

Introduction to section 5 – Management of natural resources

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Several key themes emerged from the Natural Resource Management (NRM) workshop at the 2004 IFSA conference in Vila Real. The implications for agricultural landscapes are as strong under the current period of CAP reform and declining farm incomes as they were during the period of agricultural intensification. Farming is increasingly under pressure from international trade reform and environmental regulation. What role do farmers have in this new scenario of changing policies? What are the opportunities for farmers, as well as for wider society, in the quest for sound management and use of natural resources?

Individual farmers do not always recognise their roles in the wider landscape, or management of natural resources beyond those associated immediately with cropping, and yet farms differ considerably in their relationship with the environment through differences in farm size, production systems, geographical location and farmer backgrounds and attitudes. This diversity is itself a source of innovation which must not be inhibited by emerging regulations. This farmer knowledge is strengthened through communication and collaboration within farming communities, and farmers have an important role to play in guiding future NRM policy and ensuring that it is practically grounded.

It is particularly important that state interventions such as regulation and agri-environment schemes are compatible with farmers' developing market opportunities. In developing policies, objectives must also be sensitive to scale, from field to farm, to landscape, catchment and region. People from outside the farming community and from outside the farming area have an increasingly important role to play in determining how agricultural landscapes will evolve. Attitudes and behaviour of urban people can often clash with those of farmers and other rural people, but also provide opportunities through recreation and product marketing. What about the role of researchers? Should they lobby within the research realm to promote specific types of research, or in wider society to promote specific values? As researchers, we are not independent of the systems we study.

A common theme is the increasing need for communication, between farmers, researchers and other stakeholders within rural and urban communities. Modelling and GIS provide means of facilitating such communication, as well as improving understanding of spatial and temporal issues within individual communities.

These themes are further developed in the papers of this section. Sustainable integration of agriculture and environmental management is the theme for Jayanthi *et al.* and Jennings *et al.*, reporting respectively on a mixed livestock and cropping system in India and a dairy system in Australia. The diversity of situations in which NRM is paramount is clear, but the need to recognise such diversity at the regional scale and below is also accepted. The extent to which agricultural production and NRM are integrated varies between sites and systems. Van Doorn investigates landscape functions within an agriculturally 'marginal' area of Portugal where NRM is integrated with farming but varies between farm and farmer. Levin *et al.* explore the relationship between uncropped landscape features, in the form of hedges, and the influence of changes in farm and field size in Denmark. Knickel *et al.* provide an example from Germany

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of an integrated approach to landscape management involving the co-operation of farmers, conservation groups, small food companies, tourism and other interests in developing a multifunctional vision for an agricultural landscape.

Targeted wildlife conservation is a recurring theme amongst post-productivist agricultural policy, but how does this accommodate the structural attributes of farms in different landscapes, and the equally variable attitudes and interests of farmers? Swagenmakers and Knierim and Kächele provide insights into this issue in The Netherlands and Germany respectively. Again, knowledge exchange and dissemination is a key theme, involving the knowledge and skills of farmers themselves, coupled with those of scientists and other stakeholders. Stobbelaar *et al.* investigate the relationship between the type of landscape preferred by local people in the Netherlands, and the farmers who are expected to produce it.

Increasingly, catchment scale management of water is an issue for farmers, requiring improved understanding of the land managed by farmers in the context of the wider environment, and specifically river basins. Co-ordination between farmers and between farmers and other actors is also essential for this process. Souchère *et al.* explore the potential of geographical modelling to improve understanding and communication of NRM concepts in the French Upper Normandy region. Jennings *et al.* use different process tools to engage farmers in a similar issue, while for Baptista and Sousa, the issue is one of water as a resource for irrigation in Portugal. They apply Earth Observation techniques to this increasingly widespread and important issue. Groot *et al.* develop a visual application to engage local farmers and other stakeholders in a different range of interrelated issues associated with landscape and conservation within a farming system.

The section therefore covers a wide range of NRM issues in a range of countries across the world. Throughout though, the aim is to improve the sustainability of NRM and use through integration of objectives and through improved understanding amongst all involved.