Sustainable Agriculture

I. The Role of Grazing Sheep

by Donald G. Ely

Many descriptions have been developed for "sustainable agriculture". In reality, it is simply a collection of agricultural production practices which can be continued over a relatively long period of time (a decade, a career of a producer/farmer/rancher, or for generations). It must provide long-range profitability, as well as the most often discussed long-range maintenance and improvement of soil while minimizing the undesirable effects of erosion on water and air quality. As sustainable agriculture addresses a concern for the environment, the increasing world human population will take precedence because humans must eat to survive. Future food will be produced within an environment that will always be altered, whether it comes from agricultural lands, the ocean, or the chemical laboratory. It seems, then, that profitable production of high quality and quantity of food, with minimum environmental impact, should be the goal of sustainable agriculture.

Soil is deemed the focal point in sustainable agriculture. Although fossil fuel energy use, application of conservation tillage, fertilizer use, systematic crop diversity, pesticide use, weed control, crop residue use, nutrient cycling, animal/poultry integration, waste management, and water quality are important in sustaining agriculture, all are directly, or indirectly, related to the soil. Sheep are opportunistic creatures relative to the harvest of solar energy that is contained in the biomass produced from the soil. Yet, they are synergistic in their abilities to convert forage into quality products for human consumption. Enhancing the efficient use of solar energy, recycling nutrients to the soil, use of noncompetitive renewable resources, contributing to soil and water conservation, low capital investment requirements, and adding enterprise flexibility are favorable characteristics of forage farming/ranching with sheep. These environmental and economic attributes are not new. In fact, they have sustained since sheep were discovered as a food and fiber source some 11,000 years ago. However, as history has progressed from domestication through the organic chemistry age to sustainability, certain myths have evolved regarding sustainable agriculture. Some of these follow:

1. **Commercial farmers/livestock producers are only interested in maximizing profits in the short run.** Although this may be true in some cases, generally, farmers work to increase net worth for a long period of time so the farm value can be transferred to the next generation.
2. **Sustainable agricultural practices always demand less use of chemical fertilizers, pesticides, and herbicides relative to "nonsustainable production practices".** In contrast, sustainable practices may use the same amounts

of chemicals, but use them more strategically so less harm comes to the environment.

3. **Production practices that use no purchased inputs are sustainable and will not harm the environment.** Conversely, application of animal waste can pollute ground water just like commercial fertilizer. It is the amount and time of application of both that determine if either will harm the environment.
4. **Producers who adopt sustainable agricultural practices are the same as organic producers.** Instead, these are two different producers. Organics may not use commercial fertilizers, pesticides, and herbicides at all as sustainables may strategically use reduced amounts of these commercial products.
5. **Most commercial producers are opposed to sustainable agriculture and are unconcerned about the environment.** In real life, producers are probably more aware of and have more concern for the environment than non-producers because their livelihood depends on the benefits of nature.

Although these myths apply to all aspects of agricultural production, an analysis of sheep production systems reveals that sustainable practices have been used, are currently being used, and will likely continue to be used in the future to maintain soil integrity and environmental quality.

Sheep possess exceptional abilities to transform a wide variety of feedstuffs, produced in many ecosystems, into high quality products for human use. Arid, hilly, and mountainous areas of the world preclude cultivation and crop production, but sheep can convert the vegetation of these areas into meat, milk, and fiber. Improved grasslands and cropping areas integrate sheep into the overall system to use crop residues and maintain soil fertility. The grazing habits of sheep are often maligned as the primary cause of denudation and erosion of vegetated land, probably because the land was overstocked. Overstocking low-growing legumes, weeds, and browse, which can be grazed close to the ground at repeated intervals, is a sure-fire method of denudation and erosion. In actuality, sheep readily consume weeds in improved pastures, increase the uniformity with which grasslands are grazed because of their ability to negotiate steep terrain, and reduce losses of other animals grazed with sheep because plants toxic to other animals can be safely consumed by sheep. The natural characteristics of over a billion sheep in the world and the diversity of their function, adaptability, and performance have allowed them to provide food, fiber, leather, and pharmaceuticals for millions of people in the world for thousands of years.

Sheep can serve as scavengers on many farms and contribute to a reduced need for organic herbicides through their appetite for weeds. Lambs can be "finished" to optimum slaughter weights from crop residues, spring growth of cool season grasses, and winter small grain pastures with minimum or no energy or protein supplementation. Compared with beef cows that produce 60% of their weight in offspring annually, the ewe can produce 150%. For every 22 lb of pasture forage consumed by ewe/lamb combinations,

News to Ewes continues on pg. 24

News to Ewes continued from pg. 23

1.0 lb of lamb is produced for human use. It is the unique grazing behavior of sheep that allows unusable land to be productive in terms of supplying meat for human consumption. In addition, sheep simultaneously produce the "forgotten-marketable product" – wool. Have these scenarios been sustainable in the past? Are they sustainable today? Will they continue to be sustainable in the future? Because of the nature of the sheep, it seems that future sheep production will continue to maintain soil integrity and environmental quality so production can remain sustainable.

The finite nature of land, water, and fossil fuel energy points to the need to use renewable resources efficiently. If ruminant animals consume only forage, it has been estimated that energy and land resources can be reduced by 60% and 8%, respectively. However, if this happens, the animal protein supply for humans will be decreased by 50%. To make up for the lowered protein supply, efficiency of production from fibrous materials will have to be increased. Sustaining the human animal protein supply may fall to the sheep because of their unexcelled ability to produce food from fibrous material while requiring the smallest of fossil fuel energy to do it. Concurrently, environmental quality can be maintained because sheep spread feces uniformly over untillable lands which could be overgrown by weeds if not grazed by sheep.

Worldwide, over 90% of the sheep's diet is composed of roughage (ligno-cellulosic materials), which cannot be used by nonruminants (humans, swine, poultry, fish). Nature has endowed the sheep with a fermentation vat (rumen) containing billions of microorganisms that secrete an enzyme named cellulase. This is the only enzyme in the digestive tract of animals that can degrade cellulose, the most abundant chemical component of plants and the most abundant organic chemical material on earth. Because sheep can use cellulose for energy to make food and fiber, they occupy a strategic position relative to humans and other nonruminants because they do not compete for their food. The symbiotic relationship between sheep and their anaerobic (living without oxygen) microorganisms may be the most unique aspect of biochemical evolution. The table below illustrates how the percent digestibility, and subsequent utilization for food and fiber production, of ligno-cellulosic materials differs for nonruminants and sheep:

Feedstuff	Nonruminant, %	Sheep, %
Alfalfa	20 – 30	40 – 60
Temperate grass	0 – 20	50 – 90
Tropical grass	0 – 20	30 – 60
Straw	Negligible	40 – 60
Soybean hulls	40	90 – 95
Cottonseed hulls	0 – 10	30 – 50
Common newsprint	0	23 – 37
All paper	Low	20 – 99
Wood	0	0 - 40

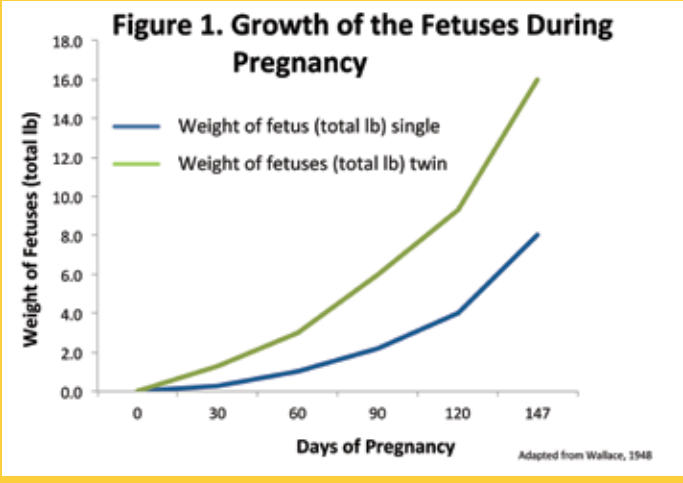
While common feedstuffs consumed by nonruminants (grains) can be digested to the same degree by sheep, ligno-cellulosic feedstuffs consumed by sheep are almost indigestible by nonruminants. This unique difference will allow continued sheep production without competing with human survivability. Furthermore, lamb production from forage requires the lowest input of cultural energy (machinery, herbicides, pesticides, transportation) of any livestock production system.

The bottom line in sustainable agriculture is future human food production. As the world's human population continues to increase, there will be a need for even more food when the supply is already inadequate in many areas of the world. While sustainability is critical to future human survival, present-day survivability (one day at a time) will take precedence. One way to sustain survivability is to increase the role of ruminant animals (sheep) in human nutrition. They can play a central role in human nutrition in the future because a highly nutritious and palatable food can be produced from a wide variety of feed sources that cannot be used by other animals. And, they can do this without disturbing the soil or environment. Then, perhaps the Spanish proverb "wherever sheep feet touch the ground, the land turns to gold" will become reality.

Dr. Donald G. Ely, professor in the Department of Animal & Food Sciences at the University of Kentucky

News to Ewes - Correction

The lines for growth of single vs. twin fetuses in Figure 1 of the article News to Ewes: "Ketosis" by Lauren N. Wood and Donald G. Ely in the HoofPrint Volume 14 Winter 2014, page 23 should be switched. Blue line = single; green line = twins. The corrected graph is shown to the right.



Is Online Marketing for You?

by Kelley Yates

Any producer who relies on niche markets will tell you having a marketing plan is critical to success. Being able to reach your target audience easily and effectively can be tricky and costly if not researched and properly implemented. Online marketing can seem overwhelming, even for the tech savvy. However, there are qualified companies who can help you create a marketing plan that is simple, concise and effective.

How do I better market myself?

Because there are so many people utilizing the Internet for information, shopping and social communication, it is an exciting time to be involved with online marketing. The Internet can bring millions of people right to your fingertips at a fairly inexpensive price.

What are the benefits of online marketing?

Regardless of the size or type of your business, it is important to let consumers know who you are and what you offer. A website can make both of these things available all the time. People can access the information either through their computer or smart phone. Thus, you can literally conduct business 24/7.

If I want to use a company to create a website, how do I get started?

1) Do some research. Ask other producers how they got their website started. Find out what kind of design support they use and whether they created the site themselves or used a professional service like EDJE[1].
2) Look at other websites and have an idea of what information you want to share.
3) Look at the design company's cost structure. By using a company to design your website, you simply provide the information you want to share to consumers and the company does the hard work. If changes need to be made, you need to know if the company charges by the hour or with a predetermined flat rate. For example, EDJE charges a quarterly fee for unlimited changes.
4) Visibility is only as good as you make it. Therefore, it is important that the company designs your site to be as search engine friendly as possible. Your website needs to include lots of "metatags" (words associated with your page) so that when consumers search key words, your site comes up first.
5) How else can the company help you? Some companies can offer many different solutions to your marketing needs and help create an entire plan that includes logo development, placement in online directories, creation of a Facebook page that matches your website, print mediums and email marketing.

When using a professional web designer, what are some pointers?

- There are no dumb questions.
- This is your site and you need to be happy with it. If that means you need numerous changes, then don't hesitate to send them.
- You want to project the best image of yourself and your operation to consumers. Therefore, use the best photos and video footage on your site.
- Keep your information current.
- Look over your site and send in updates at least twice a year.
- The best companies listen and help producers overcome their challenges. They offer solutions that are reasonable and effective.
- The company staff needs to understand that your business is not necessarily 8am-5pm each day so, being available is important.

Footnote:
1. EDJE was founded by Ed Tlach and Jeff Denzin to help producers connect with one another and to promote their sales. The original plan was to create an online directory for show cattle producers. However, the plan soon incorporated other species and services. Today, EDJE is one of the largest agriculture marketing companies in the world. To learn more, visit www.edje.com.

Kelley Yates, Editor of HoofPrint Magazine and Executive Director for the Kentucky Sheep and Goat Development Office. Contact her at (502) 682-7780 or kyates@kysheepandgoat.org.