



Strategic Challenges to Higher Education in Agricultural Sciences for Sustainable Land Use Systems Development

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Content

- **General remarks**
- **Contribution of agricultural economics to the holistic research approach**
- **Elements of sustainable development of farming systems**
- **Steps to establish a model for sustainability assessment of farming systems**
- **Concluding remarks**



General remarks



Challenges

Common interest of all agricultural disciplines

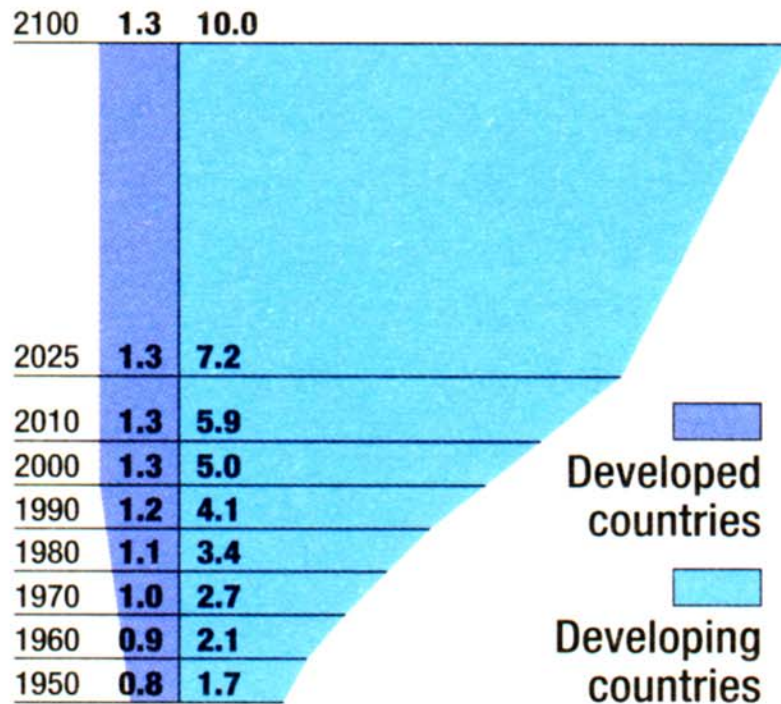
- Concepts for sustainable land use and protection in tropical ecosystems
- Reduce prevailing environmental problems
- Foster existing institutions engaged in tropical ecology research
- Educate scientist in cooperative research projects



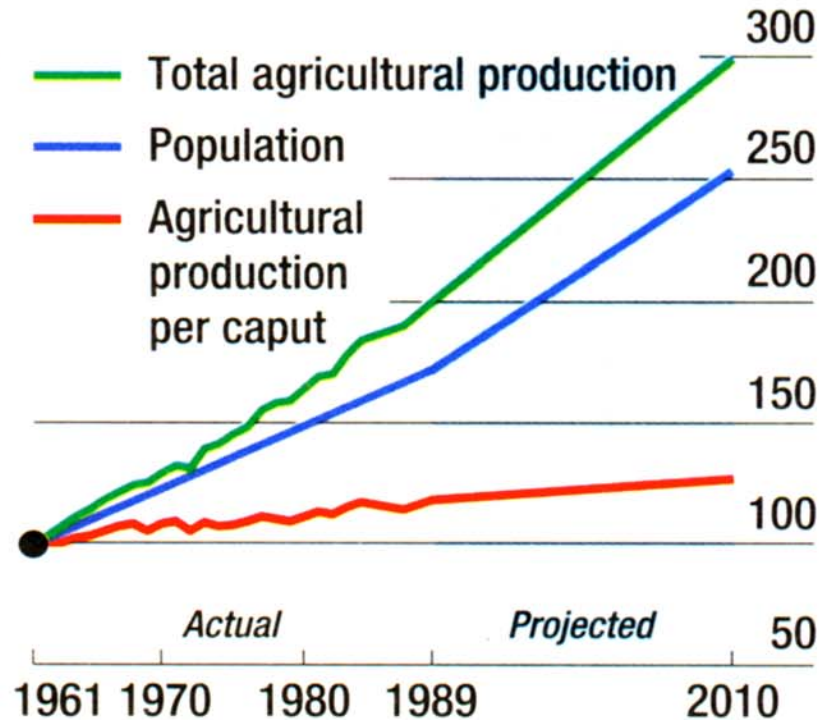
Agriculture and population

Growth of world population
 Thousand millions, 1950-2100

Source:
 UNFPA



World agricultural production and population Index, 1961=100



Max Weber's vision of the scientists of the future (1904!)

... An inspired specialized technician, a heartless hedonist (bon vivant) – that Nothing flatters himself to have mounted a prior unachieved level of humanity...

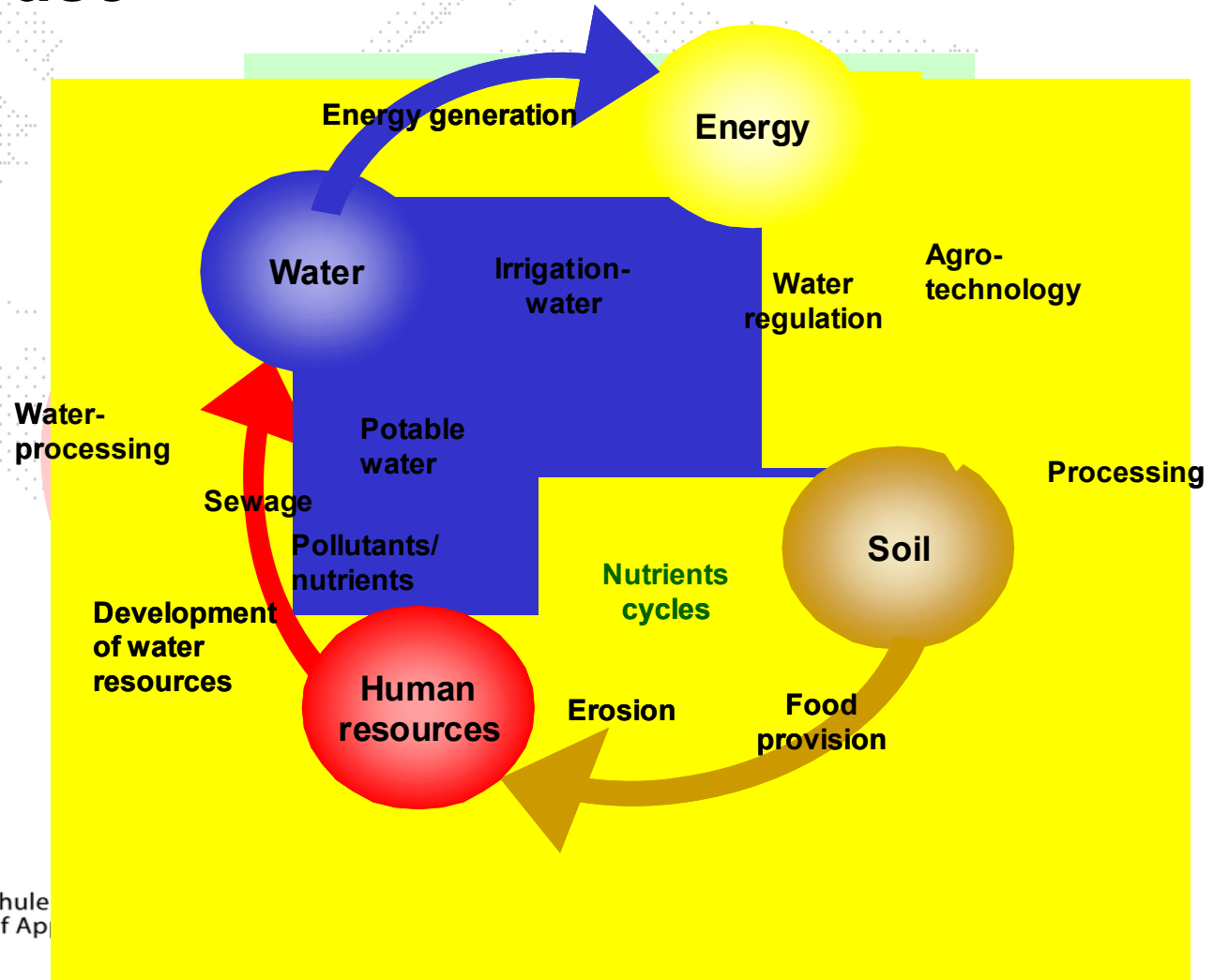
... Ein spezialisierter Fachmensch ohne Geist, ein Genussmensch ohne Herz – dieses Nichts bildet sich ein, eine nie vorher erreichte Stufe des Menschentums erstiegen zu haben...

Change of Paradigm in (Agricultural) Sciences

- Up to now the focus of sciences has been to decompose the world into its basic components and to classify those parts and pieces
- **Now we start to deal with the mechanisms of their interaction**



Structure of an interdisciplinary model for land-use



Contribution of agricultural economics to the holistic research approach



environment-super system

economy

village/higher order social system

farming system: hybrid system

social system

labour force

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Elements of sustainable development of farming systems



Sustainable Agricultural Production Systems

- Principles for sustainable agricultural production systems
 - Economics
 - environmental soundness
 - social equality
 - political feasibility
- To connect new technologies and traditional knowledge
- To integrate farmer into research, development and transfer



Sustainable Agricultural Production Systems

Holistic Approach according to formula **G + E + M + P**

- Factor G: Genotype
- Factor E: Environment
- Factor M: Management
- Factor P: People



Factor G (Genotype):

- 
- Improved, robust varieties (or animals) increase the adaptability of production systems, decrease production costs, increase productivity



Factor E (Environment):

- Characterization of the production environment for the most important crops (and animals) to understand which requirements have to be considered in terms of sustainability and which selection criteria should be applied for crop and animal breeding



Factor M (Management):

- Improved management connected to a genetic progress in terms of productivity increase has to secure sustainability within the farming system processes



Factor P (People):

Sustainable land-use requires an innovative research model, which adopts new ways for including the „target group“. Three challenges arise:

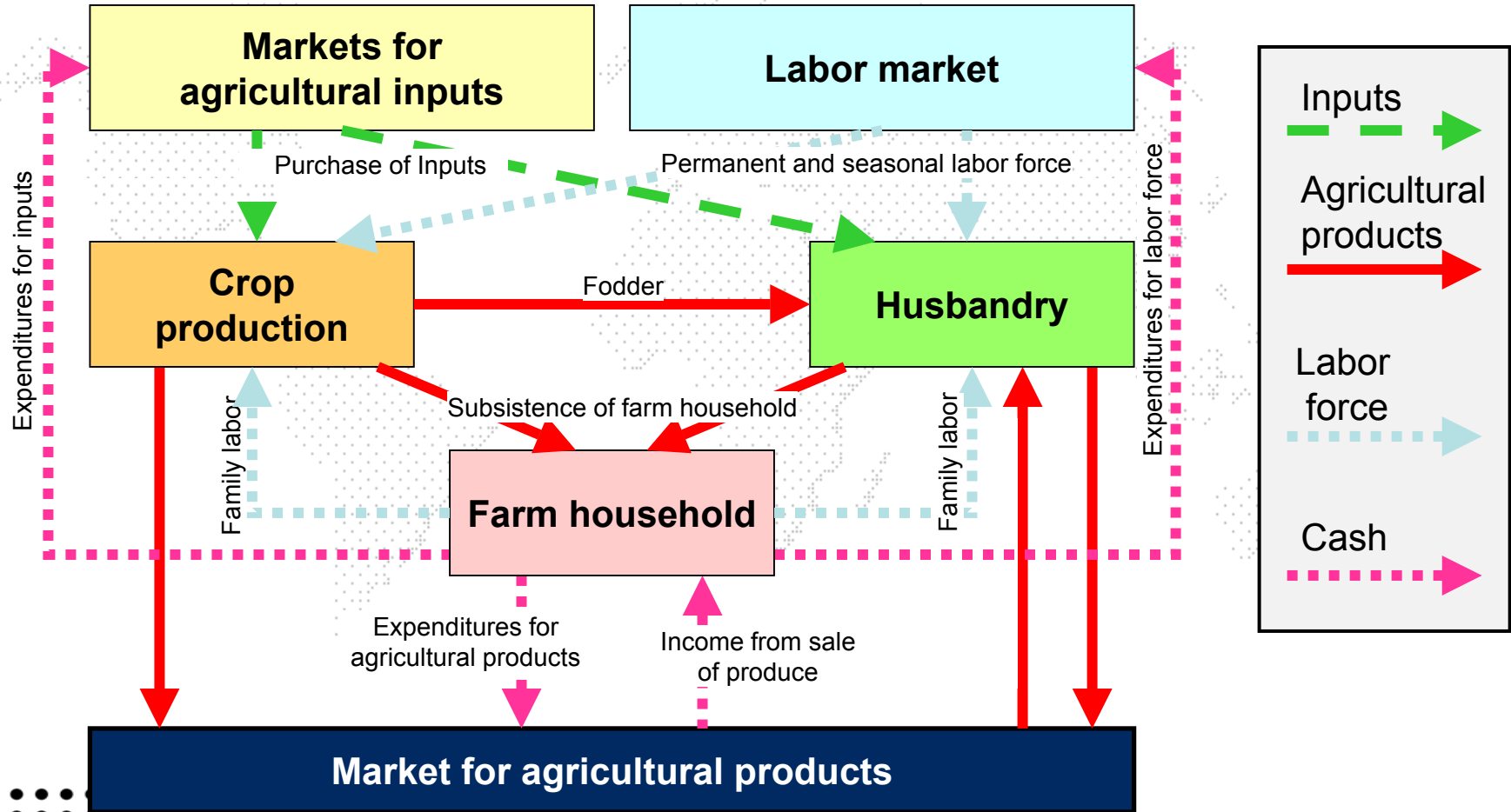
- On farm level, some technologies have to be linked
- Research sites have to be increased (→ eco-regional design)
- To develop & distribute key information among partners (GIS)



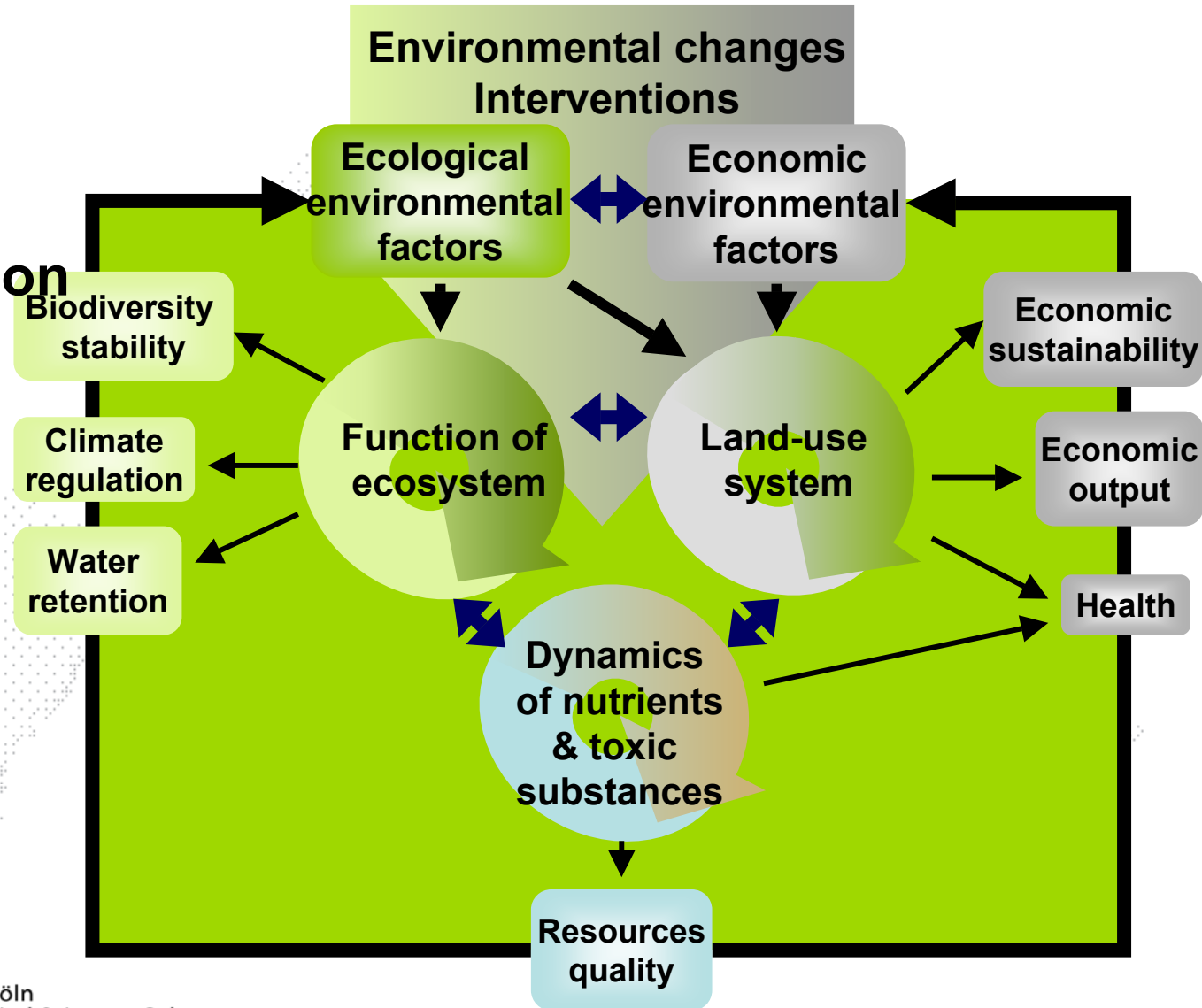
Steps to establish a model for sustainability assessment of farming systems



Material, labor and cash flows



System interaction model for interdisciplinary research



Concluding Remarks



Knowledge means power (Kant)

- To share knowledge is giving away power
- Benefit from interdisciplinary research to be ranked higher
- In international cooperation projects the problem of sharing knowledge multiplies

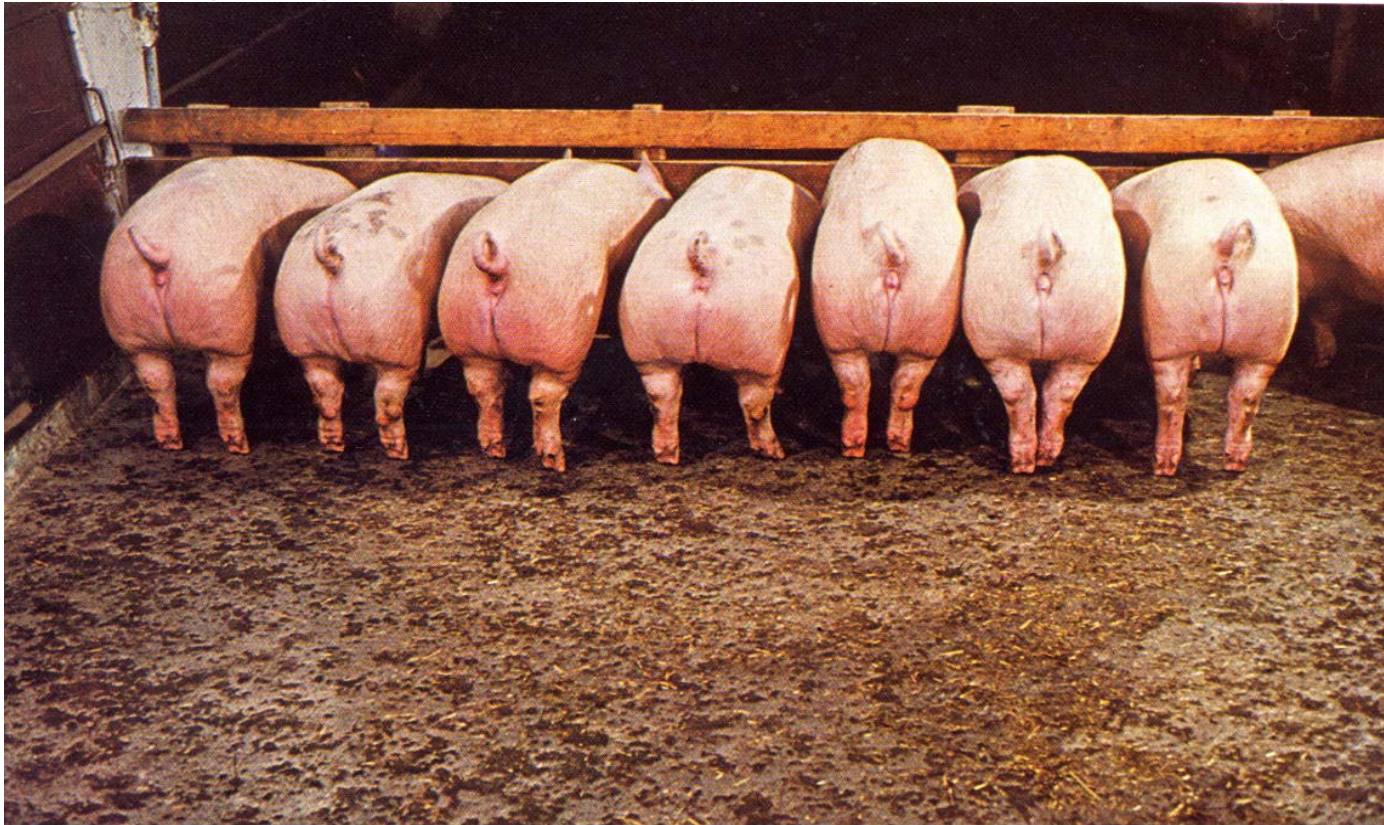


Critical Conscience in Science

- The freedom of scientific reason is the freedom of critical conscience, the prerequisite for critics is always a pluralism of independent partners who are jointly able to attain a higher level of conscience
- ➔ **This conscience has to be institutionalised in higher education**



**Knowledge sharing: If everybody has a benefit
– the resulting benefit will be more than the sum of its parts**



Conceptual Setup-Flow of Activities

