



AGRISPACE  
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### Interdisciplinary perspectives

Increasing recognition of complexity and change in real world problem solving (Jackson, 2006), acknowledgement of the need to involve all stakeholders to solve 'real world' land management problems (McCown & Parton 2006), a need for more 'democratic' and open science (Lowe & Phillipson, 2006), and increasing wariness by governments of being "sold simple solutions to complex problems" (Jackson, 2006: 647), have led to science increasingly turning to interdisciplinarity and transdisciplinarity to resolve 'real world' land management issues such as those addressed in the AGRISPACE project. However, difficulties in developing research with high levels of integration are widely acknowledged in the literature (e.g. Balsiger, 2004; Loibl, 2006; Petts et al., 2008) meaning that careful planning is required to achieve the desired outcome.

A key component of this is the recognition that different levels of integration are required to complete different tasks in integrated research (Blevis et al., 2009), and thus the type and level of integration may vary over the length of a project and the task at hand (Jerneck et al., 2011). We acknowledge the existence of three key levels of integration (see Stock & Burton, 2011) that will be applied in AGRISPACE.

*Multi-disciplinary* – non-iterative research focused on disciplinary action within a specific research field but with the results shared by other disciplines and/or work-packages.

*Inter-disciplinary* – problem focused iterative research coordinated between disciplines and/or work packages where effort is made to cross epistemological and ontological boundaries (e.g. qualitative and quantitative research methodologies) but stopping short of the development of new theory or research 'fields'.

*Trans-disciplinary* – a holistic problem focused approach involving stakeholders and scientists co-developing knowledge with a clear objective of both resolving the problem and synthesising new disciplines and theories.

Stock & Burton (2011) suggest there are two key approaches to integration between disciplines in multi-inter-trans-disciplinary research; the development of a unitary theory or methodological pluralism. Unitary theory involves a single methodological approach agreed on by all disciplines involved, whereas methodological pluralism contends that not all methods (for example, quantitative and qualitative methodologies) are equally valid in all situations. Instead, it makes "explicit use of theory to identify the strengths and weaknesses of different methods, and view them as complementary – addressing different kinds of question" (Midgely, 1996: 25 – also see Jackson & Keys, 1984).

AGRISPACE adopts the methodological pluralism approach to integration, primarily because it enables projects to "focus more directly on the problems, rather than the particular intellectual tools used to solve them" (Haddorn et al., 2006: 120). However, methodological pluralism itself represents a serious intellectual challenge (Midgely, 1996). Evaluation of earlier Norwegian integrated research in

environmental and societal related sectors (Nenseth et al. 2010) indicates that overcoming this challenge requires a focus on successful planning, organisation, management, use of resources, flexibility and motivation among contributors.

Leadership is recognised as a key component of successful interdisciplinary research projects. The ability to motivate researchers (Hollaender, 2003), a willingness to cross disciplines (Jakobsen et al., 2004), and the ability to maintain balance between groups employing different methodologies/epistemologies and deal with conflict (Petts et al., 2008) have all been recognised as key components of leadership. In addition, it is important for interdisciplinarity that researchers remain 'problem oriented' rather than disciplinarily focused as it is this problem orientation that promotes high levels of integration with different disciplinary perspectives required to address different parts of the 'problem' (Bruce et al., 2004; Massey et al., 2006; Petts et al., 2008).

Methods of ensuring good integration include (a) developing an understanding of each others' language and key concepts in the early stages (Stevens et al., 2007), (b) involving all in the research team at the early stages of project development (Kooistra & Kooistra, 2003; Mottet et al., 2007), (c) maintaining collaboration activities throughout the project (Deconchat et al., 2007), (d) coordinating access to all emerging results from the work packages (Höll & Nilsson, 1999), and (e) integrating the knowledge of local stakeholders (Höchtel et al., 2006; Deconchat et al., 2007). In addition, work packages should have specific cross-disciplinary iterative linkages embedded in the methodology. Towards the end of the project it is good practice to make an assessment of interdisciplinary success through a 'communal reflection' process and an assessment of the 'significant outcome' (contribution of the research to problem solving) (Wickson et al., 2006).

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