



# Editorial: Grazing in Future Multi-Scapes: From Thoughtscapes to Landscapes, Creating Health From the Ground Up

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## Editorial on the Research Topics

### Grazing in Future Multi-Scapes: From Thoughtscapes to Landscapes, Creating Health From the Ground Up

More than half the land surface of the Earth is used for grazing (United Nations General Assembly, 2022), with Asia at 36% and Africa at 30% of the total. About 91% of global grass- and range-lands are unfenced with few boundaries and limited crop farming (Reid et al., 2014). The remaining grass- and range-lands are privately owned and used, with 13% in North America, 10% in Australia and New Zealand, 8% in South America, and 3% in Europe; all with a mix of more intensive grazing and cultivated land. No wonder why across the world's landscapes, grazing and browsing herbivores—both wild and livestock—(be they within a spatial and temporal pastoral context, whether they naturally graze or are grazed by farmers, ranchers, shepherds, and nomadic peoples—all termed pastoralists), fulfill essential roles in driving the composition, structure, and dynamics of pastoral ecosystem. The provision of ecosystem services, including social, economic, and cultural benefits to families, farms, and communities, is accordingly impacted (Gregorini, 2015).

The term “pastoralism” may imply different types of livestock production in different countries. In Australia, for instance, pastoralism refers to ranchers with private rights over fenced properties, whereas pastoralism in Kenya commonly excludes fenced properties and refers to livestock producers operating on collectively owned and unfenced ranges. In Kenya as in many other countries e.g., Argentina (Wane et al., 2020), Botswana (De Ridder and Wagenaar, 1986), or the USA (Huntsinger et al., 2010), in some academic writing (Homewood, 2018), and the development literature (CELEP, 2021), ranchers would not be considered the same as pastoralists. In short, there is no generally accepted definition of pastoralism.

In this Research Topic of papers, we define “pastoralism” as the extensive production of domestic livestock, primarily dependent on the grazing of natural forages (see **Supplementary Material** for further discussion and examples). This definition of pastoralism excludes intensive livestock farming which is heavily dependent on feed supplements or cultivated pastures. As will become clear below, this definition of pastoralism includes people that both Australians and Kenyans would call pastoralists.

Pastoralists are found from the Arctic to the Kalahari Desert, from the Andes to Tibet, grazing reindeer and yaks in the north to alpaca and llamas in the south, to cattle, goats, sheep, and other species in between, while sharing the land-scapes with a wide variety of wild grazers and browsers, from kangaroos to elephants to bison (Reid et al., 2008).

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In many cases, grazing of domesticated and/or semi-domesticated livestock, often focused on the objectives of maximizing animal production and/or profit alone, has transformed landscapes in ways that diminished biodiversity, reduced water and air quality, accelerated loss of soil and plant biomass, and displaced indigenous livestock breeds and peoples. Where this has happened, these degenerative transformations have broken the integration of land, water, air, health, society, and culture, jeopardizing present and future ecosystem and societal services (Gregorini and Maxwell, 2020). As a consequence of these myopic grazing practices and thereby “land-scape” degradation, many land-users, policymakers and societies are calling for alternative approaches to the management of pastoral systems, keeping the good whilst throwing out the bad; diversified, adaptive and integrative agro-ecological and food-pastoral-systems that operate across multiple scales and “scapes” (e.g., thought-, social-, land-, food-, health-, and wild-scapes). To achieve these objectives requires a paradigm shift in livestock production systems embedded in a greater level of consciousness. This would be derived, initially from our perceptions about how these systems provide wealth, health, and wellbeing. The purpose of this Research Topic and book is to encourage people to reconceptualise models and practices of grazing and pastoral systems in continually evolving multiscapes. We provide a Research Topic of papers framed in different—but not necessarily separated—scapes (thought, social, land, food, wild, health and policy) that we hope will cultivate a shift in understanding and thinking, leading to new and revived choices and thereby a paradigm change as originally proposed by Schiere et al. (2012) in a seminal work on “Dynamics in farming systems: of changes and choices”.

Building on Aldrich’s (1966) definition of landscape—a view of a space or scenery from a specific perspective—here we refer to thoughts as a geography of minds’ perception and how we locate ourselves and participate in such a perception from our individual point of view and emotions. Any landscape will be perceived and felt differentially depending on who is thinking about, has experienced or is experiencing it, as well as their expectations of that -scape—their perception of its uses, their priorities and cultural values, as well as on how people function within a landscape and how the landscape impacts upon them.

Several papers in this Research Topic and book offer food for thought about thoughts. For example, historically, to manage the supply of animal protein, our hunter-gatherer ancestors domesticated and confined wild animals within enclosures, one of the earliest forms of agricultural -scapes. Swain and Charters discuss how the modern invention of fences created a culture of control and ownership in some Euro-American and Australasian grass- and range-lands, and they explore opportunities for fenceless landscapes. Contemporary challenges, as a consequence of the increased industrialized view of agriculture and food, increased meat supply, and the disconnect of most people from the food chain, are fuelling societal anxieties about the roles of agriculture and meat in human foodscapes and healthscapes. Leroy et al. (2022) contend that these issues may enhance “anti-livestock and or animal as food source” ideologies

that could lead to more holistic, ethical and sustainable human-animal-land interactions. As Beck and Gregorini point out, pastoral production systems, based on higher external inputs, face societal pressure to reduce environmental impacts, enhance animal welfare (also see Temple and Manteca), promote the integrity of meat and dairy products, and maintain profitability. They show how providing livestock with functionally diverse feeding contexts, that better meet individual needs for nutrients, pharmaceuticals, and prophylactics, can improve their health and wellbeing by enhancing hedonics and eudemonics. van Vliet et al. show that as the phytochemical diversity (see Beck and Gregorini; Distel et al.) of the diets of livestock increases, so do health-promoting phytochemicals and biochemicals in the meat and dairy products humans consume. Moreover, roots exude some phytochemicals thus influence soil macrobiota and nutrient dynamics. In turn, when livestock consume phytochemically rich plants, they also excrete some of those compounds, enhancing or adding to the benefits coming from those plants’ effects *per se* (Clemensen et al.). In other words, plant diversity enhances health from the ground up. Enhanced animal eudemonic and hedonic wellbeing, coupled with better health, suggests that phytochemically functional dietary diversity will improve not only animal welfare, but also wellbeing (mental state and health) of “them and us” (Beck and Gregorini, 2020). That, in turn, can enhance the eating experience and thus hedonic wellbeing (i.e. “healthy” pleasure) of the consumer, knowing that – in fact – such livestock products are healthier and in tune with the land and animal integrity. All of that could shift the directions of generic (one size fits all) “agri-business” models based on industrial inputs to more holistic ways of viewing health from the ground up.

Jaurena et al. use trial and case studies to show how managed grazing on private ranches can reduce financial risks and increase the profitability and environmental sustainability of livestock production on native grasslands (also see Dumont et al.). Growing interest in incentivizing sustainable agricultural practices, to enhance the provision of ecosystem services, is supported by a large network of voluntary production standards in high income countries that offer farmers and ranchers increased value for their products in support of “better” environmental sustainability. As Jablonski et al. point out, to be effective these standards must be credible, broadly recognizable, and generalizable, yet agriculture is place-based and varies considerably – it is not generic, even within a specific region, due to uniquely complex biophysical, socio-cultural, and management-based factors. This contradiction between the placeless generality of standards and the place-based nature of agriculture renders most sustainability standards ineffectual. Coping solutions and tools are emerging though, as shown by Laca, who provides a conceptual and quantitative basis to the spatial and temporal distribution of ecosystem services relative to demand, as the original focus of ecosystem services shifts to matching place-based supply with demand. And at a greater “level”, as discussed by Perley, we need to consider how modern emerging alternatives/models shift the uniform/generic “economies of scale” of industrialism to potential “economies of scope”, created locally in communities as systems self-organize.

Provenza et al. use linkages among food-, land-, heart-, and thought-scapes to discuss transformations of consciousness needed to appreciate life on earth as a community to which we belong, rather than as a commodity that belongs to us. Therefore, alternative thoughtscales should encourage pastoral ranching models that move away from the degenerative, one-dimensional, and myopic concept of industrial pastoralism (Leroy et al., 2022). In this industrial model, animals are perceived solely as a resource, existing in isolation from their wider landscape and societal functions (e.g., provide fuel, fertilizer, transport, and haulage services; offer individual and collective insurance; embody/establish social relationships through their exchange in marriage or clientage; and, have cultural and religious significance). Taking a more holistic view of industrial pastoralism will enable individual thoughtscales to become collective ones of and in modern societies, in relation to the functions of pastoral communities and industries... i.e. new ethical social-scapes in the making (Gregorini and Maxwell, 2020).

The papers focussing on social-scapes add more dimensions, presenting a variety of pastoralism cases—mobile, sedentary, and in-between, in high income countries:—New Zealand, United States, Australia, Argentina, Spain, Kazakhstan, China and South Africa -and nations—from low to middle- Mongolia, Tajikistan, Bhutan, Kenya, and Tanzania. In all these settings, people make a living from raising livestock on pastures in a socio-cultural context, not only in a specific environment or political-economic locus. The influence of social, cultural, and indigenous (Chakraborty et al.) values on land management is overlooked at great cost. Partnerships between natural and social scientists increasingly seek to understand pastoralism and rangelands by collaborating across formal disciplines and extending the “sometimes rigid and virtuous” boundaries of their research to work with many different parts of society. Transdisciplinary science, therefore, leads to growing awareness of alternative epistemologies among groups, i.e., how knowledge is acquired, filtered, enculturated, rationalized, shared and applied to the environment we work on and the landscapes we all inhabit.

Rangelands are observed differently by the state as enacted through *de facto* or implicit policies; by the managers endeavoring to implement state policies; by scientists positioned outside state management (though often reliant on state funding), and ultimately by the peoples whose livelihoods are in one way or another dependent on the rangelands. Priorities can be misaligned between these groups: “re-imagining of grazed landscapes must recognize that current pastoralists have their own visions of what pastoralism does, can and should provide to both themselves and society at large” (Addison et al.). Large-scale internationally funded programmes may contradict or compromise, not to mention negate, pastoral interests, as in afforestation of drylands and grassy biomes in Africa (Vetter). National programmes to intensify or de-intensify livestock production are altering peoples’ “grazing landscape and socialscape” among transhumants in Bhutan (Namgay et al.) or Sami herders in the Arctic (Tyler et al.). Studies on pastoralists in Argentina also note that “Top down or bottom-up experiences

hold distinct epistemological and research consequences and they affect rural livelihoods in various ways” (von Thungen et al.). Negotiating these viewpoints requires mediation and objectivity (Addison et al.; Reid et al.). Fundamentally, bridging these views entails collaboration between the disparate parties, for example, ranchers and conservationists, or indigenous peoples and scientists (Chakraborty et al.). There is a strong impetus to address complex problems “because local pastoral voices (and sometimes science) still have little impact on decision-making in the governmental and private sectors” (Reid et al.). Regulations can have profound and undesirable impacts, as in the Californian wildfires since “indigenous long-term knowledge of ecology was not used in developing policies for forest and land management” (Hunsinger and Barry). The weight of western science lies heavily on the peoples on the range- and grass- landscapes, including those in the great socialist experiments of the USSR and P.R. China (Kerven et al.; Zeren et al., 2021). Over time we discern that pastoralists in these and previously mentioned landscapes are not stubbornly conservative or passive in the face of change, but can and do adapt innovatively.

*Ko au te whenua, ko te whenua ko au.* I am the land, the land is me. We are the earth and the earth is us... (Provenza et al.). Landscapes are multi-dimensional domains we must protect and nurture to restore our collective health and wellbeing. Within landscapes are the foodscapes that nourish humans and herbivores. Foodscapes management and dietary perceptions dictate actions and reactions of herbivores (Distel et al.; Temple and Manteca) and us (Leroy et al.). Foodscapes management and dietary perceptions are changing as developed countries grapple with food-related diseases and obesity, and developing countries battle regional famines, malnutrition, and starvation, while the whole world deals with impacts of biohazards such as the coronavirus and climate change. In some richer societies, there are demands for health-scapes and nutraceutical food-scapes and, paradoxically, there is a movement away from animal products in pursuit of healthier lives, even though animal products are the best sources of some nutrients essential for human health (Leroy et al., 2022; van Vliet et al.). Meanwhile, as populations grow and incomes rise in poorer countries, demand for animal products is increasing. This raises the question of how best to react to these, apparently contradictory trends, demands on “the land”. The question is: Should sustainability assessments to inform the grazing landscapes look beyond greenhouse gas emissions to simultaneously embrace other social and environmental criteria? As concluded by Tittonell “truly sustainable, multifunctional grazing landscapes requires expanding our thinking and narratives beyond narrow discussions informed by greenhouse gas emissions or carbon footprint assessments.”

Although the peoples who rely on grazing-lands for their livelihoods often have few alternatives, there are encouraging new and revived research approaches to grazing management (e.g. related to carbon sequestration; Uddin and Kebreab; Whitehead). For instance, de Faccio Carvalho et al. discuss how to restore landscape multifunctionality by creating more biodiverse mixed farming systems that integrate livestock grazing into cropping

landscapes to reverse industrial specialization and consider multiple demands to farming landscapes. Or even, as argued by Davis, grazing lands for sheep and beef production can be designed within a public urban park alongside other park uses as well. Moreover, recognizing and rewarding herders and grazing for multiple ecosystem services would make herding less strenuous and politically, socially, and financially more secure (Schlecht et al.). Relationships and tools are emerging, and we can discern some better options for the future of our land under grazing, though compromises and trade-offs will be necessary.

While native species of animals (wildscapes) and indigenous peoples have been displaced from many of their lands by monotonic pastoralism, multifunctional pastoral systems can be designed to achieve dynamic multi-scapes that embed local breeds, native species of plants and animals and indigenous peoples into broader society. Here the papers focussing on wildscapes add even more grist to the mill. Landscapes range from highly intensively used for agricultural commodity production to wilderness areas with little or no recent human impacts. Whilst the latter are rare (Plumptre et al., 2021), a range of landscapes contain attributes of natural composition, structure, and processes (wildscapes), many of which have been shaped by humans and their livestock over millennia (Behnke). In the second decade of the 21<sup>st</sup> Century, pastoral lands are being abandoned, particularly in the developed world, and this trend may increase with pressures placed on livestock from issues such as greenhouse gas emissions and a changing acceptance of meat as a food in the western world (Leroy et al.). These trends yield benefits through the ecosystem services wildscapes can provide, although these need to be managed and properly incentivised for land managers, as increased rates of extinction of wildlife populations, in association with human activity, are the hallmark of the Anthropocene (Fortin et al.). The loss of grazing by large herbivores, across many wildscapes, poses risks of increased wildfires (Huntsinger and Barry), and invasive species. For these reasons pastoral wildscapes require some form of management intervention (Gordon et al.). For example, Fortin et al. present a spatial ecology tool to promote human-wildlife coexistence for integrated landscape management. Indigenous peoples should participate in shaping and delivering these management interventions (Singh et al.; Tyler et al.)—following the principles of adaptive management. A typical approach is revisiting old stories—many indigenous peoples have been using these management practices and tools for generations, including fire and traditional breeds of livestock (Gordon et al.). But society must factor in how to make this economically viable for people who provide these environmental services (Roche et al.).

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To conclude and encourage the reader to delve into this Research Topic and book—pastoral lands are in transition, and this brings with it challenges as well as opportunities. Some governments are focusing on curbing the negative externalities of farming and livestock production within national policies, whilst others will not tackle, or are complicit in, problems of insecurity of rangeland tenure, land grabbing and conversion to non-pastoral activities such as irrigated commercial farming, urban development, or mining (Oakland Institute, 2022). Such transitions, in many cases, have undermined the autonomy of pastoralists. The lack of autonomy further threatens our pastoral landscapes, through the rise of competing agendas when addressing the complicated social-ecological relationships; for example, environmental compliance, biodiversity conservation, livelihood security, climate change mitigation/adaptation, animal welfare, and sustainable consumption. While attempts at relational engagements are often assembled through political, intellectual, and institutional hierarchies, in truth it often seems that the divisions among these different interest groups are only growing ever wider. Our purpose is to encourage people to reconceptualise models and practices of pastoralists in continually evolving multiscapes. Unfortunately, the process of deciding the future of pastoral production systems is often exclusionary, failing to capitalize on the synergies that could be created across the spectrum of stakeholders’ views, needs and feelings about different -scapes. The concept of “multiscapes” is a unifying view for learning how pastoral lands were, are and can be, under newer functions and paradigm shifts. This is the heart of our thought-scapes as expressed in this body of work.

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All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsufs.2022.880809/full#supplementary-material>

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