

Dear Alan,

Thank you for offering me the opportunity to respond to the article by Richard Fynn – "Savory Insights – is rangeland science due for a paradigm shift."

First I must express my gratitude to Harry Biggs for arranging the visit of South African scientists to see Holistic Management at first hand. As Richard Fynn points out, Holistic Management has been ridiculed and condemned by many academics over the forty-odd years of its development; however, this group came with open minds, which was deeply appreciated. I believe they have initiated a collaboration that will prove vital to the future of South Africa.

As Richard reports, the group observed naturally expanding wetlands and restored river flow even though two of the last four years have been droughts. What readers need to understand is that this improvement was achieved with a 400% increase in livestock numbers. Without that increase it could not have been done. Further increases are now required if we are to maintain the higher levels of production now being experienced. Associated with this increase in livestock numbers has been a large increase in buffalo and elephant in particular (not due to management but to the removal of a veterinary fence). Early South African records of vast wetlands associated with very high animal numbers and less fire are now becoming more understandable as we restore what we call "animal maintained" grasslands and savannas.

Richard draws attention to a recent paper by Briske et al which states that grazing systems and rotations are dead, that range scientists don't know what to recommend as an alternative, and noting that the needs of research and management differ significantly. Applied ecologists engaged in management, like myself, have known for many years that grazing systems and rotations had to fail for two reasons: 1) they were designed to avoid complexity, which management must embrace to be successful; and 2) they focused on managing *land* and *livestock* when both are so tied to the mind and culture of the manager and the economy he or she operates in that they are unmanageable on their own. It is management of this complexity that Holistic Management was designed to handle, and which the group came to observe. Holistic Management involves the use of a decision making framework that assists people to make decisions in a manner that is simultaneously economically, socially and environmentally sound, short and long term. It is simple in principle but not always easy in practice because it involves changing some deeply ingrained range science paradigms.

Holistic Management planned grazing is a management *process* developed about forty years ago that effectively replaces grazing systems and rotations in any environment. It was based on a military planning procedure developed over some 300 years in difficult, complex and ever-changing situations. Holistic planned grazing can be observed in South Africa on several properties – for example Ian Mitchell-Innes near Elandslaagte, (KZN) and Dick Richardson, near Vryburg, both of whom have many years' experience and monitoring data.

Before looking at the range science paradigms that require a shift in thinking, let me correct some errors in Richard's comments on Holistic Management. First let me say that had he had available to him my book, *Holistic Management: A New Framework for Decision Making, 2nd Edition* (Island Press, 1999), many of his concerns would probably have been alleviated.

Richard states that the improved hydrological cycle observed on Dimbangombe, where the formerly dry river now runs once more, is due to reduced rainfall runoff and to reduced transpiration from grass kept short by grazing with increased animals. While reducing runoff is a major component in the improvement, Richard did not comment on the greatest component: the closer plant spacing and the increased, stable litter cover at the soil surface, which is reducing *soil surface evaporation*. Previously when over 90% of the soil between plants was bare, the water loss from surface evaporation would have been in the region of 50 – 80%. Now most rainfall is effective as it no longer evaporates from the bare soil between grass plants. (I emphasize the area *between* grass plants because so many are fooled when they view a grassland by looking across it instead of straight down, when the amount of bare ground becomes obvious). The group saw the property at the end of the rains when grass plants are beginning to be grazed down on a significant scale because growth and transpiration is ending. Had they observed throughout the growing season when grass plants are transpiring heavily, they would have found that despite the 400% increase in cattle and goats, very few plants were ever grazed down and those that were re-grew rapidly as overgrazing of plants is minimized through planned grazing.

Richard comments a great deal on the new concept of the "brittleness scale" but sees little use for it in range management because he does not see how it assists planned grazing. Richard feels some sort of scale of productivity would be better suited to grazing planning. This is an understandable error, given such a brief exposure to Holistic Management. The brittleness scale is not used in planned grazing at all and was never intended to be. Allowing for and adjusting for productivity of each and every grazing area or paddock is, however, a major component of holistic planned grazing. There is no need to develop any scale of productivity as Richard suggests because great productivity detail emerges for each unit of land from proven offtake by animals (animal days per acre/hectare) every season. This, as we learned from the Charter Trials in Zimbabwe over thirty years ago, is far more accurate than any research technique yet developed and the data is gathered routinely at no cost (money or time).

The brittleness scale is used mainly to diagnose the land's condition and determine how best to modify it to produce the result you want. For example, faced with severe erosion, flooding, drought and brush encroachment, when managing holistically we would want to learn the likely cause or causes before taking any action. This would be done through what we call a structured diagnosis in which the brittleness scale plays an important role along with a greater understanding of overgrazing of plants, partial and total rest, primary effects of fire and so on. Not doing this leads to millions of rands being squandered on addressing symptoms as we see in conventional range management. This is why soil erosion, droughts, floods and brush encroachment are generally getting worse since the

development and adoption of “range management” in South Africa, the U.S. Australia and many other countries.

Richard reports no improvement on shallow, arid, poor soils “because they are still dominated by annual grass species.” In fact, training sites on the ranch that were used for years on such soils had to be abandoned when dense-growing annual grasses covered the bare ground following treatments with “herd effect” and planned grazing. These sites are now gradually shifting back to perennial grasses, which we know they were historically because of the fire scars on the trees. A major reason for the slow progress, which Richard correctly observed on the poorer areas, is because when managing holistically all decisions need to be simultaneously economically, socially and environmentally sound short and long term. To focus attention on the poorer areas would not meet such criteria. Most ranchers, intent on remaining profitable, would understand this need to have more productive areas generate income to gradually improve all areas. This is one reason why a study by Ohio State University of early adopters of Holistic Management across the U.S. found they averaged 300% more profit.

To support his view that holistic planned grazing will not improve poor shallow soils, Richard quotes a paper by Burgess that states Holistic Management did not lead to improved rangeland on poor soils in the US. Burgess studied various properties using rotational grazing in a radial cell layout which, although borrowed from Holistic Management, is not Holistic Management. Burgess, like Briske et al, who also condemn holistic planned grazing, never made any attempt to study it. These researchers are entirely correct in stating that rotational grazing does not improve such situations but they are unethical in attributing such failure to holistic planned grazing (which they did not study). Many researchers confuse rotational grazing and holistic planned grazing although they are virtually opposites as the book cited explains in detail.

Finally, Richard states that I personally am against fire. I am not against any management "tool" – technology, fire, rest, animal impact or grazing – as each can only be assessed in a context. We use fire on Dimbangombe to create firebreaks and to backburn. And we will use fire at any time that it passes testing – simultaneously economically, socially and environmentally sound short and long term toward what we are striving for. Richard is correct in that right now we use no fire and go to great lengths to exclude it because there is nothing fire can do that we cannot currently do better with animals. Where animals, by maintaining grass vigour, help sequester both carbon and water in our soils, a one and a half acre fire produces more, and more damaging, pollutants than 4,000 cars per second, while exposing soil to water runoff and evaporation.* Yet for far too long the idea of using herbivores under planned grazing to keep grass vigorous has not been acceptable to researchers.

Finally, what are the paradigms of range science that Richard says are challenged by my work? Since he doesn't elaborate, I would like to. They are:

1. Overgrazing is due to too many animals and is controlled by limiting animal numbers and amount of grass offtake.
2. Resting rangelands is beneficial to their health.

3. Land can be overgrazed; and land can be managed.
4. Plants compete with one another for water and nutrients and some oust others that are less competitive.
5. Droughts are best planned for by reserving grazing areas to utilize when there is a drought.

These are generally myths, unsupported by any research I'm aware of, and are all dealt with in detail in my book (cited earlier). Here I will cover them very briefly.

1. The research, and thus the science, is clear. Overgrazing is a function of time of exposure and re-exposure of grass plants to severe grazing. This was discovered by a French pasture scientist (Andre Voisin) over fifty years ago but ignored by range scientists. So deep, however, is the myth that despite thousands of PhD dissertations and papers no range scientist I know of has ever defined overgrazing simply because all knew it was due to too many animals.
2. Resting land varies in effect across the brittleness scale world wide. Toward the low end (perennial humidity of atmosphere and soil) it is the most powerful tool known to us to restore biodiversity and land health. As any environment shifts across the scale toward the higher end (erratic humidity in soil and atmosphere), the effects of rest (total rest or partial rest – animals present but in low numbers with little “impact”) becomes increasingly adverse for perennial grasslands. Again the research and science is clear, based on the work of S.I. McNaughton and others as well as many protected (from animals) plots studied world wide, but the myth prevails in range science.
3. Range scientists talk and write of overgrazed land. Only plants can be grazed and browsed or overgrazed and overbrowsed, but not land. The distinction is important since many of the world's rangelands include overgrazed plants on overrested soils, when they could be grazed or overgrazed plants on periodically-disturbed healthy soils.
4. Plants can be said to compete with one another when viewed at the species level. But when viewed at the community level this changes. Plants, animals and soil life in communities function as wholes of great synergy and complexity. Species will even speciate to avoid competition. In an effort to reduce the numbers of a species “outcompeting” a more desirable one, US officials spend over \$300 million every year to poison the noxious invaders, and they have been doing so for over 30 years with little impact. People on the same rangelands managing holistically have solved the problem at no cost by simply changing the circumstances that result in a particular plant filling a major vacuum and dominating the community.
5. The belief that droughts are best planned for by reserving areas of land ungrazed in case of drought is another costly and destructive myth. Droughts planned for in terms of time rather than area (i.e., number of *days* of grazing preserved spread over an entire ranch) result in far higher production of the animals and the land every season – drought or no drought – with far less risk. Range science drought planning actually increases the danger of drought while decreasing the production (on both animals and plants). Despite great increases in livestock numbers it is

rare indeed for any rancher practicing holistic planned grazing to have to destock in dry years.

Clearly not all range scientists will agree with the above for some years to come, and my own views change as new knowledge emerges, but at least, thanks to Harry Biggs, Richard Fynn, and the others in the group, the door that was slammed shut forty odd years ago has been opened and we can begin learning with and from one another.

Allan Savory

* Michel Brustet, Jean Bruno Vickos, Jacques Fontan, Alain Podaire, and Francois Lavenu, "Characterization of Active Fires in West African Savannas by Analysis of Satellite Data: Landsat Thematic Mapper," in *Global Biomass Burning*, Joel S. Levine (ed) (Cambridge, Massachusetts: MIT Press, 1992), 53-60.