Farming Systems Analysis and Design The example of Wageningen University & Research

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Systems analysis is in the DNA of WUR

'To explore the potential of nature to improve the quality of life'



WACASA: Wageningen Centre for Agroecology and Systems Analysis

Collaboration between three chair groups:

Farming Systems Ecology, Plant Production Systems, Animal Production Systems

Using concepts of systems analysis, we analyse and design sustainable production systems for crops, livestock and their interactions, with focus on resource use efficiency and equitable management of natural resources.



Undergraduate teaching

BSc Plant Science, Animal Science

MSc Plant Science, Animal Science, Organic Agriculture

- 1. Systems analysis and modelling
 - Basic concepts (rate and state variables) and techniques (relational diagrams; integration)
 - Dynamic simulation modelling (e.g. WOFOST, FARMSIM)
 - Optimization modelling (e.g. FarmDESIGN)
 - Agent-based modelling
 - Programming skills
- 2. Disciplinary building blocks for farming systems analysis

e.g.: Advanced Agronomy, Systems approaches in Animal Science

3. Interdisciplinary approaches for current farming system challenges

e.g.: Global Food Security, Climate-Smart Agriculture, Analyzing Sustainability of Farming Systems, Functional Agricultural Resource Management, Analysis and Design of Organic Farming Systems

Postgraduate teaching

- Six graduate schools
- T-shaped skills

Broad range of courses, e.g.

- Art of Modelling
- Climate-Smart Agriculture
- Resilience of living systems
- Farming Systems and Rural Livelihoods (field course)



Experimental Plant Sciences (EPS)



Production Ecology and Resource Conservation (PE&RC)



Advanced studies in Food Technology, Agro-Biotechnology, Nutrition and Health Sciences (VLAG)



Wageningen School of Social Sciences (WASS)

Wageningen School of Social Sciences (



Wageningen Institute of Animal Sciences (WIAS)



Wageningen Institute for Environment and Climate Research (WIMEK)



Postgraduate teaching



Farming Systems and Rural Livelihoods (field course)

DEED cycle as organizing principle and approach for co-learning and co-design

- Resource flow mapping, village transects and maps, focus group discussions
- Farm descriptions, household questionnaires
- Typologies of fields and farms
- Descriptive and multivariate statistics
- Simple simulation models at field and farm scale
- Network analysis, nutrient flows and balances
- Multi-criteria analysis, trade-off analysis





Graduate school research theme on Re-design of (agro-)ecological systems



www.surefarmproject.eu

Postgraduate teaching

New engineering doctorate

Design for Agrifood and Ecological Systems

Wageningen University's new Engineering Doctorate degree





MOOCs



MOOC Sustainable Food Security: Crop Production

Starts on: Self-paced

Duration: 6 weeks, 6-8 hours

Language of instruction: English

How to feed the world without depleting our planet's reserves? As part of the XSeries Sustainable Food Security learn about the availability pillar of production.

MOOC Sustainable Food Security: The value of systems thinking



Starts on: Self-paced

Duration: 6 weeks, 8-10 hours per week

Language of instruction: English

As part of the XSeries Sustainable Food Security, learn how to apply systems thinking to improve the environmental sustainability of food production systems.

Education for professionals













Environment and Climate



Thank you for your attention

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