

SUSTAINABLE AGRICULTURAL PRODUCTION

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Production =sunlight and moisture by **Peter Kramer**

The term Sustainable Agriculture is commonly and regularly used, however, concepts and opinions vary as to what the term actually implies.

To me Sustainable Agriculture is; Growing vigorous, disease resistant crops without the continual inputs of organic or synthetic fertilisers whilst improving the physical and biological status of the soil over time. So, if production without the continual use of fertilisers and composts is possible, how might it be achieved?

We would need to achieve production by way of a sustainable source of energy or fertility. A definite source of sustainable energy is solar energy. If we could link agricultural production to incoming solar radiation and moisture (ie rainfall and/or irrigation) then there could be the opportunity to achieve true sustainability in agriculture.

The link between the two is a practical understanding of how to achieve and maintain a healthy, biologically active soil through managing and manipulating annual covercrops, weedy plants and pastures. This understanding is based on the principles and results of Rational Grazing as described and documented by Andre Voisin in his book Grass Productivity (1)

By establishing and maintaining covercrops, weedy plants and/or pastures by regularly and accurately cutting them at a very specific stage or height (that will permit these plants to regrow in the fastest possible time) we provide the soil, and therefore soil biology, with a regular supply of green manure. At the same time we also achieve substantial benefits in terms of soil structure, organic matter and humus by virtue of a dynamic and expanding root system.

This occurs because every time plants (including all weeds) are cut a corresponding amount of the root system dies back and this provides the soil with organic matter that can be digested. As the plants recover from being cut they regrow and the roots forage deeper. More minerals are extracted and coupled with the gains in fertility from the decomposition of the green manure, the plant regrows. If we again cut the plants at the optimum height and time we get another layer of green manure and once again a corresponding amount of root matter dies back.

With each successive cut more humus is created. Soil structure improves which in turn increases the soil's ability to drain excessive moisture, hold moisture, and remain at a relatively stable temperature. As this process continues the composition of plants change from the original species (which may have been troublesome weeds) to those of a higher biological status and agricultural value, such as preferred pasture species. A similar change from harmful soil organisms such as nematodes to more beneficial types of fungi, algae and earthworms occurs.

In most cases sufficient soil fertility can be achieved after three to five cuts (depending on original soil conditions and plant species) to successfully grow a healthy plant crop such as bananas, apples, cherries, vegetables, etc without the need for supplementary fertilisers or composts.

The choice of weed and grass cutting implements depends primarily on the grower's ability to purchase suitable implements and the size of the plantation. In local subsistence agriculture the most affordable and common is the cutlass or cane knife. Where finance is available, or for larger plantations a brushcutter and lawnmower are very versatile and efficient. In larger commercial plantations a combination of brushcutters and ride-on mowers are very effective.

A similar strategy using a once off covercrop of mixed annual legumes (including soy bean, peanut and mung bean) and grain grasses (such as rice, millet and sorghum) can be used to grow crops including Lucerne, sugarcane, asparagus etc