Final Technical Report   R7315

FLORES
Forest Land Oriented Resource Envisioning System

Executive Summary

People usually know *how they want their situation to change* to secure a better future – but they do not always know *how to change their situation*. Initiatives do not always work as intended, and unforeseen consequences may be tragic. Computerised models can help advocates explore alternatives, so they can make an informed selection, secure in the knowledge that consequences have been evaluated. This will empower them to be more innovative and critical of land use plans and policies, without alienating them or making them dependent on technocrats. The obstacle is not software, but the lack of a suitable framework for expressing and experimenting with ideas. FLORES, the Forest Land Oriented Resource Envisioning System, is such a framework to stimulate interdisciplinary collaboration between researchers, planners and clients. This project has demonstrated that present computers (high-end PCs) and modelling software (Simile) are able to support such a model, and that scientists from a range of disciplines are able to work together to express their idea and understanding in a mutually accessible way. The simple version of FLORES developed during the project was favourably reviewed in independent testing by ICRAF, but further work is needed to fully implement the model and make it accessible to target users.

Background

Complete information is a luxury that does not come into play when forest and land use policies are made or amended. New policies and changes to existing policies are usually promoted by a few influential individuals, who are often blind to unintended side effects of their proposals. This situation is compounded because biophysical and socio-economic scientists tend to use different jargon and thus often do not engage in effective debate. The result is that many policies and other initiatives are ineffective or counter-productive. An important challenge for development agencies is to find ways to help stakeholders communicate more effectively, and to become more aware of possible side-effects arising from initiatives.

Project Purpose

The purpose of the project was to evaluate the feasibility of FLORES (Forest Land Oriented Resource Envisioning System), a system to help decision makers to evaluate policy alternatives, by building a simple version in a multidisciplinary workshop. The intention was not to build everything from scratch, but to draw on existing models and knowledge to provide a framework to express and explore policy and land use alternatives, and facilitate empirical tests of predicted outcomes.

Research Activities

Bukittinggi Workshop, Sumatra, January 1999: Some forty scientists and ten support staff participated in this two-week workshop. Originally we envisaged a smaller workshop, but widespread interest and many requests to participate led us to increase the number of participants. About thirty scientists were targeted for their skills, experience and knowledge (social, technical and local) and invited to the workshop. Most of these people agreed to participate. We also announced the workshop on several internet lists

and printed newsletters, calling for expressions of interest. This generated a lot of interest, leading us to invite more participants than we originally envisaged, and prompted us to maintain an moderated email discussion and an internet site (see http://www.cgiar.org/cifor/research/FLORES/index.html) throughout the workshop so that others could participate remotely. Despite trying to balance expertise in agriculture, forestry, biodiversity, socio-economics and commerce, the FLORES concept apparently appealed more to those whose initial training was in a biophysical area. Fortunately, the concept appealed to several social scientists who made an important contribution to the workshop.

At the workshop we produced a working version of FLORES calibrated for two villages in the Rantau Pandan area of Sumatra. This version was incomplete and overly simplistic, but it demonstrated the feasibility and possibilities of what we were trying to achieve. We learned several lessons from the workshop

☺ AME was a useful platform to express ideas explicitly, and share them with others from different disciplines and backgrounds.

☺ Building model with limited time forced participants to prioritise issues, helping them identify and explain the essentials and avoid diversions on trivialities and unnecessary detail.

☺ The virtual workshop on the internet was well worth the effort and stimulated a lot of interest in the FLORES concept and the workshop process.

☹ AME wasn't a mature product at the time of the workshop, and lacked some constructs and documentation needed by participants. That has since been attended to, and Simile (as AME is now called) is a powerful platform suited to the demands of FLORES-style modelling, and good documentation is available.

☹ Too many participants and too many parallel workgroups compounded the challenges of getting submodels to link seamlessly. Ensuring that each group accommodated the input and output requirements of others remained a critical issue throughout the workshop.

☹ Modellers tended to build new models afresh rather than finding ways to accommodate existing models. This may be satisfying creative activity for them, but needs calibrating, and neglects the considerable resource of existing models.

☺ The workshop stimulated a strong commitment and sense of ownership of FLORES amongst participants, and many have continued to work on FLORES in various ways.

GIS database: We proposed to use a hypothetical landscape for Bukittinggi workshop, but participants were committed to a realistic product and rightly felt that the validity and utility of the model could only be demonstrated with real world data. Chris Legg of the EU-FIMP project in Jakarta provided a suitable GIS database for the Rantau Pandan area a few months after the workshop. This database was used in subsequent FLORES work.

Household Decision-making model: The FLORES concept involved simulating *agents* and their interaction with the landscape, and that these *agents* could be villages, households and/or individuals as the situation required. Despite much discussion at the Bukittinggi workshop, an appropriate scale was not resolved, but a decision was taken to work at the household level at least until empirical experience could guide a more informed decision. Because of limited time, expertise and AME capability, the Bukittingi household submodel was an expedient compromise. Francois Bousquet and Martine Antona of CIRAD hosted a followup workshop in Montpellier in May 1999 to

resolve some of these outstanding questions, and Mandy Haggith summarised these workshop findings as a formal model specification (available at http://www.cgiar.org/cifor/research/FLORES/FLORES-Decision.pdf).

Enhancements to AME: Workshop participants requested several extensions to AME, and these have been made in the new version, now called Simile. Simile combines the best features of compartment-flow and object-oriented modelling, and is accessible to people unfamiliar with computer programming languages because the model is represented diagramatically rather than as a foreign language. A draft reference manual and user guide for Simile is now available, as are several tutorials. Simile is available freely from http://www.simile.co.uk

Implemention: Robert Muetzelfeldt and Jasper Taylor implemented Mandy's specification and other enhancements to the Bukittinggi model to create a revised Rantau Pandan FLORES. Modelling of household decision-making is somewhat onerous, and the model runs too slowly for interactive use at the present time. Thus Robert also constructed a cut-down version (Floret) for demonstration purposes. Both versions are available on the internet at http://helios.bto.ed.ac.uk/ierm/flores

Evaluation: The Rantau Pandan version of FLORES was evaluated in the field by an independent team of people led by Laxman Joshi (ICRAF). They made several constructive suggestions for improvement of the model, and these are presently being addressed.

Outputs

The most important outputs from the project are intangible, namely the network of people enthused by, and working on FLORES-related activities, and the demonstration that a FLORES is practical and achievable. However, there are tangible outputs:

- Two versions of FLORES calibrated for Rantau Pandan have been produced, have been distributed to workshop participants on CD, and are available to others on the internet at http://helios.bto.ed.ac.uk/ierm/flores/
- Major enhancements have been made to AME, now called Simile, making it the most advanced modelling package of its kind, and uniquely able to represent concepts relating to interpersonal and land-related transactions. It enables complex concepts to be represented in a diagrammatic form accessible to those without advanced computer programming skills. Simile is available freely at http://www.simile.co.uk
- A Simile user guide, reference manual and several series of tutorials targeted for different user groups are also available at http://helios.bto.ed.ac.uk/ierm/ame/

Contribution of Outputs

FLORES, and the FLORES workshops, contribute to DFID's goals indirectly, by
- Improving the dialogue amongst stakeholders and advisors with diferent backgrounds, by helping them to explain clearly and coaxing them to explain how parts of a system interact.
- Helping people to focus on the important issues, and providing a way to test the sensitivity of outcomes to issues.
- Providing a way to evaluate alternative scenarios on an equal footing.

Although the concept and its feasibility have been proven in the present project, further work need to be done to implement the enhancements requested by the ICRAF team that performed the independent evaluation, to improve the implementation of Simile and FLORES so that simulations run more quickly, and to provide a user interface more suited to client needs. Fortunately, the development team have a good understanding of what is required, and are committed to delivering.

Further development of FLORES is assured, because:
- FLORES is a key component of the project "Integrated use of agroforestry models to support policy formation" (PM99-05) supported by DFID during 2000-1.
- Three of the six programmes at CIFOR (Sustainable Forest Management, Adaptive Co-Management of Forests, Conservation of Biodiversity and Genetic Resources) are pursuing some aspects of FLORES within their core activities, and are using FLORES to integrate and disseminate findings.
- Robert Muetzelfeldt, the author of AME/Simile, has a 3-year research fellowship, and plans to devote one third of his time to the development of FLORES.
- Several individuals in academia (eg., Fergus Sinclair, Jerry Vanclay, Robert Muetzelfeldt), in development agencies (eg., Doug Sheil, John Poulsen, and Unna Chokkalingam at CIFOR; Matina Antona at CIRAD, Laxman Joshi and Meine van Noordwijk at ICRAF), and in target agencies (eg., Kathryn Monk at the Leuser Management Unit, Frank Matose of the Zimbabwe Forestry Commission, Philip Nyhus of the Community Conservation & Education Program) are committed to further development, implementation and practical application of FLORES.