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Agroforestry Modelling — Managing Complexity

EDWIN C. ROWE

Centre for Ecology and Hydrology, United Kingdom

Abstract

Agroforestry has been promoted for its ecological benefits to farmers, such as sustained production, improved resource use efficiency, and soil conservation. However, farmers' perceptions of costs and benefits often differ from those of external researchers. Labour has a significant opportunity cost even for the poorest farmers, and so return to labour can be more important than return to area or to fertiliser. Other costs that are commonly undervalued by external researchers include risk, learning, and the development of new institutions such as trading networks and advisory services. There is growing recognition of the external benefits of agroforestry such as conserving biodiversity, reducing downstream flood risk or sequestering carbon. Efforts to monetise these benefits and pass payments back to farmers are welcome, but are unlikely to be successful unless the discrepancy between external perceptions and true or farm-gate costs and benefits is addressed. Even the farm gate may not be close enough * patterns of control of resources within farms vary and need to be understood. Farms themselves are heterogeneous. Modelling can help refine agroforestry techniques for particular niches within this complex social and ecological landscape. Modelling aimed at improving agroforestry systems needs to incorporate state-of-the-art knowledge about biophysical processes. Models must also generate indicators relevant to decision-makers at different scales. This depends on good communication among modellers, experimenters and farmers, so that adequate but measurable parameter sets can be developed. Communication is greatly aided by involving specialists, by imposing strict modularity when developing models, and by striving for transparency.

Keywords: Agroforestry, modelling