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The use of participatory three-dimensional modelling in community-based planning in Quang Nam province, Vietnam

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Vietnam has set a course for political and economic change. Decentralisation has allowed individual provinces in Vietnam significant autonomy to interpret national laws and policy. These changes are opportunities to harness the legal framework for change into community-based planning and participation in natural resource management. The MOSAIC programme in Quang Nam province, central Vietnam, has adopted innovative planning tools at the local community level, such as participatory three-dimensional modelling (P3DM). MOSAIC is building experiences, lessons, and partnerships to frame provincial policy for sustainable land-use planning. The programme is navigating the complex State administrative structure to magnify site-based results into wider-scale policy and planning at provincial, regional, and up to national levels.

Introduction

In Vietnam environmental problems are mounting as the country develops the economy and rural infrastructure after decades of war, instability, and social upheaval. With a high proportion of the rural-based population dependent on forest resources (Baker *et al.* 2000), sustainable development and poverty alleviation are seen as priority, and are

intrinsically linked to forest resource conservation.

Towards this recognition, the Vietnam government has attempted to switch its focus to 'community-based' planning approaches. There is an evolving policy framework for community participation in the natural resource management sector. The decree 'Strengthening Democracy at Local Level'¹ and the recent circular on 'Strengthening Urgent Measures on Forest Protection and Development'² call for grassroots participation in Local Government issues, with specific reference to the management of natural resources. In Quang Nam province, a logging ban decree details the importance of local collaboration in forest protection measures. Despite supportive legislation and wider macro-economic decentralisation policies, the on-the-ground reality is a lack of political credibility, resources, communications, and capacity. However, in Quang Nam province, political willpower has allowed for a coherent attempt at

¹ Decree No. 29 ('The Democracy Decree') was issued in 1998 by the Government of Vietnam with the aim of strengthening democratic mechanisms at the local level. It stipulates increased consultation and participation of citizens in Local Government issues.

² Circular number 12, 16 May 2003 challenged the effectiveness of current natural resource management, protection and enforcement, and urged for continued reform.

strategic land-use planning for long-term natural resource management, with communities involved in the decision-making processes. This is in part due to recent national circulars highlighting forest protection as a key factor in reducing the impacts of flooding, to which Quang Nam is particularly prone. The last catastrophic inundation, in 1999, cost hundreds of lives and millions of dollars.

The focus area: Quang Nam province, central Vietnam

Quang Nam province is rated as one of the poorest in Vietnam. The Committee for Ethnic Minorities and Mountainous Areas (CEMMA) has ranked 60 communes in the six mountain districts as highest priority for poverty alleviation. The population of these six districts is 87% 'ethnic minority', from 12 different ethnic groups, predominantly Ka Tu. In the Song Thanh area, transport, market access, education, basic infrastructure, health care, and social services are all minimal, whilst the effects of decades of war still have ongoing repercussions.

Upland communities in Quang Nam exhibit strong potential for effective forest governance through local institutions (Hardcastle, 2002). However, open-access resource regimes are rapidly depleting local forests, with the indigenous communities powerless against outsiders, despite provincial plans to accelerate the allocation of forestland to localities.

The MOSAIC Programme

The MOSAIC (Management of Strategic Areas for Integrated Conservation)³ programme is a partnership between WWF, the Vietnam Forest Protection Department (FPD), and other key stakeholders in Quang Nam Province. The aim of MOSAIC is to provide for appropriate and long-term management of important natural resources throughout the province and it supports the pilot forestland allocation programme through innovative approaches to community-based planning.

MOSAIC works at three administrative levels (see Table 1): firstly, with a coordination unit at the provincial level, directly linked to key government departments. Secondly, MOSAIC is active in all 16 districts of Quang Nam province, working through the relevant sub-departments. Finally, MOSAIC works within the Commune level, initially within twenty-one prioritised Communes, liaising with the

Community consultation underway in the Ka Tu 'Guorri' meeting house



Photo: Le Van Lanh

Commune People's Committees, whilst working on the ground with villages and communities.

One of MOSAIC's goals is to help develop a provincial-level strategy for effective forest management including sustainable natural resource harvesting. MOSAIC has worked with all stakeholders to prioritise forest units for concerted conservation effort in order to mitigate and offset current and potential threats, and act on the varied opportunities. Towards this effort, innovative approaches to community engagement in conservation action are being piloted. Three of the priority Communes, including Tabhing (described below), were selected as pilot sites according to biological, socio-economic, and political criteria.

Tabhing commune and Song Thanh Nature Reserve

The primary MOSAIC pilot site, Tabhing Commune supports 379 households in nine villages. The terrain is steep, inaccessible, and cut by many rivers and streams. Natural forest cover is high, apart from the inhabited valleys and swidden agricultural plots. Tabhing Commune is partly included within the boundary of Song Thanh Nature Reserve (STNR).

Participatory planning for Tabhing commune

Reaching the grassroots

A series of multi-stakeholder workshops provided crucial support and approval for the MOSAIC programme. For Tabhing, a draft action plan was compiled based on detailed participatory research, with twenty key activities to be initiated over a six-month period. Participatory three-dimensional modelling was one of the primary tools to be employed, primarily to facilitate forestland allocation and resolve tenure conflicts. The action plan was then taken to

³ The MOSAIC concept was developed by the primary and third authors, based on experience of community-based conservation activities in northern Vietnam, yet in response to the Quang Nam provincial call for assistance in strategic planning for natural resource management. It was developed to match the WWF Indochina support for landscape-level conservation in the Central Truong Son area (Baltzer *et al.* 2001).

Table 1: The administrative structure in Vietnam

Level	Approx population	Structure	Role
Provincial level	1 million to 3.5 million	Provincial People's Committees	Administrative authorities. Broad decentralised legislative powers within the overall national policy and legal framework.
District level	300,000 to 500,000	District People's Committees	Administrative authorities at local level. Legislative power within an allocated budget and provincial policy and legal framework. Degree of decentralised powers depends on the particular situation, and especially on individual leadership.
Commune	3,000 to 5,000	Commune People's Committees	Sub-committee reporting to the district authorities. The commune has legislative power at the local level, but all decisions must be approved by a relevant department at the district.
Village	100 to 1,000	Village leader	No legislative power, yet an officially appointed leader reports to the commune people's committee. However, often <i>de facto</i> leadership (such as village elders) lies outside the state institutions with limited reach and no legal recognition.

the Commune and villages for public scrutiny. A series of consultation meetings preceded village-level 'citizen's juries' (called 'people's forum' in Vietnamese). Each item on the action plan was presented for questioning by local villagers, using the discussion forum and also a household response sheet. The aim of the action plan was to clarify local land-use issues and develop a coherent land-use plan for each village within the Commune. The final action plan for the Commune was approved at the district level, where all stakeholders had a chance to review the plan. Budgets and timeframes were linked to milestones and indicators, and the plan was officially recognised by the District Government.

Participatory three-dimensional modelling

One particular element of the methodology is the use of participatory three-dimensional modelling (P3DM), building on experiences gained in Pu Mat National Park (Rambaldi *et al.*, issue 46 of *PLA Notes*, 2003). The method leads to the manufacture of accurate 3-D models of a chosen area, upon which to hinge discussions, communication, and planning. The P3DM activity was introduced to the Quang Nam provincial authorities in an orientation seminar, with participants from all relevant departments.

The coordinating team and twenty 'trainees' from provincial departments travelled to Song Thanh Nature Reserve in Tabhing, where the P3DM exercise was carried out between 6-16 May 2003. The area covered by the model totals 300km². A base map at 1:10,000 scale with

20m contours was used. Carton sheets, 4mm thick, were cut for each contour, resulting in a vertical scale of 1:5,000. After a preparatory day, students and teachers from Tabhing secondary school were invited to attend, over two days, to help manufacture the blank model, before preparing to invite the local Ka Tu people to take the stage.

Once the model was completed, locals from nine villages in Tabhing, and two from neighbouring Ca Dy Commune were invited, in two groups, to transfer local knowledge onto the model. In total, 125 villagers actively participated in producing the model, with orientation conducted in Ka Tu language.

Villagers selected the features they would depict on the model, using coloured paint, yarns, and pins provided by the facilitators. In this way, intellectual ownership of the output was ensured and an insight into the relative local value of land features was gained. For example, the rivers and streams were marked very prominently, before forest areas, roads, or mountaintops were identified. With five or six people from each village, there was enough 'peer discussion' to locate, identify, and name features accurately. These included paths, streams, households, traditional meeting houses, different types of forest, shifting cultivation land, cinnamon plantations, artisanal gold mine workings, and even wartime helicopter bases.

Animated discussion arose between villages and several minor conflicts, such as village boundaries, were resolved through debate focused around the model. Other issues, such as illegal gold mining, were identified and discussed. As the model began to take shape, more specific issues emerged.

⁴ Rural areas have significantly lower populations than the coastal strip and lowland plains.

Table 2: Methodology applied in Tabbing

Element	Community-based planning in Quang Nam
Planning unit	Commune.
Methodology	Action planning. Special emphasis on 3-D modelling as a form of participatory mapping.
Facilitation of commune plans	By local Forest Protection Department and other partner departments, supported by WWF, and endorsed by the district People's Committee.
P3DM exercise	P3DM exercise covering the Tabbing area (30,000 ha) and involving 125 representatives from local communities. The event has also served as a hands-on training ground for a wider audience and lay the ground for adoption of the P3DM method elsewhere.
Financing the planning process	Largely through MOSAIC, with funds from a range of WWF sources, as well as local government contributions and mobilised resources.
Funding the implementation of the plans	Principally from local revenue for community projects, backed up by national programme budgets, such as the '5 million hectare' reforestation programme. Focused support from MOSAIC is ongoing.
Linkage to district and provincial plans	Direct linkage to district development plans and to provincial strategy for conservation and sustainable use of natural resources. It is also a pilot for the provincial forestland allocation programme, which will be replicated across 60 upland Communes in Quang Nam, allocating nearly 500,000ha of forest land to local management regimes.
Implementation of the community plans	Identified responsibilities and finances are clearly outlined. Much of the support is for the community itself to carry out and monitor activities.
Monitoring of implementation at community level	Community groups, such as the 'village protection teams', with external monitoring from a set of relevant departments and individuals. Monitoring will be based on a set of mutually defined indicators, with many data collated at the household level.

Foremost was the placing of the boundary of the Nature Reserve by the STNR vice-director. It was instantly clear that it conflicted with local agricultural and forest resource use. The villagers from both groups challenged this boundary, and after discussion, demarked a preferred boundary, to which the STNR vice-director agreed in principle – a significant breakthrough.

MOSAIC is currently working with STNR and the provincial authorities to facilitate an assessment of the reserve boundary. Due to the legal status of the reserve, this is possible at provincial level. However, the boundary issue is also under discussion at national level for a separate issue, gold mining. The model has shown clear conflicts between local resource-users and illegal gold miners. The model has allowed MOSAIC to raise these topics directly with the relevant authorities, following local community identification of hot issues during the modelling process, in an official and recognised planning activity.

Lessons learnt from P3DM as a tool for community-based planning

Feedback from the participants, both trainees and local people, allowed for an initial stock-take of lessons from the whole planning exercise. Seven common themes emerged:

1. The model was a powerful tool to use as the basis for discussions and planning for the local area, and to assess the importance of issues.
2. The model, including the legend identifying which data is represented by the model, must be 'owned' by the community participants, accurately reflecting the values local people attach to landscape features and resources, and giving them confidence.
3. Local people are capable resource persons, with a good knowledge of the lay-of-the land, and are well capable of making models and using spatial representation.
4. Reproducing the landscape on a relief model has a strong learning dimension, especially when it results from the negotiated collation of knowledge stored in the minds

Ka Tu girls tracing contour lines during the manufacture of the blank model



Photo: WWF / James Hardcastle

'Tell me, I forget.
Show me, I remember.
Involve me, I understand.'
(Moore and Davis, 1997)

of 125 informants, each one mastering a piece of the puzzle.

5. Elderly people, women and youngsters provided valuable contributions to depicting data on the model and to the discussions.
6. It is important to listen to the local interpretation and presentation of the detailed model in plenary discussion, and reflect these lessons in future activities. Women and children made an invaluable contribution to the model and to the discussions.
7. It is important that authority representatives are present during the modelling activity, as well as local representatives from across the locality, to quickly settle disagreements and ensure that the local perspectives are well understood by all.

Initial follow-up in Tabhing

Village protection teams: Tabhing commune People's Committee passed two decrees establishing village protection teams, which are recognised under national and provincial laws. The teams were granted powers of arrest to

apprehend, for a period of twelve hours, 'outsiders' caught in any act of illegal access or forest crime, and anyone else in transgression of a series of agreed terms on local forest protection. This provides sufficient power to enable violators to be handed over to the appropriate authority. They used **patrol zones**, based on markers placed on the 3-D model. The number of arrests to date are estimated at around sixty.

Boundary reassessment: the reserve boundary will be reassessed over the coming two years and demarcated on the ground in partnership and with consensus of local communities.

Forestland allocation programme: data extracted from the 3-D model through digital high-resolution photography⁵ have been merged with topographic data and elaborated in a Geographical Information Systems (GIS) environment. The resulting information has been used to draft thematic maps to be used in a consultative process meant to support forestland allocation.

Village and Commune land-use plans: based on the

⁵ More information on the extraction process is found in issue 46 of PLA Notes, 2003 (Rambaldi et al. 2003) and at www.iapad.org/participatory_p3dm.htm

Conflict resolution during local planning discussions based on the 3D model



Photo: WWF / James Hardcastle

information and issues visualised on the 3-D model, land use plans are being collated in collaboration with the Commune authorities and relevant departments. A series of local-level meetings will confirm the plans and link them to other activities (reforestation, forestland allocation).

Clear steps for co-management arrangements: Song Thanh Nature Reserve (STNR) is currently preparing a management plan, based on an operational plan for the period 2003–2008. This operational plan outlines steps to be taken to devolve relevant management responsibilities to the local communities in and around the reserve.

Proposed modelling activities to the east (Cha Val) and South (Phuoc Duc-Phuoc My) to cover the full boundary of the STNR.

Transfer of the model to the Commune office: the model will be moved to the Commune office, to allow for wider use of the model for local-level issues.

Replication and scaling-up

MOSAIC will continue to foster pilot sites, with a fourth site encompassing the A'Vuong watershed area, consisting of five

Communes. Elsewhere, the MOSAIC model is providing lessons for the newly listed Phong Nha-Ke Bang Natural World Heritage Site, in north-central Vietnam. MOSAIC also has a 'sister' programme underway in the Mondulkiri province in Cambodia. As the Central Truong Son Initiative gathers momentum, the MOSAIC lessons in community-based planning will be tested across the central mountains of Vietnam. In 2003, participatory three-dimensional modelling has also been used in the context of the GEF/UNDP-funded PARC project in Ba Be and Yok Don National Parks.

Conclusion

The MOSAIC results show community-based planning as a tool for framing action at a 'provincial' scale and how efforts to link landscape-level planning into micro-level conservation action have benefited from P3DM as a learning, planning, and mediating tool. The P3DM method⁶ has

⁶ P3DM has been used in Thailand and the Philippines for many years in the contexts of natural resource management planning and Indigenous Peoples' rights. It has been recently introduced in Nepal, India, Colombia, Ecuador, and Vietnam.



The Ka Tu village protection teams plan their patrol routes

proved to be cost effective in terms of collating and visualising community knowledge in an accurate and clearly understandable manner. The cost of completing a 1:10,000 scale 3-D model involving a large number of informants and exporting the displayed data into a GIS environment, corresponds to approximately US\$4/km² or four cents/hectare. Compared to alternative data gathering methods, P3DM is cost effective. When looking at P3DM as a method for efficiently supporting learning, planning and community empowerment, investing in it has additional non-monetary benefits.

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