



## Sustainable Land Management – A New Approach for Implementation

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TS.24.3 Planning for Rural and Urban Communities  
Dr.-Ing. Michael KLAUS  
Sustainable Land Management – A New Approach for Implementation  
From Pharaohs to Geoinformatics FIG Working Week 2005 and GSDI-8  
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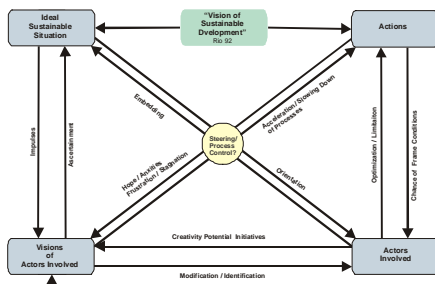


## Sustainable Land Management

- Planning: a key element of Land Management.
- Planning does not only include the final plan and its implementation but also the actual planning process.  
**Key-question: What are the factors influencing this process?**
- Sustainable development can be described as a system framed by the ideal sustainable situation, the actors involved, their actions, and their visions.  
**It is necessary to understand the process.**

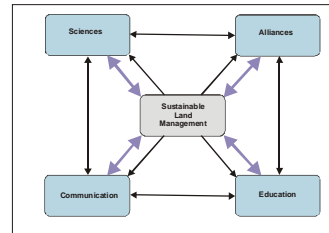
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## System Sustainable Development



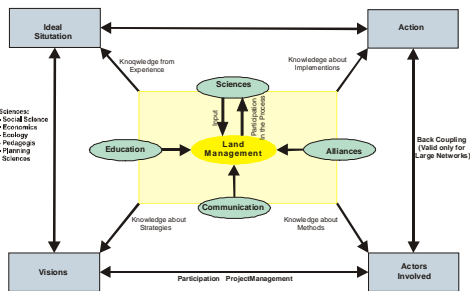
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## Interactions



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## Application of Chaos-theory

- The system of Sustainable Land Management and the interaction can be compared to a non-linear equation composed of the components education, communication, sciences and alliances.
- This equation has a multiplicity of correct solutions which are equivalent to possible actions.
- Consequently, mechanisms of chaos theory and especially fractal geometry can be applied and used to improve planning processes.
- Based on the mechanisms of chaos theory a process-oriented approach can be worked out to strengthen sustainable land management and to firmly establish sustainable proceedings in rural and urban communities.

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## What is Chaos-theory?



- Chaos-theory is a mathematical-physical theory for the exploration of random non-linear processes but has recently also been applied to social phenomena.
- The chaos research is examining systems during the transition from an ordered to a disordered (chaotic) stage and vice versa.
- It is describing phenomena which are based on certain physical laws but with unforeseen behaviour.

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## Key Principles of Chaos-theory



- Bifurcations
- Strange Attractors
- Iteration
- Back Coupling (Feedback)
- Intermittence
- Dissipation
- Fractals

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## Consequences for Planning and Sustainable Land Management



- Influencing bifurcations
- Identification and strengthening of strange attractors
- Critical guidance of iteration
- Encouragement of positive coupling back
- Utilization of intermitences
- Dissipation – a way to new solutions and self-responsibility
- Learning from fractals

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## Conclusion (1)



- Complex systems – whether chaotic or organized – cannot be entirely analyzed.
- They cannot be reduced to small parts of it, because due to iteration and back coupling they are reflexive.
- Every interaction occurs in a bigger system and the system as a whole is changing permanently including bifurcations and iterations.

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## Conclusion (2)



- Using the principles of chaos-theory for analyzing the mechanisms of sustainable land management makes evident, that it is not possible to make either prognoses about the trend, nor set up certain compulsory tasks, components or specific indicators because every land management process is unique.
- While it is not possible to make generalized statements about the contents of land management, it is however very well possible to give a general statement on the process of land management.

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## Conclusion (3)



- By means of chaos theory it is possible to identify the critical points within land management processes.
- This theory also offers answers on how to deal with such chaotic processes to bring them at least rudimentary in a controlled course

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**Thank you very much!**

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