congress – 1927 to 2020*, page 347.

XXIV Congress "The hosting of the first-ever joint congress in Africa was significant, as this region offers diverse and unique tropical savannah ecosystems, which are home to some of the most economically important grasses in the world and mesmerizing wildlife."
H. Kimtai (Kenya)

XXV Congress "With our Proceedings, Archive, and IGC History projects, we are building on our past as we prepare for the future."
S. R. Smith (USA)

Appendix O Tables[45]

Appendix Table O-1. Presidents and Continuing Committee Chairpersons[46]

Congress	Country	President	Chair of Continuing Committee[47]
1	Germany 1927	F. A. Falke, Germany	
2	Sweden/Denmark 1930	A. Elofson, Sweden	
III	Switzerland 1933	A. Volkart, Switzerland	
Fourth	United Kingdom 1937	R. G. Stapledon, UK	
Fifth	Netherlands 1949	D. S. Huizinga, Netherlands	
Sixth	USA 1952	P. V. Cardon, USA	
Seventh	New Zealand 1956	B. Levy, New Zealand	
Eighth	United Kingdom 1960	H.R.H. The Prince Philip[48]	
Ninth	Brazil 1965	M. H. Castelo Branco	
X	Finland 1966	P. Saarinen, Finland	
XI	Australia 1970	E. M. Hutton, Australia	R.M. Moore, Australia
XII	USSR 1974	P. I. Morosov, USSR	D.E. McCloud, USA
XIII	GDR 1977	R. Lemke, GDR	S.C. Pandeya, India
XIV	USA 1981	R. F Barnes, USA	W.R. Childers, Canada
XV	Japan 1985	I. Nikki, Japan	L.R Humphreys, Australia
XVI	France 1989	J. Picard, France	Y. Maki, Japan
XVII	Australia/NZ 1993	R. W. Brougham, NZ	D. Crespo, Portugal
XVIII	Canada 1997	B. R. Christie, Canada	T. Nolan, Ireland
XIX	Brazil 2001	S. C. da Silva, Brazil	R.J. Clements, Australia
XX	Ireland/UK 2005	J. Flanagan, Ireland	V.G. Allen, USA
XXI	China 2008	F. Hong, Q. Guo, and J. Yun, China	G. Sheath, New Zealand
XXII	Australia 2013	D. Kemp, Australia	G. Allard, Canada
XXIII	India 2015	P. K. Ghosh, India	D.M. Mwangi, Kenya
XXIV	Kenya 2021	H. Kimtai, Kenya	R. Smith, USA
XXV	USA 2023	R. Smith, USA	D. Woodfield, New Zealand

[45] Addendum to 'Appendix O'' section of *The History of the International Grassland Congress – 1927 to 2020,* page 351.
[46] Presidents were designated by Host Country; Chairpersons of Continuing Committees were elected at the end of the Congress preceding the listed Congress. (Adapted and updated from L. R. Humphreys, 2005).
[47] At the Fourth Congress, the Executive Committee was composed of the President of the next Congress, who became also President of the Association; the outgoing President of the Congress; Past Presidents; and the Permanent Secretary. By 1956, a newly structured Executive Committee was evolving but no records of its chairs have been found. In 1966, this was renamed as the Continuing Committee and its structure and function were defined as it exists today. R. M. Moore (Australia) was its first Chair.
[48] H. G. Sanders (UK) Congress Executive Committee Chair functioned as President during the Congress following the Opening Address by Prince Philip.

Appendix Table O-2d. Continuing Committee Membership (2021 to 2023) [49, 50]

------ Region[51] ------		XXIV Kenya 2021	XXV Kentucky, USA 2023
I	North America	Ray Smith United States	Gleise Silva Canada
II	Central America	Fernando Ibarra Flores Mexico	Luis Villalobos Costa Rica
III	South America	Fernando Ortega Chile	**Fernando Ortega** Chile
IV	Southeast Asia	P. K. Ghosh India	Mahendra Singh India
V	Oceania	**Derek Woodfield** New Zealand[52]	Lindsay Bell Australia
VI	East Asia	Joung-Kyong Lee South Korea	Joung-Kyong Lee South Korea
VII	Middle East	Hayatullah Esmati Afghanistan	Nahid Naghizadeh Iran
VIII	Mediterranean and Near East	Serkan Ates Jordan	Mounir Louhaichi Tunisia
IX	Europe excluding Regions VIII and X	Christian Huyghe France	Bridget Lynch Ireland
X	Northern Eurasia	Iveta Gutmane Latvia	Lina Sarūnaité Lithuania
XI	Africa excluding Region VIII	Babo Fadlala Sudan	Babo Fadlala Sudan
-	Host Country Representative	Elkana Nymbati Kenya	Ray Smith United States

[49] Those listed as serving under the XXIV Congress will continue to serve through the XXV Congress. New Continuing Committee Members, as well as the new Chair, are normally elected at the Congress with the Constitutional requirement that those elected are present in person at the Congress at the time of their election. Because of the need to hold the XXIV Congress as virtual and not in person, current membership was retained. (See Resolution 6). As directed by the Constitution, a new Chair was elected by the Continuing Committee members. Note: Regions conform to names used in the current Constitution revised in 2001 (Appendix F-5; in *The History of the International Grassland Congress – 1927 to 2020*, page 317).

[50] The Congress where a person's name first appears is the Congress where that person was elected to serve on the Continuing Committee. The Congress where the person's name last appears begins the last full term of that individual's service on the Committee and their term extends through the following Congress until their replacement is elected.

[51] Note: Regions conform to names used in the current Constitution revised in 2001 (Appendix F-5; in *The History of the International Grassland Congress – 1927 to 2020*, page 317).

[52] Chairs of Continuing Committees are indicated in bold font.

Literature Cited[53]

ALLEN V.G., BATELLO C., BERRETTA E.J., HODGSON J., KOTHMANN M., X. Li, MCIVOR J., MILNE J., MORRIS C., PEETERS A., and SANDERSON M. (2011) An international terminology for grazing lands and grazing animals. Grass and Forage Science. 66:2 to 28. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2494.2010.00780.x

ALLEN V.G., WILKINS R.J., LACEFIELD G.D., and SMITH S.R. (2021) The History of the International Grassland Congress – 1927 to 2020. The Forage and Grassland Foundation, Lexington, Kentucky, USA, 400 pp. https://internationalgrasslands.org/wp-content/uploads/2021/05/IGC-History_Final_Electronic-1.pdf

ANDERSON C.P. (1948) Forward, In: Stefferud, A. (Ed.) Grass The Yearbook of Agriculture 1948. pp. v to vi. Government Printing Office, Washington, DC.

BALLERSTEDT P. (2023) Welcome Address: Promoting Grasslands' Role in the World of 2050. In: Proceedings of the XXV International Grassland Congress, Covington, Kentucky, USA. 14 June to 19 June, 2023. pp. xv to xix. The Forage and Grassland Foundation.

BMEL (2024) Landwirtschaftlicher Bodenmarkt in Deutschland. Bundesministerium für Ernährung und Landwirtschaft, Berlin, 09. Juli 2024. https://www.bmel.de/DE/themen/landwirtschaft/flaechennutzung-und-bodenmarkt/bodenmarkt-deutschland-landwirtschaft.html

BOGA H. (2021) Opening Remarks. In: Proceedings of the Joint XXIV International Grassland and XI International Rangeland Kenya 2021, Virtual Congress, Kenya. Vol I, pp. xiv to xv. Kenya Agricultural and Livestock Research Organization, 25 to 29 October, 2021.

BRANNAN C.F. (1952) Address of Welcome. In: Proceedings of the Sixth International Grassland Congress, Pennsylvania State College, Pennsylvania, USA. pp. 79 to 81. International Grassland Congress, State College, Pennsylvania.

BURTON G.W. (1986) Preface. In: Forages: Resources for the Future. Council for Agricultural Science and Technology. March, 1986. Report No. 108.

[53] Addendum to 'Literature Cited Section' of *The History of the International Grassland Congress – 1927 to 2020,* pages 365 to 373.

CARDON P.V. (1952) Our concept of grassland agriculture. In: Proceedings of the Sixth International Grassland Congress, Pennsylvania State College, Pennsylvania, USA. pp. 92 to 95. International Grassland Congress, State College, Pennsylvania.

CHAMBERLAIN T.C. (1908) Soil Wastage. In: Cattell, J. McKeen (Ed.), The Popular Science Monthly, July to December 1908, The Science Press, New York, pp. 5 to12. https://archive.org/details/popularsciencemo73newy/page/4/mode/2up .

CONGRESS REPORT (2021) Sustainable Use of Grassland and Rangeland Resources for Improved Livelihoods. Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya 2021, 25 to 29 October, 2021, 94 pp. https://www.internationalgrasslands.org/wp-content/uploads/CONGRESS-REPORT-14.4-final.pdf .

COPPOCK D.L., ASH A.J., and IRVING B. (2021) Key Issues Generated from the XI International Rangeland Congress 2021: Summary and Way Forward. In: Proceedings of the Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya, 25 to 29 October 2021. Vol I, pp. xl to lii. Kenya Agricultural and Livestock Research Organization.

DAVIDSON W. (2016) The Great Plains: America's Carbon Vault. Op-Ed from ENSC and the Environment: Economics and Policy, University of Nebraska-Lincoln, Department of Agricultural Economics, Fall 2016.

EGAN T. (2006) The Worst Hard Time. Houghton Mifflin Company, 215 Park Avenue South, New York, New York. 340 pp.

EHRLICH G. (1986) The Solace of Open Spaces. Penguin Books Limited, Penguin Random House, London, United Kingdom. p. 103.

HODGSON J. (2001) Grassland production and management - Trends and perspectives for the 21st Century. In: Proceedings of the XIX International Grassland Congress, São Pedro, São Paulo, Brazil 11 to 21 February, 2001. pp. 1 to 3. Fundação de Estudos Agrários Luiz de Queiroz, Piracicaba, State of São Paulo, Brazil.

HUMPHREYS L.R. (1997) The International Grassland Congress. In: The Evolving Science of Grassland Improvement. pp. 202 to 209. Cambridge University Press, Cambridge, UK.

HUMPHREYS L.R. (2001) International Grassland Congress outlook – an historical review and future expectations. In: Proceedings of the XIX International Grassland Congress, Brazil, 11 to 21 February, 2001. pp. 1085 to 1097. Fundação de Estudos Agrários Luiz de Queiroz, Piracicaba, State of São Paulo, Brazil.

HUMPHREYS L.R. (2005) A brief history of the International Grassland Congress. In: Proceedings of the XX International Grassland Congress, Dublin, Ireland, 26 June-1 July, 2005. pp. 45 to 52. Wageningen Academic Publishers, Wageningen, The Netherlands.

INGALLS J.J. (1872). In Praise of Bluegrass. In: Stefferud, A. (Ed.) Grass: The Yearbook of Agriculture 1948. pp. 6 to 8. Government Printing Office, Washington, DC.

ISSELSTEIN J. (2022). Book Review: The History of the International Grassland Congress – 1927 to 2020. Grass and Forage Science, Vol 77, Issue 2, pp. 151-152.

KELLOGG C.E. (1948) Grass and the Soil, in: Stefferud, A. (Ed.) Grass: The Yearbook of Agriculture 1948. pp. 49 to 55. Government Printing Office, Washington, DC.

KELLY D. (2021) Opening Speech. In: Proceedings of the Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya. 25 to 29 October, 2021. Vol I, pp. xvi to xvii. Kenya Agricultural and Livestock Research Organization.

KEMP D. and MICHALK D. (2013) Revitalising grasslands to sustain our communities. In: Proceedings of the XXII International Grassland Congress, Sydney, Australia 15 - 19 September, 2013. pp. Preface. New South Wales Department of Primary Industry, Orange, New South Wales.

KIMTAI H. (2021a) Preface. In: Proceedings of the Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya. 25 to 29 October, 2021. Vol I, pp. v to vi. Kenya Agricultural and Livestock Research Organization.

KIMTAI H. (2021b) Closing Remarks. In: Proceedings of the Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya. 25 to 29 October, 2021. Vol I, pp. 919 to 920. Kenya Agricultural and Livestock Research Organization.

KIREGER E. (2021) Closing Remarks. In: Proceedings of the Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya. 25 to 29 October, 2021. Vol I, pp. 913 to 914. Kenya Agricultural and Livestock Research Organization.

KLOTZ J.L. and BOUTON J.H. (2021) Joint International Grassland and International Rangeland Congress Kenya 2021: Grasslands Summary. In: Proceedings of the Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya. 25 to 29 October, 2021. Vol I, pp. xxxvii to xxxix. Kenya Agricultural and Livestock Research Organization.

LEVY B. (1956) Chairman's Address In: Proceedings of the Seventh International Grassland Congress, Palmerston North, New Zealand, 6 – 15 November, 1956. pp. 15 to 17. Wright & Carman Limited, Wellington, New Zealand.

MUNYA P.G. (2021) Opening Speech. Proceedings of the Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya. 25 to 29 October, 2021. Vol I, pp. xi to xiii. Kenya Agricultural and Livestock Research Organization.

NIKKI I. (1985) Presidential Address. In: Proceedings of the XV International Grassland Congress, Kyoto, Japan 24 to 31 August, 1985. pp. 3 to 4. The Science Council of Japan and the Japanese Society of Grassland Science, Nishi-nasuno, Tochigi-ken, Japan.

RAEL C., SZILASSIZ P., and SZABOLCS F. (2025) Demographic causes and environmental consequences of land use change in Nairobi (Kenya), Carpathian Journal of Earth and Environmental Sciences, 20:5 to 17.

SANTAYANA G. (1920) The Life of Reason or the Phases of Human Progress. Vol. 1, p. 284. Charles Scribner's Sons, New York, New York.

SETO K.C. (2011) In: Fragkios, M., Gueneralp, B. and Reilly, M.K. A Meta-analysis of Global Urban Land Expansion. Published August 18, 2011. https://doi.org/10.1371/journal.pone.0023777.

SMITH R. (2021a) In: IGC Business Meeting Minutes – All Virtual Meeting. Proceedings of the Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya. 25 to 29 October, 2021. Vol I, pp. xviii to xxii. Kenya Agricultural and Livestock Research Organization.

SMITH R. (2021b) Resolutions from IGC XXIV. In: Proceedings of the Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya. 25 to 29 October, 2021. Vol I, p. xx. Kenya Agricultural and Livestock Research Organization.

SMITH R. (2021c) Closing Remarks. In: Proceedings of the Joint XXIV International Grassland and XI International Rangeland Virtual Congress, Kenya. 25 to 29 October, 2021. Vol I, pp. 915 to 918. Kenya Agricultural and Livestock Research Organization.

SMITH R. (2023) Presidential Address: Importance of Grasslands. In: Proceedings of the XXV International Grassland Congress, Covington, Kentucky, USA. 14 June to 19 June, 2023. pp. xi to xiv. The Forage and Grassland Foundation.

SMITH S.R., GOTSICK E., WEINERT-NELSON J., JACOBS A., TUETSCH C., FLEMING W., WOODFIELD D., KLOTZ J., LEHMKUHLER J., HALICH G., DAVIS B., HENDRIX B., and LEA K. (2023) IGC Oral Presentation Summary: XXV IGC Congress. In: Proceedings of the XXV International Grassland Congress, Covington, Kentucky, USA. 14 June to 19 June 2023. pp. xxvii to xxxiv. The Forage and Grassland Foundation.

Photographed by Dr. Jimmy Henning, University of Kentucky.

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(Photo by C. Philip Brown,
Texas Tech University).

Vivien G. Allen

The XIV Congress in Lexington, Kentucky, USA, was the first attended by Vivien Allen. She was then present for every congress through the XXI Congress in China, the first joint meeting with the International Rangeland Congress). She was on the Continuing Committee from 1997 to 2005 and served as Chair during the last four of these years. Allen led the international team that published 'An International Terminology for Grazing Lands and Grazing Animals' in 2011 that was supported jointly by the IGC and the IRC. She received the BS degree in General Agriculture (1962) from the University of Tennessee at Martin and the M.S. (1973) and Ph.D. (1979) from Louisiana State University with majors in Agronomy (forages) and Animal Science (livestock nutrition). She spent her career first at Virginia Tech, Blacksburg (1980 - 1995), and then as Thornton Chair of the Forage Research and Teaching Program at Texas Tech University, Lubbock (1996-2011). She retired from Texas Tech University in 2011 as a Paul Whitfield Horn Professor Emeritus. In retirement, she raises commercial Angus Cattle in Tennessee.

Roger J. Wilkins
(Photo by Keith Bolsen,
Kansas State University).

Roger J. Wilkins

Roger Wilkins attended his first IGC in Moscow in 1974 and then attended all IGCs to the XX Congress in Ireland and the UK in 2005. He served on the Continuing Committee from 1974 to 1981 as representative of Europe other than the Mediterranean and was Chairman of the Scientific Committee for the XX Congress. He played a leading role in drafting the Constitution of the IGC adopted in 1977 and chaired the group that prepared revisions to the Constitution adopted in 2001. Roger Wilkins did his first degree in Agriculture at Reading University, England, graduating in 1963. This was followed by a Ph.D. in Agronomy at the University of New England, Australia, awarded in 1967. He returned to England in 1966 to take a post at the Grassland Research Institute, Hurley. He was involved in grassland research through his career at the GRI and its successor Institutes. At his retirement in 2000 he was Deputy Director of the Institute of Grassland and Environmental Research and in charge of the North Wyke Research Station, with appointments as Visiting Professor at Reading University and Plymouth University.

Jürgen Pickert

Jürgen Pickert

Jürgen Pickert attended his first IGC in Nice, France in 1989. Jürgen graduated as Diplom – Agraringenieur (Pflanzenproduktion) at Berlin Humboldt-University in 1979. Based on a thesis about his field experiments with Sudan grass in Ethiopia from 1980 – 1982, he received the PhD in Tropical Agriculture at University of Leipzig in 1983. From 1983 till 2020, Jürgen Pickert was involved in Grassland and Forage Research at the Institute for Fodder Production Paulinenaue and its successor institutes, with an interruption between 2003 and 2013, when he served as head of the Crop Production and EU Payments Section at the Ministry for Agriculture in Brandenburg. When he retired in 2020, Jürgen Pickert was the head of the Sustainable Grassland Systems group at Leibniz Centre for Agricultural Landscape Research (ZALF). Jürgen Pickert was Vice Chairman of the German Maize Committee from 2009 to 2020. In retirement, he serves for ZALF as consultant for the preparation of the XXVI IGC.

Garry Lacefield

Garry D. Lacefield

Garry Lacefield attended his first IGC in Lexington, Kentucky, USA in 1981 and served as chairman of the Mid-Congress Tours. With the exception of Nice, France, in 1989, he has participated in all conferences to date since 1981. He served as chairman of the IGC North American delegation from 1993-2008. He received the Bachelor's degree in 1970 and the Master's degree in 1971 in agronomy and biology from Western Kentucky University. In 1974, he received the PhD from the University of Missouri. He joined the University of Kentucky Faculty in 1974 and retired in 2015, as Professor of Plant and Soil Sciences. In retirement as Professor Emeritus at the University of Kentucky, he continues to speak, write and serve as a consultant. He is co-author of the book, Southern Forages and the newly released, Wonder Grass-The Story of Tall Fescue in the United States.

S. Ray Smith

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S. Ray Smith attended his first IGC in New Zealand/Australia in 1993 and has attended all IGCs to the present with the exception of Brazil in 2001. He has served on the Continuing Committee since the 2013 Congress in Sydney, Australia and as Chair of the Continuing Committee from 2015 through 2021. He is also the President of the upcoming XXV IGC that will be held in the USA in 2023. Ray received a BS degree in Biology (1983) from Asbury University in Kentucky, MSc. (1988) and Ph.D. (1991) from the University of Georgia in Agronomy and Forage Breeding. From 1991-2001, Ray held a research and teaching position at the University of Manitoba, Canada. He then held an Extension and Research position in Forages at Virginia Tech from 2001-2004 and started his current position as Professor and Forage Extension Specialist at the University of Kentucky. Under his leadership, the University of Kentucky Library is duplicating the entire collection of Congress Proceedings making them accessible and searchable.


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