

# Sheep, pastures, soil and the biological farming philosophy

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*Planted pastures serve as an important source of feed supply in many sheep enterprises in South Africa. Therefore costs associated with cultivating these pastures represent a significant input in these businesses. For sheep to be healthy, fecund and productive, it is vital that their nutrition be of a very high quality and supplied in sufficient quantities throughout the year to meet their nutritional requirements.*

To achieve this objective, farmers need to look to the soil upon which their pastures are being grown. The soil is where plants derive a great deal of their nutrition. It has been said that the soil can be thought of as the plant's stomach. To expand on this analogy, soil can be seen as a complex, living entity - similar in many respects to the rumen of a sheep. Soils comprise many components, some of which are particles of sand, silt and clay in varying proportions, humus and other decaying organic matter, and soil life in the form of micro-organisms like fungi, protozoa, algae and bacteria, and larger organisms like earthworms, nematodes, insects and moles.

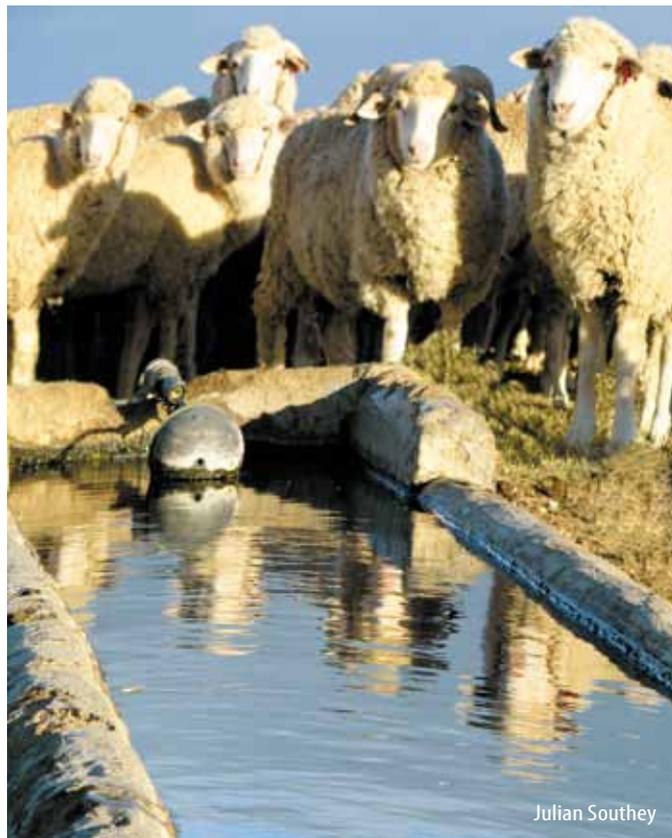
Planted pastures that will yield healthy and highly nutritious feed, need to be grown where the soil environment is biologically healthy, well aerated, moist and the supply of nutrients to the plants is in the desired quantities and proportions.

One way for the farmer to achieve this objective is to implement the philosophy of biological farming. In his book "The Biological Farmer", Gary Zimmer describes biological farming as utilizing resources of both science and nature in a superior farming system working with (not against!) natural laws. Biological farming practices improve the environment, reduce soil erosion, disease and insect pressure, and alters weed pressure - all this is achieved while working in harmony with nature. It boils down to good stewardship of the soil.

What does it mean for a sheep farmer to practice biological farming? In the following paragraphs some of the steps that can be taken to get started in Biological Farming will be covered.

The first and most important step in Biological farming is to take soil samples from the fields where pastures are grown, and have them analyzed so as to determine their nutrient status. This will reveal possible deficiencies or excesses of nutrients in the soil and how these may be remedied for healthy plant growth. It is extremely important that the soil nutrients be available to the plant roots in the desired proportions and quantities for healthy plant growth. Which method should be used for this determination? To quote the book "John Fair's guide to profitable pastures" (Part 1 Foundational principles of coat effective pastures and their application in South Africa, 3rd edition 2008), huge success has been achieved by applying the Albrecht system of soil mineral balancing. The Albrecht system of soil mineral balancing is expanded on in great detail by Neal Kinsey in his book "Hands-on agronomy". The basic premise of the Albrecht system is to feed the soil to feed the plant. It determines the ideal levels of both macronutrients (calcium, magnesium, potassium, sulphur, phosphorus and nitrogen) and micronutrients (sodium, manganese, zinc, copper, boron, molybdenum, and cobalt) for each type of soil sampled. For more information regarding the taking and submission of soil samples to be analyzed using the Albrecht method, refer to [www.sabiofarm.co.za](http://www.sabiofarm.co.za).

When amending soil fertility, Zimmer maintains that where possible, fertilizers which are "life promoting" should be used. These include



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materials that are mined and subjected to minimal processing. Examples include soft-rock phosphate (mined in Tanzania) and gypsum (mined near Yzerfontein in the Western Cape). Other "soil friendly" fertilizers include MAP (mono-ammonium phosphate), ammonium sulphate, potassium sulphate, and lime. It is crucial to use the appropriate type of lime - calcitic lime is recommended for soils that have sufficient magnesium, but are deficient in calcium. Dolomitic lime is used where both magnesium and calcium levels need to be raised. Fertilizers that should be avoided include potassium chloride and anhydrous ammonia as they tend to destroy soil life.

To promote soil life, pesticides and herbicides should only be used if absolutely necessary and in the smallest doses possible. Zimmer claims that the need for pesticide and herbicide use will decrease as the soil's nutrients come into balance and when the soil is more biologically active. Many of the soil micro-organisms protect plants against pest and disease, and healthy plants tend to be "immune" to pest and disease attack. When plants have a healthy root system and are vigorously producing sugar via photosynthesis, they will seldom be attacked by insects and other pathogens.

Another important management factor in Biological Farming is the

appropriate tillage of the soil. A good soil should have adequate air and moisture because plant roots and beneficial soil organisms need oxygen and water. For the optimum decay of plant residues and animal manures into humus, these materials should be tilled into the upper layer of the soil. The humus thus produced will help improve soil structure, resulting in better drainage and aeration, and ultimately contribute to good plant growth. Another method for increasing soil humus is to add compost to the soil. When the soil is tilled deeply, inverting it (example: using a mouldboard plough) should be avoided. It should rather be sliced or uplifted using tined implements. Soil that is wet should not be tilled. Field traffic should be kept to a minimum to avoid soil compaction. A hardpan can be temporarily broken up by subsoiling. The best long term solution to eliminate the occurrence of hardpans is high calcium, adequate humus and soil life, and deep root systems.

Other tips for biological management of livestock that Zimmer shares with the reader include:

- Provide a clean, comfortable environment to keep sheep content and to promote maximum health and production.
- Feed sheep a palatable, balanced, steady diet which includes home-grown feeds (grown on healthy, living soils with balanced, adequate levels of minerals), fresh, clean water and access to free minerals.
- Use the best quality additives to balance nutrient deficiencies, including protein, energy and mineral supplements when necessary.
- Use antibiotics as a treatment only when absolutely necessary to save the sheep's life.
- Avoid the use of synthetic hormones to promote enhanced growth/production beyond the animal's natural genetic ability.
- Feed the "extras" – for example kelp, yeast, probiotics, digestive aids and extra vitamins.

There are many more elements to the biological farming philosophy. This article has covered some of the important ones, but in reality an article of this length can only serve as a brief introduction to this way of farming.

The following on-farm example demonstrates what can be achieved by practicing biological farming. In his book alluded to above, John Fair describes the achievements of the Sutherland family of Wellington, Australia (about 3 hour's drive from Sydney) as follows: "They use cross-bred ewes to produce mutton, marketing 4000 lambs per year from a flock of 2800 ewes...Lamb growth rate averages 8 kg/month (266 g/day)". In addition to this, the Sutherlands won the Australian Golden Canola grower award (yield of 3.7 ton/ha) and were runners up for the best dryland wheat growers in Australia, with yields exceeding 8 tons/ha. This wheat crop only needed 70 kg of nitrogen and 30 kg of phosphorus per ha.

By practicing Biological Farming, the necessity for using expensive inputs like nitrogen fertilizer should decline. Dry spells should have a less significant impact on plant production (fodder). Because Biological Farming practices improve soil structure, less energy in the form of diesel will be used when these soils are tilled. Sheep grazing pastures managed in this way will be healthier, more fecund and productive and should be more profitable compared with traditional management practices. Therefore Biological Farming is one way of ensuring that sheep farming can continue to be economically viable and sustainable.

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