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## **Lecture -20**

# **ORGANIC ECOSYSTEM AND THEIR CONCEPTS**



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- Organic agriculture is often described as a natural farming system. It is characterised by refraining from chemical-synthetic inputs, like chemical fertilisers and pesticides. It controls undesirable quantities of crop associates by stimulating the self-regulatory capacity of the agro-ecosystem as much as possible, for example by using agro-bio-diversity at different levels of management (farm level, crop species level, variety level) within the organic farming system (IFOAM 2002).



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- **SELF-REGULATORY ABILITY OF THE ORGANIC FARM-ECOSYSTEM SYSTEM STABILITY AND YIELD STABILITY**
- Although organic agriculture is nowadays known for its avoidance of the use of agro chemicals and its consequent striving for environmental benefits, organic agriculture is more than merely replacing chemical by natural compounds (IFOAM, 2002). In organic agriculture, one does not want to rely on (phytosanitary) agro-chemical intervention because of the application of the concept of the integrity of life at the level of the ecosystem.



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- **SYSTEM STABILITY**
- The self-regulatory ability of organic agro-ecosystems can be defined as the capacity to either resist the effects of small and large perturbations or show enough resilience to counter them without high input (chemical protectants) from outside the farm-ecosystem.
- Such system stability or resilience can often be found in multi-species agro-ecosystems and is important for risk reduction and yield increase, but also for reducing population densities of hard organisms and increasing densities of beneficial organisms, both in the short and the long run.



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- Each organic farmer has to find his own way in managing site-specific diversity and identifying the correct assemblages of species in time and space) that will best realize through their biological synergism--the self-regulatory capacity of his individual farm-ecosystem.
- Next to the farm.differences in cultural practices and the knowledge, skills and motivation of each farmer result in specific farming styles, emphasising that the farmer himself is also part of the agro-diversity-complex.



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- More than his conventional colleague who has greater means no control or overrule diversity, an organic farmer has to translate and apply general ecological knowledge to his specific farm situation. given differences in environmental conditions and the socio-economic context of each farm, differences in cultural practices and the knowledge.



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## Yield stability:

The reliability of an organic farming system depends not only on high yield levels with low inputs, but also largely on yield stability.

Although organic farmers may gain relatively more system stability after their conversion period and several years of good farming practices, they still have few external inputs to quickly control or correct farm conditions during the growing season against undesired heterogeneous environmental conditions in time (weather, Climate) and space (soil, topography). Reduced system stability can result in yield



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- This means that more research is needed to further optimise the organic farming system and to understand the different interactions within the farming system, including research on the role of variety improvements.
- Selecting the proper variety can contribute to yield stability through different specific traits, but also by more general traits such as flexibility, robustness and buffering capacity.
- It is in this context of a self-regulatory farming system that the organic sector is developing a concept for improved varieties adapted to organic farming systems.

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- **Description of soil management in organic farming**
- Use of organic manure makes the availability of nutrients less controllable. This might result in lower yield stability.
- On the other hand, in organic systems, often a higher soil organic matter content is observed than in conventional systems.
- This might partly compensate for the yield limiting effect of the low nutrient availability by increasing the water holding capacity and nutrient retention capacity of soils under organic production.



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- Another matter worthy of attention is that in low input system such as organic farming, within field variation might affect yield stability.
- Most essential in the use of organic fertilizer necessity for active soil organisms, like earthworms, nematodes, collemboles and mycorrhiza to regulate nutrient cycling processes, to make nutrients available to the crops, to make the soil structure and systems and to suppress pests and diseases.



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- **WEED MANAGEMENT**
- In organic farming, weed management is directed at preventive measures and timing of cultural weed management practices besides crop rotation and smothering intercrops.
- **Description of weed management in organic farming**
- Weeds are often cited as the most significant problem in organic farming systems they are certainly the problem that most concerns the farmers, who are considering converting their farm from a conventional one into an organic one.



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- The concept of weed management in organic agriculture is: because herbicides are not allowed in organic farming system emphasis is on prevention, decision-making (timine) and control technology: control on organic farms of yield-and quality-limiting weed populations requires strategies that account for long-term effects.
- This in turn requires knowledge about the population dynamics of weeds over a rotation and about the seed setting of weeds. If weeds are not suppressed in time, they may become very aggressive (competitive) and complete their life cycle thus producing a seed bank for the coming years and the subsequent crops in the rotation.



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- **Management of pest and diseases**
- **Air borne**
- **Soil borne**
- **Seed borne**



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**Thank You**