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SUSTAINABILITY - CONCEPT, PRINCIPLES AND AGRICULTURAL APPLICATION

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Abstract

Sustainability: Sustainability is a buzz word to the man in the street. The concept is highly publicized by politicians, developers, researchers and conservationists. It is also perhaps the least understood word in the common vocabulary, at this point in time. To complicate matters further, sustainability is a direction rather than a destination. Some authors regard it to be "a philosophy, based on human goals and on the understanding of the long-term impact of man's activities on the environment and on other species" (Hansen, 1996).

Sustainability, whether it be in agriculture, land use management, conservation, development, is based on five principles. Three principles as expressed in terms of land used management are listed in Table 1. In short, sustainable agriculture is economically viable, ecologically sound and socially supportive (Auburn, 1994). A good article on this subject appeared in the December 1995 issue of the National Geographic Magazine. The author views sustainable agriculture as the farming revolution (Klinkenburg, 1995).

Sustainable Agriculture was born out of the 1985 USA Farm Bill. Research into Alternative Agriculture was proposed, due to the energy crises at that time, falling prices of commodity foodstuffs, overproduction and concerns about pesticides in the environment. Alternative agriculture places a major focus on organic farming and reduced inputs of fertilizers and pesticides. As such, these practices are a component in sustainable management practices. Similarly, Integrated Pest Management (IPM) is a component of sustainability.

Human needs or interest in sustainability arise from one of two backgrounds. Firstly, from concerns in response to the negative impacts of the particular activities on the environment. The other approach arises from the need to provide guidelines for managing a business in a rapidly changing social, physical and economic environment. There is an urgent need to integrate these three environments in order to achieve the best "fit" which matches the goals and objectives of the business operation and the five principles of sustainability.

Measurement: The concept of sustainability is dynamic. Although it cannot be measured directly, assessments can be made on the performance and direction of the processes that control the functions of a given system at a specific location, and at a specific point in time. Measurement thus entails the development of critical indicators, criteria for each indicator and threshold values in each case. A good indicator in agriculture is the problem of soil degradation, where the tempo of soil erosion is quantified. A threshold value of 5 tonnes of soil lost per hectare per year is acceptable in some communities. However, more recent views are that losses can be managed to be less than 1 ton/ha/year by means of conservation tillage and correct soil and wind erosion protection measures.

Measurement must include on and off site indicators. Off site indicators are an expression of the pollution hazard, negative impacts on the environment and the externality costs incurred.

An economic analysis is also an integral part of measurement process. In this case, resource economic principles are used. The next present values of all the options by which a resource base is used are determined. A full cost-benefit analysis is done of each option, with regard to the present and future generations. Furthermore, system of judgement values are developed to determine the equity and sustainability of each opinion. A finite resource must have value for the generations to come in order to allow for an equitable and sustained benefit and man and the environment.

Conclusion: Man is the pivotal decision-making component in sustainability, whether it be agriculture, conservation or development (Greeff, 1995). An understanding of the five principles involved, are a prerequisite for success and achievement. Community involvement and a bottom-up approach are other components of the sustainability process. Sustainability, by its nature, is an inclusive process.

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