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Modelling Interactions amongst People and Forest Resources at the Landscape Scale

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FLORES, the Forest Land Oriented Resource Envisioning System, is a framework to facilitate quantitative modelling of ecological, economic and social issues at the landscape scale. This issue of *Small-scale Forest Economics, Management and Policy* describes the evolution of FLORES from a concept to a series of models calibrated for diverse locations, and documents the lessons learned.

The idea to construct and use landscape-scale models of the forest frontier, based on simulating household decisions and land use at a spatial scale close to the field level, arose from a desire to add rigour to land-use policy research at CIFOR, the Center for International Forestry Research (Vanclay 1995). This simulation modelling approach to addressing interdisciplinary issues, where people are strongly interacting with forest resources, became known as FLORES, the Forest Land Oriented Resource Envisioning System (Vanclay 1998). Muetzelfeldt *et al.* (1998) constructed a simple prototype of a FLORES model to illustrate the concept and demonstrate the ability of a system-dynamics modelling environment to animate such a model (Muetzelfeldt and Taylor 1997, 2001). In 1999, FLORES became a reality, when 50 scientists from diverse disciplines met in Bukittinggi, Indonesia to construct the first FLORES model styled on this prototype (CIFOR 1999, Vanclay *et al*. 2003).

The Bukittinggi workshop and the resulting model were small but important steps in the process of establishing procedures, building confidence, proving concepts, fostering software development, and finding a workable approach to a complex

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problem. One of the less tractable issues that arose from the workshop related to the level of detail: many biophysical modellers intuitively and quickly arrived at a reasonable compromise for sub-models within their own expertise, but tended to become bogged down in detail when assisting others. There was much less previous experience in developing dynamic simulation models of how people made decisions, as influenced by an unfolding social, economic and environmental context. This led to a considerable diversity of opinion about the desired level of detail: for some, the model diagram negotiated at the workshop was a 'horrendogram' that was too complicated to be useful, while others felt that it was 'beginning to approach the complexity required to acknowledge social interactions in the real world'. The diversity of views about the appropriate level of detail persists, and is evident in the contributions to this special issue (e.g. Vanclay 2003, Haggith *et al*. 2003b).

The Bukittinggi workshop was the beginning, not the conclusion, of work on the Rantau Pandan model. In the three years since the workshop, the model has been enhanced to better represent the intentions of workshop participants, modified to take better account of social interactions (Haggith 1999, Haggith *et al*. 2003a), and tested in relation to local circumstances and perceptions (Joshi 2000). While the model was not developed to a stage where it could have been adopted by local planners, much has been learned from the process (Vanclay *et al*. 2003). The experience has guided the development of FLORES models elsewhere (e.g. Legg 2003, Prabhu *et al*. 2003) and stimulated the development of the FLORES Local Adaptation and Calibration (FLAC) Package (FLORES Society 2001).

The Bukittinggi workshop and the Rantau Pandan model have also inspired alternative approaches to similar issues elsewhere (e.g. Purnomo *et al*. 2003a). In February 2002, an International Symposium held in Harare (Zimbabwe) provided a forum to share experiences from applying the FLORES approach in diverse situations. Symposium presentations included reports of experiences from Asia (Purnomo *et al*. 2003b) and Africa (Prabhu *et al*. 2003), with single (Standa-Gunda *et al*. 2003) and multiple natural resources (Legg 2003), and with abstract (Haggith and Prabhu 2003, Haggith *et al*. 2003c) and more concrete concepts (Robiglio *et al*. 2003). Included in this special issue are selected papers from the Harare symposium that may assist others dealing with similar issues. These papers address a broad range of issues, but all share a common concern for more effective management of people's use of forest resources.

It is somewhat surprising that lessons learned to date from the FLORES experience are not so much about the technical aspects of modelling households and landscapes addressed by Haggith *et al.* (2003a), but rather more general aspects about managing teamwork (Vanclay *et al*. 2003), defining problems (Haggith *et al*. 2003b), and idealizing possible solutions (Haggith and Prabhu 2003). There remain many open questions relating to issues much broader than the specifics of modelling, including questions about the use of forest resources (Standa-Gunda *et al*. 2003), planning for sustainability (Purnomo *et al*. 2003b) and about extension and education (Haggith *et al*. 2003c).

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