

Special Report

COWS CAN SAVE THE WORLD

I write to offer a constructive way forward in the tragic cultural genocide unfolding in America's wonderful western ranching culture that is embedded in the nation's culture.

I do so knowing the risks of trying to help a lion by operating on a back molar in its jaw.

By Allan Savory

The recent *RANGE* article featuring Nevada rancher Cliven Bundy (whose cattle were taken from his southern Nevada range by the BLM backed up by SWAT teams) typifies the western ranching cultural genocide taking place. It is a tragedy based on deeply held myths and assumptions rather than on any known science.

No publication has done more than *RANGE*, valiantly fighting for fairness and the rights of ranchers in the protracted rancher-federal agency war over western public lands. When decent human beings—including ranchers, environmentalists and government land managers who are doing the best they can—all want healthy land with abundant wildlife, flowing rivers, stable rural families and communities in a healthy thriving nation, solutions and collaboration are needed instead of conflict.

How easy it is to draw our swords and yet how difficult it is to re-sheath them. So let me start with a point that I believe all parties can agree upon: management including policy should be based on science rather than on emotion, belief and assumption. With that in mind, let's look at the current situation. Because the ultimate form of land degradation is man-made desert, I will use the official jargon and call the process rangeland desertification.

Desertification typically does not occur where precipitation and humidity are fairly well spread throughout the year, as in many coastal areas like Florida and Washington. However, most western rangelands experience long dry periods whether rainfall is high or low and here desertification occurs on both private and public lands. The symptoms of desertification are: increasingly frequent and severe droughts and floods, poverty, social breakdown, mass emigration to cities or across borders, decreasing wildlife, pastoral culture genocide, and violence and conflict. Most of these are being experienced in America today despite the good intentions of both ranchers and policy-makers.

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Barefoot Allan watches herders move the cattle, sheep and goats as one land- and wildlife-management herd. Such herd moves have been planned months in advance using Holistic Planned Grazing. BELOW: Bunched cattle managed well result in a healthier biodiverse resource.

Public Belief

Scientists advising U.S. lawmakers are employed by institutions, universities, government agencies, and in some cases large environmental nongovernmental organizations (NGOs). Universally they advise strict controls on livestock numbers to prevent desertification caused by overgrazing. Some special-interest groups desire the complete removal of domestic livestock from public lands. Institutional beliefs always reflect the society, so let's begin with what the public believes: (1) The western rangelands are deteriorating (desertifying) because there are too many cattle; (2) Riparian areas important for wildlife and aesthetics are damaged by cattle; (3) Finishing cattle with corn in factory feedlots is inhumane and leads to excessive water use, pollution, diversion of grain from human use, and excessive use of antibiotics resulting in superbugs; and (4) Cattle are responsible for climate change through methane emission.

About 35 years ago I wrote an article entitled "Ranchers may have to go but their cattle will need to stay." That is still true today. Ranchers are losing the war against policies, laws and regulations founded on public perception, and America is losing generations of ranching families and their communities. The ulti-

mate tragedy will occur when science prevails over beliefs and government agencies eventually have to run millions more cattle on these lands to reverse the desertification process. To prevent such tragedy we need to

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collaborate based on science and common desire now.

Having trained thousands of officials in policy development, I've learned that there is only one reason policies are developed and that is to address a perceived or actual problem. Range management policy is made to address the problem of widespread range degradation or desertification. Political and economic power has shifted to cities and politicians who do not know what to do are advised by experts (often by academics and civil servants) and are influenced by pressure-group lobbyists. It is the deep beliefs of such institutional professional advisors as well as lobbyists that determine policy. So it is those beliefs about the cause of desertification that we need

to look at and understand.

Desertification is the result of noneffective rainfall, a term I coined 50 years ago when my country's government in Rhodesia (now called Zimbabwe) proclaimed a severe drought when, as a government researcher, I had observed it was the sixth highest rainfall ever and that Mozambique, lower on the same river system, was suffering severe flooding. Clearly something was askew.

Noneffective rain flows across the soil surface or evaporates from exposed soil surfaces, leading to drought and/or floods. Effective rain soaks into soil and only leaves it by flowing through the soil to rivers, wetlands or underground aquifers or into growing plants. For years I demonstrated the effectiveness of rainfall to ranchers by pouring a set amount of water on different condition land and timing its disappearance. A recent YouTube video by NRCS (<http://youtu.be/IqB4z7IGzsg>) provides the best demonstration I have seen of rainfall infiltration. Rainfall was absorbed 42 times faster on healthier rangeland and 181 times faster than on cropland.

Desertification results when land management increases the amount of bare soil. Keeping soil surfaces covered with plant life and dead plant litter is critical to increasing the effectiveness of precipitation

(either rainfall or snowmelt). If just one inch of rain was made more effective in New Mexico where I live part time, it would be equivalent every year to three full dams the size of Elephant Butte, New Mexico's largest dam. Such water accumulating in soil annually, as it formerly did, explains how early Americans enjoyed an irrigation-based civilization in New Mexico in what is today virtually desert.

Stocking Rates

Does enforcing the "officially correct" stocking rate through policy lead to healthy, vibrant rangelands? Let's look at the evidence.

If lower stocking rates prevent overgrazing, then no grazing should be ideal, as some lobbyists desire. Chaco Canyon National Park in New Mexico had livestock removed about 80 years ago and with no overgrazing of any plants the situation got worse. (See photo at right.)

There are many examples of active desertification in government research plots across western U.S. rangelands that were established to provide evidence that removing livestock would solve the problem. All plots that I have inspected—together with government officials and land-grant faculty—show less effective rainfall and thus desertification. In more than 60 years of research, neither I nor any collaborating scientists have found any evidence to support the idea that controlling livestock numbers prevents desertification.

Let's look a bit deeper into the stocking rate/overgrazing relationship. We believe overgrazing is caused by too many animals on the land and that overgrazing causes desertification. This ancient belief is so deep in society that it has assumed institutional scientific validity. Reading thousands of dissertations and papers, I have not found a single one that defined overgrazing. No one would define what everyone *knew* was a fact.

Fortunately, 60 years ago, a French pasture scientist named André Voisin discovered that overgrazing had nothing to do with animal numbers. Plants were damaged if grazed too frequently, but when grazed infrequently they thrived. Time of exposure and reexposure to grazing and *not* animal numbers governs whether plants are overgrazed or not. Published in four major languages and never refuted, the science has been clear for a long time but institutional belief in western land-grant universities



PHOTOS © ALLAN SAVORY

Severe desertification in Chaco Canyon National Park in New Mexico. No livestock have been on this ground for 80 years. With no overgrazing or grazing of plants desertification is as severe as anything in Africa.



Oxidizing dying grassland in Aldo Leopold Memorial Forest on the Rio Grande River in Albuquerque, N.M. The grass plants providing most soil cover in seasonally dry regions such as western rangelands are conspicuous by their absence and those few still existing are largely dead, black and breaking down chemically (oxidation). Fifty or more species that should be here have died out along with most wildlife. If Leopold were alive today, he would be horrified to see a riparian forest desertifying in his honor. But thousands of people trail through this nature preserve every year, blindly believing all such conservation is good and has to be the best nature can do.

training policy advisors did not change.

This now poses the question, why does stopping any overgrazing by removing livestock cause severe desertification? If our beliefs are correct, then no overgrazing at all should not result in desertification. However, it does, even in riparian areas close to water. I live a quarter mile from the Aldo Leopold Memorial Forest on the Rio Grande River. Thousands of people visit this commemoration of Leopold and his land ethic. Because

of beliefs, what the public and the endorsing organizations are blind to is the health of the land desertifying, as you can see in the photo at left.

Far From Pristine

Complete removal of grazers accelerates desertification because two things happen. First, most or all aboveground stems and leaves of perennial grasses die back every year. Unlike trees that also have leaf turnover, grasses cannot shed dead leaves and stems. Over millions of years such grasslands—soil life, plants, grazing animals and their predators—developed together in an amazing

symbiotic relationship. The grasses needed animals grazing, trampling, dunging and urinating just as much as the animals needed plants. Past numbers of animals are today unimaginable to us. Early pioneers like Lewis and Clark wrote of millions of bison, but those were only remnants of past species and numbers. What Lewis and Clark described as pristine land was far from pristine.

Perhaps there is another reason society could not see such obvious desertification



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ABOVE: On the left side of this fence, the Navajo land is said to be abused and overgrazed by the very few Navajo sheep present. The national park wilderness land on the right has been managed to the best of western scientists' knowledge with no plants overgrazed and total rest of the land from livestock for 80 years. These two totally different treatments offer the same result—desertification. Excessive rest—partial on the left and total on the right—is the dominant influence leading to such severe desertification. Partial rest is what occurs over most U.S. rangelands—too few animals not functioning with moving herd behavior as they evolved to do in symbiotic relationship with soil life and plants.

providing very high periodic animal impact—trampling, dunging and urinating—to keep plants alive and soil surfaces between plants covered. Because this was a new concept—land with animals grazing but overrested—I had to give it a name and called it partial rest. Partial rest—animals on the land grazing but in such low numbers and scattered that the bulk of the land rested—is the norm on both public and private land consequently desertifying. And as we have learned such partial rest is almost as damaging as total rest as we see in Navajo fence line photo at left.

Over thousands of years humans learned they could keep grass plants alive by annually burning off the dying leaves and stems. Today we call this “prescribed fire” because scientists approve of it. This clears the way so adequate sunlight can reach growth points.

conflicting with beliefs. Most of America's 350 million people live along the East and West coasts where there is more evenly distributed humidity. In these regions biological decay of annually dying aboveground grass leaves and stems is rapid enough to prevent dead plant material oxidizing in sunlight leading to soil exposure between plants. In such environments, resting the land is the most powerful thing we can do to restore biodiversity and full functioning of our environment.

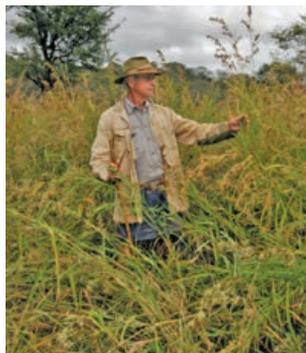
Gradual oxidation weakens and kills most perennial grass plants because it prevents adequate sunlight from reaching growth points at ground level. This is out of harm's way from grazing animals the plants evolved with symbiotically. Dying leaves and stems need to decay before the next growing season, clearing the way for sunlight to reach growth points. As grasslands weaken, nature strives to fill a vacuum so the community shifts generally to taproot plants—weeds or forbs, shrubs and trees if rainfall is high enough, or algae/lichen crusts and desert bushes where rainfall is lower. All too often the plants with which nature is trying to fill the vacuum are institutionally called noxious or invasive.

In summary, oxidation of perennial grasses must be prevented in seasonally dry environments. When either ranchers or policy-makers reduce animal numbers to try to



COURTESY GRANT KNIGHT, SOUTH AFRICAN NATIONAL PARKS

Tree planting with drip irrigation in the United Arab Emirates cost \$30 billion for one percent of its land but desertification continues unabated. No amount of planting trees or grasses can replace the role of animals in maintaining biological decay essential to grass plants to address desertification. BELOW: Allan in dense grassland along river resulting from increasing cattle greatly with Holistic Planned Grazing.



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prevent overgrazing of plants, it not only fails, but it leads to more plants oxidizing and dying. This is why vast areas of rangeland from western California to East Texas and from Mexico to Montana are dominated by rest-tolerant grass species of low productivity and not the highly productive soil-building, animal-dependent grasses of the past.

Today rangeland as a whole is overrested. This is because there are not enough herds

However, fire, no matter how expertly prescribed, also burns the plant material needed for soil cover so rain becomes less effective, advancing desertification. Fire also puts enormous amounts of pollutants into the atmosphere and leads to a plant community dominated by plants dependent on fire providing the optimum microenvironment for seedling establishment.

Because the belief that grasslands need fire to thrive is as widespread as our belief that overgrazing is caused by too many animals, let's look at an example of a grassland kept alive using fire instead of animals. The picture (p. 45) is a grassland in South Africa in a seasonally dry environment that has very

few cattle on it each year. The average annual precipitation is about 21 inches and it undergoes periodic burning to prevent it from shifting to woody plants and weeds. The extensive flooding seen below in Kruger National Park results from the runoff of rainfall from such extensive “excellent” grasslands in the upper river tributaries.

Clearly using fire in order to keep seasonally dry grasslands alive is a major contributor to decreased effectiveness of rain and thus desertification, although it does remove the dead slowly oxidizing plant material keeping most grass plants alive.

What other tools do we have to prevent oxidation in such grasslands? Resting the land partially by reducing livestock numbers leads to the problem and fire exacerbates it although often reducing woody plants. We have only technology left for us to use in its many forms—chemicals, piping water, machinery, etc. As a consequence, a great many technological interventions have been tried involving billions of dollars in costs.

The United Arab Emirates has done an amazing job of tree planting with drip irrigation and desalination of sea water, spending over \$30 billion on one percent of its land, but the desert simply keeps advancing (see photo at left).

In Israel, in the largely man-made Negev Desert, government policy enforces reduction in the ancient pastoral Bedouin tribe sheep numbers. To compensate for lost livelihoods Bedouin men are paid an allowance based on the number of children they father and families are being settled in constructed towns. I had dinner with the mayor of one of these towns and he told me the average age of his citizens is 12 years, an inevitable result of paying men based on how many children they can father. While removing the sheep the Israelis are spending over 4,000 Euros per acre planting trees with no more chance of stopping the desertification than the UAE.

Over the western rangelands of America state and federal governments have spent uncountable billions of dollars using various machines and chemicals to no avail. I am afraid no technology can ever replace biological decay every year over billions of acres.

What then can be done to manage our public and private lands to regenerate the land, rivers, aquifers, wildlife and rural communities while preventing Bundy-type armed conflicts? After all, this is what all Americans want.

“Habits of thought are even more tyrannous than habits of the body. They make for the masses of men a mental atmosphere out of which they can no more rise than out of the physical atmosphere.”

—HENRY GEORGE, 1878



PHOTOS © ALLAN SAVORY

This would be considered an exceptionally good grassland, far better than on most private and public land. However, the cancer of desertification begins with the soil surface between plants. The soil cover in this “excellent” grassland in South Africa shows that it is bare and exposed between plants (BELOW LEFT). It is covered with a crust almost as hard as concrete reducing rainfall infiltration into the soil resulting in high runoff of water and also evaporation from the soil surface. BELOW RIGHT: The extensive flooding seen below in Kruger National Park results from the runoff of rainfall from such extensive “excellent” grasslands in the upper river tributaries.



Time to Regenerate

We have to recognize that it was not livestock causing the problem; it was the way we managed them for centuries. And it is our management that has to change on private and public lands. Parts of our 400 million acres of public lands are in reasonable condition where humidity is better distributed. Unfortunately, most public lands lie in regions of long dry periods and often low rainfall. That public lands like the Aldo Leopold Memorial Forest are in generally worse condition than most private ranching land is because of the strict policies institutions place on animal

numbers leading to greater rest and thus desertification.

When I first questioned the effectiveness of management methods 60 years ago, I struggled because of my university training as an ecologist. As Henry George said in 1878: “Habits of thought are even more tyrannous than habits of the body. They make for the masses of men a mental atmosphere out of which they can no more rise than out of the physical atmosphere.”

I used to detest domestic livestock because I was trained to believe they caused desertification, and it was after all “so obvi-



Tony Malmberg ensuring land is not partially rested to deteriorate by concentrating his cattle while in a large paddock on the ranch in Wyoming. The moves of this herd are planned on a grazing chart months in advance, always ensuring plants are not overgrazed while the land is heavily impacted by the animals with their hooves, dung and urine to lead to healthy rangeland.

ous.” In the 1960s, realizing there was no option but to learn how to use livestock properly managed to reverse desertification, I faced a dilemma. How do we do that? No one knew how it could be done. For thousands of years, ancient pastoral tribes had bunched and herded their animals with great knowledge of the land. That had resulted in the great man-made deserts of the biblical lands right across North Africa to India and China. Then we had the development of modern range science limiting stocking rates and designing many rotational and other grazing systems. But these, as we first observed in Africa then confirmed in America, accelerated desertification where grasslands had long dry periods.

Voisin had provided a clue from his research highlighting why rotational grazing, although not leading to desertification in the more humid environments, was producing such poor results in Europe. He had concluded that some form of planning process was needed to replace all rotational and other grazing systems and he developed Rational (not rotational) Grazing—a process of planning grazing using maps and calendar with timing based on recovery periods rather than grazing periods.

I tried Voisin’s Rational Grazing on ranches in Africa but ran into problems in the more seasonally erratic environments

and greater diversity of plants and animals including wildlife. Fortunately I realized Voisin was not wrong, but that rangelands needed a better planning process that could handle greater complexity. I began looking at other professions eventually discovering what I sought in Britain’s Sandhurst Military Academy where they had built on centuries of experience in planning whilst in the chaos of intense battlefield situations. Adapting their planning processes required hardly any change but there was another problem. Battles last a short time while ranchers have to plan for months and years catering to different seasons, different soils, erratic rainfall, wildlife, crops, different types of livestock, other uses on the land, and more. This was solved by planning on a large chart on which several dimensions of time, area, number of animals, wildlife needs, cropping, etc., could all be plotted, and then finally the moves of the livestock could be plotted to get the animals in the right place, at the right time, for the right reason, and with the right behavior to affect plants and soil life. Today we are training illiterate people in Third World countries to do this planning.

Holistic Planned Grazing

Over the years I was able to develop what today is known as Holistic Planned Grazing. This is a profoundly simple but thor-

ough decision-making and planning process that uses currently known science to ensure that the full complexity of people’s culture, the environment, and economy are addressed, and in which cattle and other livestock are used as the main tool to regenerate the land, river flow, aquifers and wildlife. This is described in my short book “The Grazing Revolution,” available from Amazon for \$1.99.

Holistic Management involves the overall management of complexity in any situation—from the ranch to government policy level—using currently known science in place of beliefs. Then if livestock are needed to regenerate the land, the Holistic Planned Grazing process is used to accomplish that. Once the holistic framework was in place in 1984, results became consistent and replicable and the practice has now spread to about 50 million acres on six continents. As usual not all including myself do things as well as we would like, but as long as people are using the holistic framework to guide management, improved results show within days to months. Today data are pouring in from many ranchers and scientists in universities, government agencies, and environmental organizations, all collaborating globally in an expanding network of locally led and managed learning and training hubs affiliated through the Savory Institute.

In short, we have known how to regenerate the land reversing desertification since 1984 and have not experienced any failure in any country where the process is practiced. So why is adoption by political policy-makers and government agencies so slow?

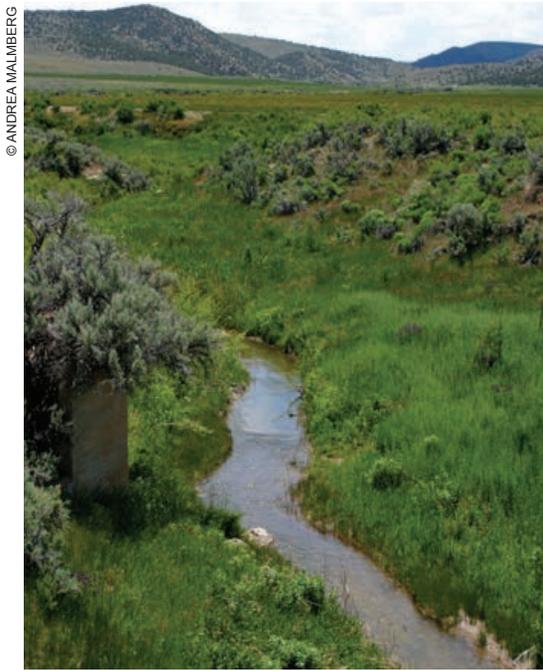
During the early 1980s, two far-sighted, caring Soil Conservation Service officials in New Mexico—Don Sylvester and Ray Margo—persuaded the USDA to establish an Interagency Committee that engaged me to provide training in Holistic Management. In all, some 2,000 officials, scientists and academics participated from the Bureau of Land Management, U.S. Forest Service, Bureau of Indian Affairs, Natural Resources Conservation Service, U.S. Fish & Wildlife Service, World Bank, U.S. Agency for International Development (USAID), and from western land-grant universities. They went through a week of training learning to use the holistic framework in management and policy, bringing hundreds of their own policies on which to work. They discovered that every one of their policies was addressing symptoms and thus likely to fail and lead to unintended consequences. One group in training made a unanimous statement that I recorded: “We can now see that unsound resource management is universal in the United States.”

I was in discussion with USDA to train more than 15,000 officials when further training was banned by the newly appointed chief of the Soil Conservation Service, Texas rancher Wilson Scaling. Members of the Interagency Committee told me they were powerless to prevent the ban and appealed to me to keep the work alive because they considered it “vital to the future of the United States.” I mention this history because bureaucrats are often vilified as much as cattle are and I have found individuals as caring and concerned as any rancher.

Systems Science

To understand this behavior, I began studying research in fields other than ecology. From systems science, social research and history I learned that this was normal institutional behavior that has not changed since Galileo’s time.

Systems science recognizes different systems. “Hard systems” are everything we make from the clothes we wear to space exploration vehicles, our magnificent cities, bridges, planes, computers and more. Hard systems involve the use of technology in



Same creek in a sagebrush steppe environment taken moments apart from a bridge. The left side is managed holistically and has an estimated 250 percent more stocking rate than the land on the right. **BELOW:** Overnight lion-proof kraal where 500 head of cattle are held each night for a week before the kraal moves with the constantly moving cattle. When placed on crop fields, such kraals lead to great increases in production.



some form and they do what we design them to do. If parts are broken or batteries are flat they do not work because they are not self-organizing. They do not do unexpected things or have what are called unplanned properties. When problems do occur they are relatively easy to solve and are called “kind problems.”

Then there are “soft systems” and these are human organizations—cattlemen’s organizations, universities, government agencies, NGOs, churches, etc. These generally do what they are designed to do efficiently. They work if people are missing because they are self-organizing. They also have “unplanned emergent properties,” meaning they do things we do not expect and cannot anticipate. When problems occur they can be almost impossible to solve and are called “wicked problems.”

Lastly, there are “natural systems” that have similar characteristics to soft systems except they are not designed or made by

humans. Nature is the best example.

Let me now pose some questions which may seem unanswerable because they involve unplanned, emergent, wicked problems. No organizations are immune. Why after many people in government agencies and universities helped develop Holistic Management, and there was high demand for further training, did the USDA ban further participation? Why are we still seeing such things as the BLM bringing in SWAT teams to enforce destocking? Why, when thousands of professionals have known for years that management policies are unsound, are we still spending over a billion dollars every year to eradicate noxious plants when not a single species has ever been eradicated over 50-odd years? Why are government policies causing increasingly severe droughts and floods when we have known for years how to reduce them using properly managed livestock? Why is such slowness for policies to change costing American taxpayers many billions of dollars annually internally and in USAID and foreign policy? Who is being evil, who is being bad or has any ill intent? No one.

The answer to these questions is found in wicked problems of soft systems—our essential institutions. I believe it is time to begin understanding wicked problems affecting cattlemen’s organizations as much

as government agencies, universities and environmental organizations.

The first wicked problem is that organizations are not able to adopt new counter-intuitive scientific insights ahead of public opinion. No amount of data, proof, evidence, money spent, or how many people dying will bring about institutional change until a significant level of public opinion changes.

Organizations reflect public opinion. When that changes, organizations change. This is obscured because organizations tend to lead in adopting new ideas not conflicting with public perception—hence they have the latest technology, computers, software, etc. American universities led when they developed giant machines to mimic animals to reverse desertification because the public believed in technology. Governments spend vast sums using technology without question because everyone believes in technology. However, organizations lead the opposition and ridicule when new paradigm-shifting scientific insights occur. This is why not a single cattlemen's organization has ever supported Holistic Planned Grazing any more than government agencies could.

Checking the Past

Let's look at historically documented cases. Britain's Royal Navy, led by brilliant minds, did not officially accept that lime juice would end scurvy until 200 years after it was first demonstrated by James Lancaster while this was vital to Britain's empire. All this while many ships' captains began changing individually. A million sailors died. The institutional persecution of Galileo is history as is the persecution of the Hungarian doctor Ignaz Semmelweis who, before bacteria were known to exist, discovered that washing his hands after cutting up corpses and before going into maternity wards saved women's lives. He was persecuted by his institutional peers and died in a mental asylum.

No organizations are immune to this tragic wicked problem of complex soft systems. Thousands of decent people in government agencies and environmental

If we are to end the senseless conflict between government agencies enforcing flawed policies on ranch families, two things will be needed. First, a shift in public perception from blaming livestock for causing the degradation of public lands to blaming management by ranchers and government agencies through flawed policies, laws and regulations. In fact, it is time to end the blaming, period.



Allan with wife, Jody Butterfield, in Zimbabwe. After decades of work, he finally got it right.

organizations all want healthier land, thriving communities and abundant wildlife but they are powerless to change their organizations ahead of a shift in public opinion. I have not been able to find a single case in history where new insights have been institutionally accepted ahead of a significant shift in public opinion. This was further con-

firmed for me when I achieved more in a 20-minute TED talk going viral to shift public opinion to accepting that management not livestock is the cause of desertification than I and thousands of others were able to achieve over 50 years of struggle against institutional rejection of the same idea.

If we are to end the senseless conflict between government agencies enforcing flawed policies on ranch families, two things will be needed. First, a shift in public perception from blaming livestock for causing the degradation of public lands to blaming management by ranchers and government agencies through flawed policies, laws and regulations. In fact, it is time to end the blaming, period. Just as fast as public perception can change, so too can cattlemen's organizations and government agencies, so what change is needed? First, that without using livestock properly managed the regeneration of public lands cannot take place using all the technology even imaginable. Second, policies resulting in legally enforced management need to be developed holistically, embracing science.

As soon as public perception shifts significantly, we will see institutions change. Then policies that achieve almost 100 percent public support will no longer address only symptoms, but the real causes of desertification. When this milestone is reached, ranchers, agencies, and environmental organizations will no longer waste billions of dollars annually but will be collaborating in the rehabilitation of public lands. ■

Allan Savory lives in Albuquerque, N.M., and near Victoria Falls, Zimbabwe, Africa. He gave six talks in California last spring: "In several I made it very clear and unarguable scientifically that only cattle and other livestock properly managed can now save civilization as we know it. I also made it clear that vegans are welcome to be vegans if they believe it good for their health or for religious reasons. But if they are doing so for ethical or environmental reasons they are unintentionally doing great harm and endangering humanity." To contact, go to www.savoryinstitute.org or www.achmonline.org.

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