

Model-aided learning for adaptive management of natural resources by agriculture: an evolutionary design perspective

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In addition to access to food, the production of sufficient food to feed the global populations 50 years from now is high on policy and research agendas. Different systems of food production are possible and are subject to debate. Notions such as sustainable intensification, conservation agriculture, eco-agriculture and organic agriculture represent combinations of objectives and means of agricultural production. Often the objectives are implicit and the means constitute a highly reduced set from the 'global basket of technologies'. In view of the inherent uncertainty about objectives, means and drivers of future change, choices should be underpinned by scientific methods that reveal trade-offs among objectives and the associated land use patterns, taking into account scale interactions. In this presentation, approaches developed at the Farming Systems Ecology group in Wageningen will be presented that allow systematic model-based evaluation of alternative system configurations at farm and landscape levels. Examples will be provided in which modelling activities were adjusted to contribute to ongoing innovation by stakeholders. Such design-oriented approaches built on analytical insights avoid pre-emptive choices and enable learning based on a diversity of solutions.