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Challenges to Organic Farming and Sustainable Land Use in the Tropics and Subtropics

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The central aim of Organic Farming is to maintain and improve soil fertility as a means of supporting animal health by species-adapted animal keeping and feeding. These two aims have developed from the basic desire of many human beings to live in harmony with nature, ultimately emanating from a wish to sustain their own health.
In industrialised countries of temperate humid climate, diseases of modern civilisation have been developing at an alarming rate. One of the main reasons is excessive and incorrect nutrition, resulting from alienation in preparing and making our own foodstuffs. In this respect, food procurement today looks at qualitative aspects, i.e. at changes in nutritional habits, especially at a reduction of excessive meat consumption, but also at taking precautionary action to ensure that foodstuffs are free of pathogenic agents and harmful substances. In many tropical and subtropical regions, man is not supplied with sufficient amounts of food. In this context food procurement means protection against hunger and help in the daily fight for survival. This means that the main focus is on quantitative aspects of food production. However, the risks of intensive farming also have a completely different magnitude in tropical and subtropical regions due to the much more frequent occurrence of acute poisoning after the improper use of pesticides (Castillo, X., 2000).
Organic Farming tries to meet the demands of man in temperate humid as well as in tropical and subtropical regions and to provide something of a unifying element. The tension between these different demands and the resulting exciting discussion is a specific feature of our faculty "Ecological Agricultural Sciences" in Witzenhausen, with its strong roots in both Sustainable Tropical and Subtropical Agriculture and in Organic Farming.
In the view of a soil biologist, who tends to consider the aspects of soil fertility, the basic principles of Organic Farming mainly rely on the efficient and careful use of natural resources in all climatic regions (Paoletti, M.C. *et al.*, 1993; Lavelle, P. *et al.*, 1999). Under temperate humid climatic conditions, Organic Farming is especially devoted to protection against environmental pollution. Under tropical and subtropical climates, the possibilities of human intervention are enormously restricted due to the environmental conditions, e.g. nutrient deficiency of many soils or the drought of the climate, even if sufficient mineral fertilizers were available (Prasad, R. and Power,

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J.F., 1997). A characteristic feature of Organic Farming is the attempt to integrate problems into a systematic approach, to resist the temptation of simple solutions in mono-causal reason-effect-relationships, e.g. in finding a soil biological reference number that gives a fertilizer recommendation with a constant value. The euphoria in the use of molecular biological methods in the area of gene technology generates the suspicion that scientists search with complex methods for apparently simple solutions. This leads to the expectation that crop yields can be miraculously increased, for example, by introducing and switching on a gene. Problems are dealt with by taking immediate action, leading to fast and furious campaigns. Tackling problems in a systematic way, often called a holistic approach, entails the inherent risk that a specific topic will be dealt with very superficially.

It is a major problem that the transfer of knowledge from temperate humid to tropical/subtropical regions is impossible or seriously restricted. The use of easily-soluble mineral P-fertilizers is not really useful in P-fixing soils regularly occurring in large areas of tropical and subtropical regions (CASTILLO, X., 2000). Through promotion of soil microorganisms, e.g. by suitable soil organic matter management, P is much better held in biological cycles. However, knowledge about the control mechanisms of biological processes in tropical and subtropical soil is very sparse, especially considering the observation that the composition of the microbial decomposer community differs enormously in tropical and subtropical soils from those in humid temperate regions (REES, R.M. *et al.*, 1999).

Not only is available knowledge regarding the large diversity of the tropical and subtropical regions restricted, but the realization of the farmers themselves is also hampered by quite different problems to those experienced in industrialised temperate humid regions. The cultural and political conditions, for instance with regard to property rights and the level of education, mean that the transfer of scientific knowledge can often only take place within very close limits (BOLANOS, M.F., 2000). While the profession of a farmer requires an academic education in some countries of the European Union, land-using persons in tropical and subtropical regions are often very poorly educated, often lacking the most basic reading and writing skills. This problem is becoming increasingly serious with the increasing disappearance of rural traditions.

A special advantage of Organic Farming is the fact that it always takes the social and political environment of human beings into consideration and not only the production of foodstuffs. Even more important for the development of sustainable agriculture in the tropics and the subtropics is the future oriented character of Organic Farming. In setting itself current limits in the means of production, its outlook into the future is unlimited.

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