SRM Society for Range Management

Native Science: Understanding and Respecting Other Ways of Thinking

By Linda Black Elk

On the Ground

- Over generations, Native Americans have developed a timely and reliable knowledge of the land, its processes, and its management needs. This knowledge has been referred to as *Native science*.
- Native science employs many concepts such as observation, background research, and experimentation familiar to non-Native researchers and recognizes the interconnectedness of science. Good rangeland management also requires recognition of interrelatedness.
- If we are open to it, Native science can give us new ways of looking at the landscape and all that it has to offer in terms of chemical, physical, and ecological processes and communities.

Keywords: Native science, respect, holistic, scientific method.

Rangelands 38(1): 3–4
doi: 10.1016/j.rala.2015.11.003

As a Native American ethnobotanist and plant ecologist, I find healthy rangelands to not only be economically and environmentally important, but also culturally and spiritually significant. These lands are central to the lives of Indigenous peoples, and they have been so for millennia. Over these generations, we have developed a timely and reliable knowledge of the land, its processes, and its management needs. These ideas developed through observation, experimentation, and participation with the natural world.

Some literature refers to this knowledge as *traditional ecological knowledge*, *Native ways of knowing*, or simply *Native science*. Whichever term we use, it is vital to show respect for this information, particularly when working with Indigenous peoples. An appreciation of Native science reflects respect for the people, their protocols, ceremonies, histories, stories, and ecological knowledge. A good researcher should listen to these often varying worldviews and open their mind to the contributions that Native science can make to their research.

It is first critical for researchers to understand that good rangeland management (according to Native science) requires recognition of ecological interrelatedness. This is perhaps best exemplified in the Lakota phrase *mitákuye oyás'iŋ*, which translates literally as "all my relatives." This phrase reflects the belief that we, as human beings, are related to everything and everyone—from huge cottonwood trees to the cool wind, and from barking prairie dogs to the fertile soil. Understanding this concept of interrelatedness can make research a lot more fun and interesting, and our results gain relevancy when our collaborators, our lands, and all of these plants and animals are considered our relatives.

Many researchers are reluctant to consider the contributions of Native science because they do not understand the methodology behind it. However, Native science has at its foundation the very same scientific method that we, as researchers trained in the Western world, all hold so near and dear. For example, The Native scientific method begins with observation. Long-term observational data is nothing new to Indigenous peoples; we have been observing the world around us for millennia, gaining an understanding of its systems and processes. Additionally, Native science is grounded in experimentation. Much of the early literature in anthropology claimed that Native Americans learned everything by trial and error, as if we would test edibility of various berries on any unfortunate soul who came along. Rather, the introduction of new foods involves observation (Have we ever seen other people eat this berry? Other animals?), background research (ask others about this berry), and experimentation (does my tongue hurt or feel numb when I touch this berry to it?). This process could take many months and the results would be shared and replicated throughout the extensive trade routes that once existed between and among tribes.

If all of this sounds similar to the Western scientific method, it is because cultures all over the world have been using this technique of knowledge acquisition since the beginning. There are, however, critical differences between Western science and Native science.

Study Fig. 1. On the left you see a star quilt. The eight-pointed star is an incredibly sacred symbol to many tribes of the Great Plains. It symbolizes life and longevity. This particular color pattern is known is a "sunburst" or "starburst" pattern. Elders say that a Dakota woman created it more than a century ago. The woman claimed that she went to sleep one night and had a dream that she was standing on the

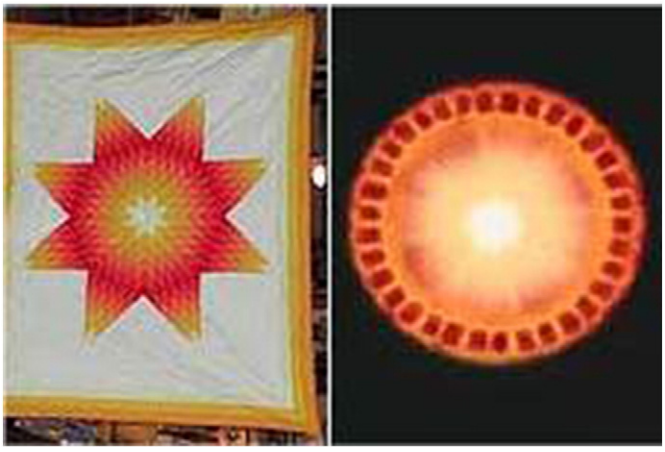

Figure 1. On the left a sunburst quilt and the right a NASA photograph of the interior of the sun. Photo courtesy the National Aeronautics and Space Administration.

inside of the sun, and the sun was giving her power and healing. When she woke, she made this quilt to symbolize what she saw on the inside on the sun. The photograph on the right is a NASA photograph of the interior of the sun.

This image comparison is important because it illustrates that dreams and visions are a valid way of attaining scientific knowledge. For Indigenous and land-based peoples all over the world, dreams and visions have always been an important part of the scientific method. That may sound strange to some, but even Western science recognizes the fact that our minds process things differently when we are asleep and when we are in ceremony. It was the great scientist August Kekule who sat wracking his brain over the chemical structure of benzene. The process was driving him mad until he went to sleep one night and dreamed of two snakes, intertwining head to tail in the shape of a circle. He suddenly woke up and said, "Benzene is a ring!" Dreams and visions are an important piece of the scientific process.

Although many Native American tribes did not possess a written language as we know it today, all tribes have written and oral methods of communicating scientific data. Native science uses stories, songs, ceremonies, and winter counts as part of the scientific journey. Contrary to popular belief, most songs do not consist of some elusive, mystical knowledge. Rather, they are tools for organizing, understanding, and communicating data—knowledge—to future generations.

Native science also differs from Western science in that it is based on participation with the natural world. We do not separate ourselves from the Earth's processes. Also, we do not tend to believe in the concept of complete objectivity. Western science often prides itself on objectivity, but many scientists have long acknowledged a lack of objectivity within their research. 'For example, both Niels Bohr and Werner Heisenberg noted that simply observing an event changes it.' This is an old belief among Indigenous peoples, and many Native scientists prefer to think of themselves as active participants rather than passive observers. One person's observations do not always match another's. Two individuals can look at the same occurrence and describe it quite differently. As a scientist, I value our attempts at being completely objective in my research, but because of my ancestors, I have a healthy awareness of the truth of this situation.

Finally, it is important to remember that Native science does not divide its application into departments. Native science strives for holism in theory and in practice, so it is almost impossible to discuss botany without also discussing zoology, soil science, or climate science. Ecological fields of study are closely related, and problems are solved with a consideration of the big picture. Rangelands are not islands; rather, they are part of a larger whole that must be considered in any decision-making process.

Research on any rangelands can and should be a collaborative, reciprocal process. In particular, when working on or around Indigenous lands, consideration should be made for the traditional knowledge of local peoples. In discussions with locals who have inhabited a particular area for hundreds or even thousands of years, we will find a deep understanding of our surroundings that can enhance our research in a variety of ways. It is obvious that, if we are open to it, Native science can give us "new" ways of looking at the landscape and all that it has to offer in terms of chemical, physical and ecological processes and communities.

Acknowledgment

Research was partially funded by a NIFA-AFRI Grant Opportunity Number USDA-NIFA-AFRI-003041. For more on Native Science, see Dr. Gregory Cajete's book: Native Science: Natural Laws of Interdepedence.[1]

Reference

1. Cajete, G. 2000. Native science: Natural laws of interdependence. Santa Fe, New Mexico, USA: Clear Light Publishing.

Author is Science Educator and Ethnobotanist, Sitting Bull Tribal College, Fort Yates, ND 58538 (linda.blackelk@sittingbull.edu).