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Sod/Livestock-Based Peanut/Cotton Production System: Why We Recommend It! [1]

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The past two decades have seen major changes in cultural practices in the peanut/cotton cropping systems. Among these changes are: consolidation of farm units, increased irrigation, reductions in corn/soybean acreage, large increases in cotton production and changes in support programs for peanut. Technological changes have also been rapid, and include dramatic increases in use of Bt cotton and corn and Roundup Ready cotton, corn and soybean. Furthermore, conservation tillage is now widely adopted in the U.S. southeast (SE) and the SE leads the nation in the use of this practice (National Crop Residue Management Survey, 2002). The changes in economics, technology, and government support programs have led to the need for integration of the traditional peanut/cotton rotation and livestock production systems. Other less obvious factors have also prompted the need for the change from simple rotations to more complex rotations. The yields for peanut and cotton reached a plateau almost 25 years ago and have since remained stagnant (USDA, 2004). This is not surprising, because short two-year rotations can become susceptible to classic problems similar to monocultures, such as stagnant yields, soil degradation, and survival and adaptation of pests and disease to the rotations (Crookston, 1995; Tanaka et al., 2002). It is thus essential to find alternative cropping systems which can increase yields and simultaneously enhance soil quality and conservation and promotes environmental stewardship.

An excellent system to achieve higher yields and environmental benefits is a four year sod-based rotation which includes bahiagrass for 2 years, followed by 1 year of peanuts, then a year of cotton in place of the traditional peanut/cotton rotation. To increase economic returns in the overall system, livestock can be integrated into the peanut/cotton cropping system. Numerous benefits can be obtained by including bahiagrass in the rotations and also for the integrated livestock crop farming system. Bahiagrass is a good choice for a perennial grass for the SE because traditionally it is grown as a pasture grass, hence it is not new to most farmers. It is drought tolerant and can be grown on a wide range of soil types including sandy soils (Field and Taylor, 2002). Furthermore, its nutritional value, including crude protein (CP), acid detergent fiber (ADF) and

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neutral detergent fiber (NDF) values are comparable to other grasses and can be grazed or harvested for seed or hay. This article is introductory to a series of articles which report on an extensive program from the Tri-State (Florida, Georgia and Alabama) region on the many benefits of adopting sod/livestock/peanut/cotton farming systems. Herein, we outline the challenges which have prompted the need to the adoption of the livestock based cropping system.

Farmers tend to specialize in the crops due to environmental constraints, economics, infrastructure or because that is what's been grown for many years. However, like all successful ventures, farming is dynamic and must respond to changing environmental and economic conditions. While conservation tillage greatly reduces soil degradation, including perennial grasses will improve soil health and consequently improve crop growth.

Furthermore, bahiagrass is a non-host to several plant pathogens and nematodes. Synergistic effects are achieved with a combination of improved soil health, resulting in enhanced plant growth which can out-compete weeds and better tolerate diseases-all cumulating in higher yields at reduced costs. While cotton and peanut yields have been stagnant, the cost of agricultural chemicals including fertilizers, herbicides and pesticides conversely has continued to rise. Thus for peanut/cotton production systems to remain viable, there is a need for an alternative farming system that reduces chemical inputs. Reduction in the use of synthetic chemicals is in accord with environmental stewardship, but more important to growers, a necessity to reduce production costs. There are numerous examples worldwide of agricultural chemicals infiltrating into the ecosystem and these problems are more serious in the southeast U.S. because of its fragile ecosystem.

Early in U.S. agricultural history, mixed livestock and crop production were the norm. While mixed farming was necessary for early farmers, the last half of the 20th century was a time with increasing emphasis on commercial farming, and an increase towards specialization. However, changing economic, technological and ecological values have made it necessary to re-visit diversified crop/livestock enterprises. Integrated livestock/crop farming systems feed into each other where the products from one enterprise can be used as inputs for the other enterprise. Additionally, diversified cropping can provide a buffer against unpredictable weather, such as droughts and hurricanes. A good example is the four major hurricanes that swept through Florida in 2004. While all four hurricanes caused economic damage to crops at different stages of growth, hurricane Ivan severely impacted cotton during the boll opening stage, and as a result, a number of farmers lost a large part of the crop. If a grower had most of their farm in cotton, they would have lost most of their income. On the other hand, if a grower had some section of the farm under bahiagrass, the bahiagrass would have survived the hurricanes and perhaps produced higher yields due to good moisture.

Diversified cropping systems also reduce economic risks by reducing yearly variations in returns and also increases the total income. We developed an interactive business model that evaluates the economic feasibility of a four year livestock/peanut/cotton/sod rotation. The URL for the model is http://nfrec.ifas.ufl.edu/sodrotation.htm. Results from the model show returns to be 3- to 6-fold greater for the fourth year of the integrated sod/livestock/peanut/cotton farming system compared to the conventional peanut/cotton rotation. Other researchers also identify livestock as the key link in developing sustainable systems. There are other advantages of the sod/livestock/peanut/cotton farming systems which go beyond the monetary values. Expansion of cropland coupled with intensification of agriculture has drastically reduced both micro and macro flora and fauna population density and diversity. It is thus imminent that flora and fauna biodiversity be progressively maintained in agricultural farmlands. Sod based cropping systems can provide niches to preserve biodiversity.

Numerous factors interact to bring about the positive outcome for implementation of the sod-based livestock/peanut/cotton cropping system. We depict a conceptual model with all the possible events for the sod-based/livestock cropping system as Figure 1. Development of an effective sod-based livestock integrated cropping system is an

economically and ecologically viable alternative to the current peanut/cotton cropping system. Furthermore, this system is applicable under different climatic conditions, soil types. We recommend growers read our related articles on this subject for details and also visit our Web site http://nfrec.ifas.ufl.edu/sodrotation.htm for more information.

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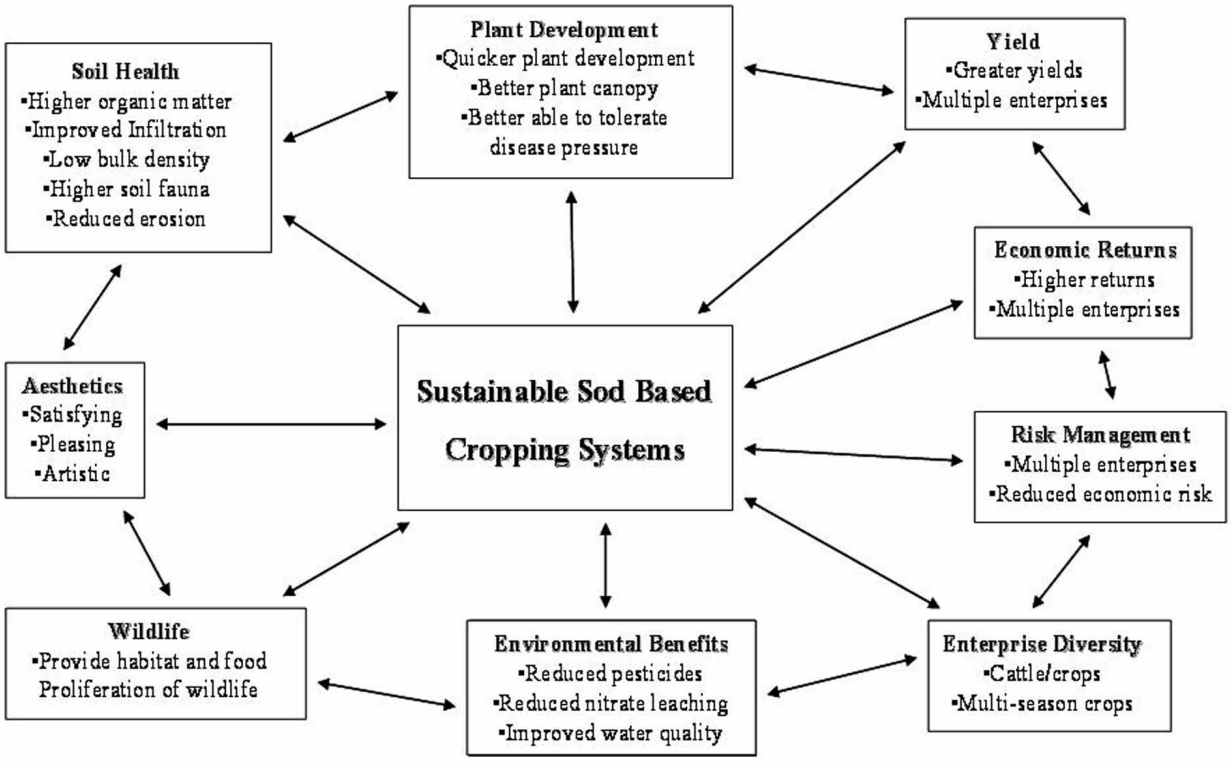

Figure 1. Conceptual model of benefits accruing from integrated livestock peanut/cotton farming systems and their interactions.