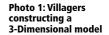# 15

The seventh helper: the vertical dimension feedback from a training exercise in Vietnam
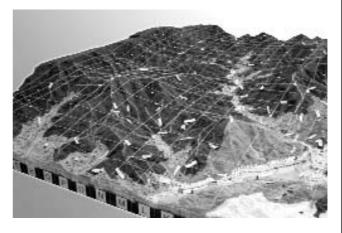
by GIACOMO RAMBALDI and LE VAN LANH

Participatory 3-D Modelling (P3DM) is a community-based mapping method developed in Thailand in the 1980s and fine-tuned in the Philippines over the past eight years. P3DM has been conceived to support collaborative processes related mainly to resource use and tenure and aimed at increasing public participation in problem analysis and decision making.

P3DM integrates people's knowledge and spatial information (contour lines[1]) to produce stand-alone scale relief models (Photo 1) that have proved to be user-friendly and relatively accurate data storage and analysis devices and at the same time excellent communication media (Rambaldi et al., 2000). Relief models may display exclusively community knowledge composed from the mental maps of the participants or be enriched by additional geo-referenced information obtained from field surveys, Global Positioning

Photo 1: Villagers constructing a 3-Dimensional model

Systems' (GPS) readings, and secondary sources.

When linked to a Geographic Information System (GIS), the P3DM method bridges the gap existing between Geographic Information Technologies and spatial Indigenous Technical Knowledge (ITK) found among marginalised, isolated, and frequently natural resource-dependent communities. The manufacture of a 3-D model leads participants through a collective learning process (see Photo 2) to the visualisation of their economic and cultural domains in the form of scaled and geo-referenced relief models, which can be subsequently used for different purposes. These

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[1] Contour lines can be sourced from existing topographic maps or from digital data sets. Bringing source data to the desired scale (e.g. from 1:50,000 to 1:10,000) may involve enlargement via digital copiers (modern photocopying machines) or elaboration in a GIS environment. The first solution is the cheapest, but suffers in terms of loss of accuracy. Incorporating GIS into the process increases accuracy and adds communication power to community knowledge. Compared to other processes used to generate geo-referenced and scaled data (aerial photography, remote sensing, etc.), P3DM is definitely cost effective (2-3 USD/km2 at 1:10,000 scale). What is more important is that by adding accuracy and transparency and to people's knowledge, the method definitely amplifies communication capacity. Obviously this does not happen for free ...

Photo 2: Discovery learning, the first step for informed decision making

Photo 3: 1:10,000 scale model of Pu Mat National Park, Nghe An, Vietnam

include among others collaborative research and planning, management of conflicts bound to the territory and its natural resources, community based natural resource management, participatory monitoring and evaluation and community cohesion and self-actualisation.

One major constraint of participatory 3-D models is their limited mobility due to their size and weight. Their use is therefore generally confined to those convening around them (see Photo 3).

To upscale their utilisation, P3DM exercises are best integrated with GPS and GIS to make the content of the models portable and sharable. This allows adding precisely geo-referenced data, conducting additional analysis, and producing cartographic outputs. The synergies resulting from the combinations of the three systems add veracity and authority to community knowledge, paving the way for more balanced power-sharing in collaborative natural resource management.

Practitioners using physical 3-D models at community level have found that when informants are provided with a blank relief model instead of a blank contour map or a blank sheet of paper, they can easily depict their spatial knowledge in a scaled, geo-referenced manner and add a lot of precise details. The fact that 3-D models augment the power of mind and facilitate scaling, allows for filling in information more fully and accurately on a given area. Generally this is not the case with sketch mapping, which has been widely used to represent spatial knowledge in the context of participatory action research. The difference between a blank contour map and the corresponding relief model is the physical vertical dimension that provides essential cues for stimulating memory and for establishing spatial associations.

Among the different visualising methods[2] used to spatially reproduce people's knowledge, P3DM is the one which – by adding the vertical dimension and using simple communication means like colours, shapes, and dimensions – offers substantial advantages for depicting cognitive maps (Rambaldi et al., 2002).

Here are some noted advantages of P3DM (Rambaldi et al., 2000 and Rambaldi et al., 2002):
• The physical 3-dimensional representation of space offers users a so-called bird's eye view and a common perspective from which to acquire a holistic view of the landscape where landmarks and salient features are *visible* to everyone.
• If the method is applied in a genuinely participatory manner, it generates relatively accurate qualitative and quantitative geo-referenced data that are intellectually owned and understood by those who have compiled them (Chambers, 2002).
• Both process and output fuel self-esteem, raise local awareness of linked ecosystems, and delineate intellectual ownership of the territory.
• Relief models provide stakeholders and local authorities with a powerful medium for easing communication and language barriers, and create common grounds for discussion.
• The method is especially effective in portraying relatively extensive and remote areas, overcoming logistical and practical constraints to public participation in land/resource use planning and management.
• Manufacturing a relief model has positive effects in stim-

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[2] e.g. sketch mapping, transect diagramming, participatory aerial photo-interpretation, relief modelling, mapping, etc.

ulating community cohesion because it gathers people to share information and concerns and frequently reinforces community self-actualisation through the revival of local knowledge. Old people share history with young people, passing on legends and religious beliefs, and knowledge of sacred rites and places so essential to conserving tradition (Alcorn, 2000:1–2).

• In Participatory Monitoring and Evaluation (PM&E) sketch maps, transect diagrams, or other conventional spatial tools produced at different times are compared. There is an inherent weakness in the fact that the outputs are not properly geo-referenced and consistently coded. P3DM overcomes this weakness, because the relief model is a constant with its legend and coding embedded.

• Most protected areas in Less Developed Countries do not have demarcated boundaries. Relief modeling can give communities and local authorities a clear first time factual understanding of their perimeter. This facilitates a bottom-up approach to boundary delineation and zoning, both of which activities tend to otherwise be characterised by bureaucratic logistics and lengthy negotiations.

• Thanks to the use of differentiated coding systems and materials, 3-D models, similarly GIS, accommodate over-lapping information layers, thus facilitating community-based analysis and decision making.

• Experience gained in the Philippines over almost a decade has shown that 3-D modeling exercises conducted entirely at community level, and as a response to local needs versus external threats, have yielded positive effects in terms of community-cohesion and identity building (PAFID, 2001).

The Vietnam experience

In response to a request made by the Vietnam National Environment Agency (NEA), the Vietnam National Parks and Protected Areas Association (VNPPA), the Social Forestry and Nature Conservation of Nghe An Project (SFNC), and the ASEAN Regional Centre for Biodiversity Conservation (ARCBC) organised a participatory 3-D modelling exercise in Pu Mat National Park, Con Cuong, Nghe An Province, Vietnam. The main purposes of the event included training participants in the use of the technique, acquiring data on the application of the method in the local socio-economic and environmental context while providing local stakeholders with a communication means that would enable joint learning and dialogue between ethnic minority groups living within or close to the park, government officials, and project staff.

The exercise was a Ministry of Agriculture and Rural Development (European Commission) funded intervention, the Social Forestry and Nature Conservation Project

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Box 1: Training in participatory 3-D modelling and visualising local knowledge for application in protected area management

Participating bodies
■ **Government agencies**
 • **Forest Protection Department (FPD)**
 • **National Environment Agency (NEA)**
 • **Protected Areas and Wildlife Bureau (PAWB), Philippines**
■ **National parks**
 • **Bach Ma National Park**
 • **Ba Be National Park**
 • **Cuc Phuong National Park**
 • **Tam Dao National Park**
 • **Pu Mat National Park**
■ **Non-government organisations (NGOs)**
 • **Vietnam National Protected Areas Association (VNPPA)**
 • **Conservation Education Network (CEN)**
 • **Centre for Environment, Tourism and Development (CETD)**
 • **Foundation for the Philippine Environment (FPE), Philippines**
■ **Projects**
 • **GTZ-funded Song Da Social Forestry Project**
 • **GEF/UNDP-funded Protected Areas Resources Conservation (PARC) Project**
 • **EU-funded SFNC project**
■ **Academe**
 • **Hanoi University of Sciences, Faculty of Biology**
 • **Hanoi University of Sciences, Faculty of Geography**
 • **National Centre for Natural Science and Technology (NCNST), Geographic Institute**
 • **Hanoi National Economic University, Faculty of Economy and Municipal Environmental Management**
 • **Centre for Resources and Environmental Studies (CRES)**
 • **Institute of Water Resource Planning**
 • **Human Geography Research Centre**

(1997–2004). This project aims to conserve biodiversity within the park through people's participation.

The hands-on training took place in November 2001, but preparations started well ahead.

The training, which followed an orientation seminar held in Hanoi in October 2001, had a broad outreach, involving a number of agencies, projects and NGOs (see Box 1) operating in the sectors of biodiversity conservation and natural resource management in Vietnam.

The core area and the buffer zone of Pu Mat National Park cover 91,000 and 86,000 hectares respectively and are inhabited by a number of minority groups, including Tay Phoong, Man Thanh, Dan Lai, Kho Mu, H'Mong, Thai, and Kinh. The population of approximately 10,000 resides in 16 communes and 110 villages. Key to the success of the exercise has been the active participation of 76 villagers inhabiting the park and its buffer zone, 30 students and teachers residing in the area, a number of park staff, 24 trainees, facilitators, and translators.

Photo 4: Key informants locating themselves vis-à-vis the relief model

The 1:10,000-scale model, measuring 2.8m x 2.4m, covers a total area of 70,000ha including portions of core area and buffer zones located southeast of the park. A 1:7500-vertical scale was used to enhance the perception of slope.

The exercise went through a series of phases including orientation, focus group discussions, and hands-on activities, all of which served as a learning ground for participating members from the local community, project and park staff, trainees, and facilitators. To complete the model, exercises were done to extract data and export these to a Geographic Information Systems (GIS) environment. Different methodologies were practiced including data extraction by the use of digital photography coupled with direct on-screen digitising.

Group dynamics

Careful attention was paid to group dynamics during the entire exercise. The trainees, coming from different institutions, easily became familiar with one another and generally worked as a team. The diverse educational background of the group (including cartographers, GIS technicians, biologists, socials scientists, and park management staff) positively contributed to the outcome. In fact, any P3DM exercise is meant to be facilitated by a multi-disciplinary group including at least three disciplines: cartography/GIS, community work, and environment.

The management of the Pu Mat National Park sent ten staff to attend the training. Interestingly – before starting the actual exercise – most of them expressed some doubts about the capacity of the villagers to fruitfully relate to the

Box 2. Fissuring frames of mind

The 'inverted map' exercise involves displaying on a wall a map featuring the terrestrial boundaries and/or the coastline of a country known to the participants, with the North pointing to the floor and the South to the ceiling, and stimulating discussion on the feeling induced by such an unconventional display.

Participants will generally concur that there is nothing wrong in hanging a map upside-down, except for the fact that their frame of mind has been somehow distressed and that this has caused feelings of discomfort.

Thereafter the facilitator should lead the focus of the discussion on the concept of 'diversity' and its social and cultural implications.

Photo 5: Quick reference guide

3-D model and to compose its landscape based simply on cognitive maps.

Questions like 'how can we correct their errors?' surfaced during two focus group discussions, organised in anticipation of the arrival of the key informants. The meetings helped prepare the park staff to accept different perspectives and the fact that there is more than one locus of knowledge.

'Do's and don'ts' of facilitation were discussed to enhance the importance of 'broadening the perspective' or 'developing analytical skills' of key informants, rather than 'correcting their mistakes'.

The 'inverted map' exercise (see Box 2) was used to encourage the acceptance of existing diverse frames of mind, and the necessity of 'thinking outside the box'.

After being oriented on the mechanics of the 3-D modelling exercise and on the use of the coding means, key informants quickly familiarised themselves with the topography of the model, and pinpointed the location of their houses and other landmarks (see Photo 4).
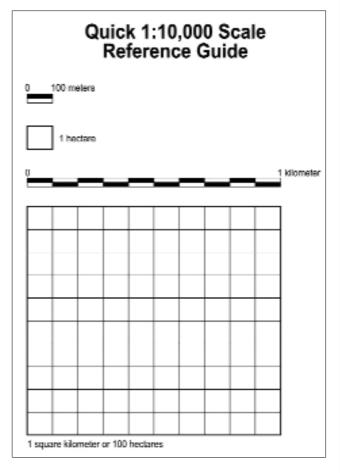
In learning by doing and through concrete sensorial experiences, they rapidly internalised the area represented by the model.

The use of the Quick Reference Guide (see Photo 5) proved to be extremely useful in the process.

By sharing this discovery learning process, the park staff rapidly appreciated how familiar and spatially conscious community members were. The villagers took the lead in generating data and the park staff acted with increasing skills as facilitators.

It is worth recalling that the park management drafted the initial map key (legend) and that at the beginning of the activity, key informants were invited to review it and suggest changes or integrations and to improve definitions. By the end of the exercise the initial legend had expanded to a total of 55

features (lines, polygons, and points), a number of which were added by the villagers themselves. Some of the items listed on the draft legend were removed. Most importantly the villagers improved the definitions of the various features to assure better understanding by all those participating.

Interpersonal dynamics, final workshop assessments, and the closing remarks made by the trainees, all clearly indicate that the park and SFNC project staff recognise collective community knowledge as a valid and substantial asset to be considered as a key component for the management of the park and its buffer zones.

In addition, the exercise was the first occasion for most key informants to visit the Protected Area Office Compound, which is located at a considerable distance from the park. Some participants had to travel for two days to reach the venue. They were first time 'actors on the scene', playing the role of resource persons (see Photo 6).

All these human interaction dynamics are stepping-stones towards improving relationships and mutual trust between park/project staff and communities residing within

Photo 6: Villagers introducing a second group of key informants to the dynamics of the exercise

the core area and buffer zone.

As Andrew Weir (EU Co-director, SFNC) spelled out in his closing remarks, 'Participatory 3-D Modelling has proven to be – among others – an efficient means for bringing people together'.

The exercise led to the manufacture of a relief model covering only a portion of the area of interest. The SFNC project manifested the intention of replicating the activity to include the entire project area. So far the model has been used for collating information, learning, and discussing boundaries and zoning issues. Other activities will follow.

Innovative techniques

New techniques have been successfully tested including the use of a quick reference guide, which helped key informants to scale data in terms of size, thus reducing one error (scaling of areas) common in depicting mental maps, and the export of data from the model to a GIS environment with the use of a high-resolution digital camera (see Photo 7) followed by direct on-screen digitising.

Conclusions

The exercise was based on experience gained in the Philippines

among indigenous people living within or around protected areas, and among hill tribes in Thailand. The applied process, which included a long preparatory phase of community mobilising, has proven to be successful in diverse cultural settings.

The use of the third dimension appears to offer additional cues to memory, thus enhancing the capacity of individuals to recompose their cognitive maps in a quite accurate, geo-referenced, and scaled manner. The fact that 3-D models facilitate scaling, allows also for a large number of features to be depicted on a given area. This is not the case in sketch mapping which has been the most common manner of representing spatial knowledge in the context of Participatory Rural Appraisal (PRA). The difference between a blank contour map and the corresponding relief model is the physical vertical dimension.

In promoting discovery learning, facilitators are frequently advised to stimulate discussion by the use of open-ended questions to allow respondents to better articulate their replies. This is generally achieved by the use of the so-called six helpers – who, what, where, when, why, and how? Experience has shown that the third dimension definitely helps when it comes to depicting mental maps. We wonder whether '3-D hints' could be added to the list.

Photo 7: Parallel camera movement shooting to capture digital, high resolution images of the landscape

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Giacomo Rambaldi has been practicing community mapping for the past 12 years. He has been working (2001–2002) as technical advisor at the ASEAN Regional Centre for Biodiversity Conservation and has been tasked with the development and dissemination of the P3DM method in Southeast Asia.

Le Van Lanh is the Secretary General of the Vietnam National Parks and Protected Areas Association and has been instrumental in organising the training in Vietnam.

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Details on the exercise and lessons learned, including the cost analysis of conducting P3DM in Vietnam, are found in the proceedings, which are available for download from the following address:
www.iapad.org/publications/02_0003a.zip

Additional information and selected bibliography on P3DM are found at www.iapad.org

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