

Mobile Interactive Geographical Information System (MIGIS), China

GIS for NGO development projects

Introduction

MIGIS is an approach to community based planning that uses a Mobile Interactive Geographical Information System in conjunction with, and fully informed by, Participatory Rural Appraisal. MIGIS relies on community support and muted expert facilitation. It is designed to bring the best of indigenous knowledge and scientific information together to provide common ground on which farmers, government administrators, and planners can optimise their understanding of each other and work as a team to plan for a better future... Stated as simply as possible, MIGIS works by transferring graphic information gathered in PLA exercises into computer program format. As quickly as possible this is projected on to a screen in front of the whole community for discussion, correction and critical comment. The PLA exercise is written up during the exercise and the results presented to the community before the MIGIS facilitators depart (John Mackinnon).

The idea behind MIGIS is to provide computer supported back up for a PRA exercise in which farmers can carry out an evaluation of their environment and socio-economic situation, and in consultation with outside government officials and scientists acting as facilitators, devise a series of action plans designed to enable them to pursue a strategy of sustainable growth. Devised in the early 1990s in connection with RRA, MIGIS was abandoned for ten years until funding could be secured and key people found.

Experience to date of using the technique across South East Asia has found that it is possible to do good PRA and enhance the presentation of the participatory studies in a manner which only seems to empower the voice of those to whom the information belongs. To restrict people to scrabbling in the dirt and playing with sandcastles is not what appropriate technology is all about. Through MIGIS, with the emphasis on the visual presentation of information, we have found that we can extend PRA into a wide reaching dialogue between outsiders and locals. The example used here comes from a feasibility study, commissioned for the period Jan 1999 to June 2000, in Xiashapu and Shangshapu villages, Luchan County, Yunnan Province, China.

Yunnan has special development needs. The province is mountainous. Much of the up-land area is unsuitable for arable farming. The wide ranges of ethnic minority farmers have access to few alternative employment opportunities and the great majority secure a livelihood from the agricultural sector. Poverty is a considerable problem, and although much has been done to reduce this, the gap between rich and poor has continued to grow.

(Information taken from <http://www.geo.vuw.ac.nz/geography/projects/migis/index.html>)

Sustainability factor	Sources of Info <ul style="list-style-type: none">• MIGIS website: http://www.geo.vuw.ac.nz/geography/projects/migis/index.html• MIGIS Report: "Incorporating the PRA reports for Xiashapu and Shangshapu Villages, Luchan County" by McKinnon, J et al June 1999• MIGIS: "A feasibility study to strengthen Participatory Appraisal and Planning Capability" by McKinnon, J et al June 1999
Objectives	<p>The goal of the MIGIS Feasibility Study was to make a significant contribution to the quality and effectiveness of participatory planning; by introducing the use of GIS and advanced graphic techniques into the PRA process; and, using the images produced in a way that would enhance the presentation and therefore the authority and impact of information collected in and provided by communities in which development intervention was planned.</p> <p>Objectives of the MIGIS Feasibility Study were to:</p> <ul style="list-style-type: none">• Establish MIGIS as an advanced mode of participatory intervention for use in rural development planning in the highlands of the Upper Mekong Sub-Region.• Transfer MIGIS skills to our Chinese partners so that they can use the techniques to carry out subsequent development exercises of their own.• Train counterpart researchers and planners in a range of Participatory Learning and Action techniques, specifically PRA, which they can competently use in the course of their own work.• Secure the full support of a typical highland community in the facilitation of a MIGIS/Participatory Rural Appraisal exercise which will result in the

	<p>preparation of a study report they accept as their own and which includes an appropriate set of action plans.</p> <p>The main outputs of the work were to be:</p> <ul style="list-style-type: none"> • a clearly identified set of PLA/MIGIS techniques by which graphic and written information can be fed back into the participatory learning process to enhance both the authority of the study and the formulation of practical community based action plans • a marketable package of skills (MIGIS Package) which will be widely used by development agencies responsible for implementing sustainable, rural, participatory development programmes in the region. • an appropriate set of Mobile Interactive GIS instruments which can be successfully used by partners and counterparts in participatory field-based community development and planning work. • new and enhanced skills in participatory approaches, methods and gender analysis for Honghe counterparts who will participate in carrying out the village PRA exercise. • a MIGIS Community Report in the local language compiled out of information collected during the MIGIS exercise.
<p>Institutional arrangements</p>	<p>The MIGIS study team was comprised of the following members:</p> <p>Dr Ma Huan-Cheng Associate Professor in forestry and soil science, Southwest Forestry College, Kunming; Leader of the Social Impact Group of the Yunnan PRA Network and GIS literate.</p> <p>Dr Jack McConchie Senior Lecturer in hydrology and geomorphology, Institute of Geography, School of Earth Science, Victoria University of Wellington. GIS expert.</p> <p>Ms Jean McKinnon consultant in gender issues, micro enterprise and graphics advisor. MIGIS project manager and process monitor.</p> <p>Ms Cai Kui Researcher, (RDRG) Development research centre, Yunnan Institute of Geography, Kunming. Secretary of the Social Impact Group of the Yunnan PRA network. PRA specialist.</p> <p>Dr John McKinnon Reader in Development Studies, Institute of Geography, School of Earth Science, Victoria University of Wellington. Team Leader.</p> <p>Also Three Government officers representing the counterpart agencies, who underwent intensive training in the field. One representative from the Honghe Institute of Minority Studies and two field officers from the Environment Protection Bureau.</p>
<p>Target Groups</p>	<p><u>Definition of target groups.</u></p> <ul style="list-style-type: none"> • The target group is essentially the members of the two villages, Xiashapu and Shangshapu. But because this was a feasibility study, the target area can be expanded to all those villages that will benefit from future MIGIS projects. • Another target group is those who took the MIGIS-PRA training workshop (4 farmers, from the villages, plus several agency leaders from HIMS, the EPB and middle managers in Luchun County government, and the three Hani facilitators. 24 in all), since this was a major objective of the study. <p><u>Relationships with target groups</u></p> <ul style="list-style-type: none"> • Because the entry into the village was managed by EPS this automatically gave the team an honorary official status. Although this tended to subdue open commitment on sensitive issues like family planning and forest clearance, these matters were not ignored in the PRA exercises. As people came to know the team better they relaxed and opened up. <p><u>Poverty and the project</u></p> <ul style="list-style-type: none"> • Poverty is a considerable problem within the target communities, and although much has been done to reduce this, the gap between rich and poor has continued to grow. <p><u>Roles and Responsibilities</u></p> <ul style="list-style-type: none"> • One of the objectives of the project was to ensure that the communities see the end report of the MIGIS results as their own. The villagers were very cooperative, and despite the fact that this was a busy time in the agricultural

	<p>cycle, they helped as much as they could. The involvement of the villagers was essential.</p> <p><u>Commitment/motivation</u></p> <ul style="list-style-type: none"> The villagers were very motivated and they could not have been more cooperative. <p><u>Involvement in project design</u></p> <ul style="list-style-type: none"> The village leaders were asked to select a group of 12-14 villagers to attend/participate and/or observe the project. The villagers were involved in group discussions and interviews for the household surveys and the historical timelines. In the survey work they drew out resource, social and land use maps, seasonal calendars and historical transects. Since they had been involved at every stage of the PRA, participating in group discussion, interviews and the practical survey work, the report produced at the end was seen as theirs. <p><u>Group ICT Capacity</u></p> <ul style="list-style-type: none"> Little, if any at all before the training. <p><u>Format</u></p> <ul style="list-style-type: none"> Because illiteracy issues and the obvious language problems, the villagers were asked to compile a list of symbols/icons to be used in the graphical interpretation of the results. <p><u>Gender Issues</u></p> <ul style="list-style-type: none"> Equal number of women and men for each significant age group over the age of 15 were selected Findings showed that the technology did not create barriers to women's participation and men and women farmers were equally engaged in all stages of the work.
<p>ICT Technology</p>	<p><u>Technologies in use</u></p> <ul style="list-style-type: none"> Laptop computer – capable of the GIS efficiently and effectively and quick enough that the villagers would not become bored waiting for the images to display. Roll-up digitiser – for converting existing paper maps and local villager-produced maps to digital form. Digital camera – for capturing pictures and other images of the villagers and local environment. Video projector – for displaying and projecting images onto a large screen so that all the villagers could review the output and be involved in discussions. Scanner – because it was hoped to use locally drawn icons on the maps and illustrations a scanner was also needed. The option chosen was to purchase a scanner head for the printer. This saved space, reduced cost, and provided the level of resolution required by the project team. Generator – to provide a reliable source of power, largely for use with the video projector during the evenings when power supply was unreliable. Software – while many GIS packages are currently available on the market, the two products used on the current study were ArcView (ver 3.1) with Spatial Analyst extension and Idrisi (ver 2). Marcomedia Freehand (ver 8) was also used for many of the presentations graphics which were displayed using Microsoft PowerPoint (ver 5). <p><u>Access to data</u></p> <ul style="list-style-type: none"> Access to topographic and land use information proved to be more difficult than expected. The location of the study area, near the Vietnam border and a national policy prohibiting the export of data in either hardcopy or digital form meant that DEM (digital elevation modelling) could not be prepared in NZ.

	<p>National policy prohibits access by foreigners. Working with Chinese counterpart allowed the team to minimise the negative impact of this policy.</p> <p><u>ICT problems</u></p> <ul style="list-style-type: none"> • Hardware and Software: All the hardware and software worked well with the exception of the digitiser that powered down every 15-30 mins. One of the six laptops carried by the team crashed, losing all data on the hard drive. As most of this was backed up on disk, little time was lost. • Local icons on maps: It had been hoped to use local icons on all the maps and illustrations. While it was possible to create icons from farmers' drawings, when placed in close proximity to each other they tended to mask each other and the underlying information, producing a very unsatisfactory result. Attempts are still being made to overcome this problem. • Data Protection: a third party undertook all pre-processing of DEM data. This led to frustration and delays. The lack of attribute data was not discovered until the team was in the field. Correction was made more difficult by having to view all the data and coverage's on a relatively small laptop screen. • Chinese translation: When producing the reports the inability of some of the software to print Chinese characters created some minor problems. The simplest solution to this was to produce blank fields in maps and diagrams that could be labelled by hand. This was time consuming. In future software should be checked for this difficulty. • Power Supply: As a reliable power supply was critical to this study a petrol generator was taken into the village. To minimise dependency on the generator all hardware was either designed to run off batteries, or prior to leaving NZ had adaptors built to allow them to operate on batteries. The only piece of equipment for which this was not possible was the video projector, which was critical for reporting back to the villagers. • One area that would be changed for the future MIGIS exercises would be to use heavy-duty power extension cords. Locally sourced cords were very thin, were not waterproof, and tended to break easily under the tough field conditions.
Financing	<p><u>Capital contributions</u></p> <ul style="list-style-type: none"> • Grant of NZ\$267,290 for the MIGIS feasibility study. Paid by the secretary of foreign affairs and trade. <p><u>Training resources</u></p> <ul style="list-style-type: none"> • NZ\$2391 spent on the PRA workshop. <p><u>Cost of equipment</u></p> <ul style="list-style-type: none"> • Laptop: \$3,481 • Laptop batteries, recharger, misc equipment & materials: \$831 • Portable printer: \$771 • Honda Generator: \$1,305 • Film, video tape, processing, display: \$271 • Mapping and graphics software, satellite imagery, maps, digital data: \$2,420
Project Process	<p><u>Are a variety of technologies offered to communities?</u></p> <ul style="list-style-type: none"> • Groups work mainly on large sheets of paper spread across makeshift tables, using coloured pens. In later exercises pencils were used to sketch in shapes before the bolder pens were used. In some cases draft figures were prepared, or "finished maps" were collected and taken away by the villagers to be redrawn. <p><u>Village participation</u></p> <ul style="list-style-type: none"> • These exercises were initially carried out by representatives from each village working with the help of a few self-selected participants and casual passers-by. As most farmers were busy during the day the exercises were held at night in the two school classrooms. Each village worked in a separate room and when gender split exercises were undertaken the women and men worked in separate rooms. Neither of the rooms was treated as sacrosanct, dedicated exclusively to one village or one gender. In all but the gender-divided

	<p>exercises there were often as many "interlopers" in attendance as members of the selected representative group.</p> <ul style="list-style-type: none"> • Because the MIGIS exercise was focused more on information and getting reliable data it could be argued that less attention was given to open participation and feed back than is encouraged in a well-staged PRA exercise. This was certainly not the intention and where it became the case it was for reasons other than those built into the MIGIS exercise. • Feedback sessions were difficult to organise. Because of the timing of the study, which coincided with the beginning of the planting season, there were usually too many things going on to allow for a considered response. Two other reasons for this were: <ul style="list-style-type: none"> • the school in which the exercises were carried out had a relatively neutral cultural identity as a Han rather than a Hani domain. Fewer social controls pertained than would have been the case had the exercise been mounted in the heart of Xiashapu and Shangshapu. • as we were committed to working with two villages within a strictly limited time frame there was not enough time to hold separate exercises for each village. • Prescriptive exercises were a more significant part of the MIGIS exercise than in a normal PRA. The data focus placed an extra demand on participants but this did not appear to place a damper on farmer support, if anything it added to the challenge. For instance drawing the scaled land use information (resource maps) initiated heated discussions about acknowledging the presence of farmers from neighbouring villages who were considered to be interlopers. Boundaries were redrawn and a careful assessment made of the information. These scruples only added to the accuracy and the usefulness of the map. • As the exercises preceded and the participants tired there was a marked preference to take work home. This worked well. The representatives could work as facilitators and, if they chose to, consult more widely with male elders whose role was otherwise limited. • At the end of the field work phase, Mr Bi, the director of the Honghe EPB, undertook to follow up on two of the village action plans: Xiashapu, tractor road; and Shangshapu, domestic water supply. • There was always at least one member of the MIGIS team beside the Hani facilitator at each of the evening meetings. Photographs were taken, lighting and seats arranged to make as many people as comfortable as possible. As gatherings moved away from the schoolhouse and into the village both Hani and Chinese facilitators followed with occasional visits by one of the NZ party. <p><u>Monitoring and Evaluation</u></p> <ul style="list-style-type: none"> • The PRA process was carefully monitored throughout the study. Each evening a meeting with participants was followed by a morning gathering of the MIGIS team to discuss and evaluate both the results and process. • Given the integrative nature of the exercise in which the outsider facilitators were asking for information in a set form and farmers were being encouraged to take as much control over the process as they wanted made it necessary to monitor several different work places. • Meetings mostly went well and the monitoring principally provided an early warning system if an argument developed or the group was unsure of what they wanted to do. A close watch was kept on facilitators to make sure that they did not assume leadership and in some cases the frequent comings and goings of children and courting males was discouraged. The schoolhouse venue was neither the easiest nor the most comfortable and we did our best to make it easy.
<p>Key linkages</p>	<p>The following relationships were made in the pregnancy stage of the project:</p> <ul style="list-style-type: none"> • KINSA and VUW: Three visits were made to Kunming by John McKinnon and Graeme Aggett (GIS expert). • RDRC: Discussion focussed on Mr Lu Xing and Ms Cai Kui with courtesy visits to Wang Xue Lin, Deputy Director of the Yunnan Institute of Geography. • Bureau of Foreign Trade and Economic Cooperation (BOFTEC): Contact was conducted through Mr Yin Yonglin, Foreign Technical-Economic

	<p>Cooperation Division and extended through Mr Gu Yuchang, Deputy director Lancang-Mekong River Sub-regional Trade and Economic Cooperation Development Centre.</p> <p>It was out of the good relationship formed between the MIGIS originators and the RDRC that resulted in the joint undertaking. RDRC built up a good understanding on the Chinese side and the NZ MIGIS team pursued funding from the Asia DAF. These negotiations generated an understanding of mutual trust and a willingness to accommodate each other's needs which in turn created the conditions for a flexible working relationship of considerable depth and resilience.</p> <p><u>Links with other stakeholders</u></p> <ul style="list-style-type: none"> • HIMS (Honghe Institute of Minority Studies) Contact was restricted to Chiang Mai and Kunming. Mr Li Qibo visited Kunming to meet with John McKinnon and assigned Ms Zou Hui to a liaison role. <ul style="list-style-type: none"> • HIMS saw the MIGIS project as a chance to extend their international connections and make a contribution to development work. MIGIS was to train a group of their researchers in PRA so that they could undertake work for development agencies and make PRA a part of their literacy training programme. Initially HIMS was to be the principle counterpart, but due to lack of staff, the Environmental Protection Bureau was taken up as a de facto counterpart. • HIMS provided: <ul style="list-style-type: none"> • Professional Support • Field Support • Translation • Environmental Protection Bureau: The relation with the Environmental Protection Bureau as formed as a consequence of a request directed to Dr Hermann J. Tillman, Co-Director of the EU project to ask if he would be interested in the results of the MIGIS work. He decided to draw the MIGIS undertaking into plans to extend the work of the EU-China HEPPAP into Luchun. When Ms Cai Kui followed up this communication Dr Tillman put her in contact with the Environmental Protection Bureau. • The role of the Bureau was to: <ul style="list-style-type: none"> • Set up meetings with leading officials at both prefecture and county level. • Make arrangements for the introductory PRA-MIGIS workshop. • Arrange transport between the village and Daxing for the team and field gear, and delivery of supplies when needed. • Assign two talented Hani speaking middle managers as facilitators. • Facilitate the entry to the villages of Xiashapu and Shangshapu and arrange accommodation. • Arrange the building of toilets, a kitchen and office tables in the village. • Purchase bedding, food and other supplies. • Arrange for local women to work as a kitchen assistant so that the team could prepare their own food. • Convene the meetings in Daxing and Gejiu at which the results of the work were presented.
<p>Intermediaries</p>	<p><u>Where does editorial control lie when packaging / disseminating information?</u></p> <ul style="list-style-type: none"> • The PRA type exercise results in a range of visual tools, which summarise the current socio-economic and resource situation of the community. The exercise provides the communities with an analysis of their development needs and an appraisal of how these might be met. The report in which this information is compiled provides the community with accurate and authoritative material to negotiate development inputs with appropriate agencies. • Several biases crept into the process. Whenever some tension appeared to develop between the more prescriptive approach of the MIGIS team and the cultural needs of the participants, priority was given to the farmers. Although this somewhat compromised the egalitarian age and gender objectives of the

	<p>exercise any other decision could have tested their patience in a quite unnecessary and unproductive manner.</p> <ul style="list-style-type: none"> Perhaps the most disappointing aspect of the exercise were the limited opportunities for folding back information provided by the community and our inability to keep up with what was being given to us. Systematic analysis of the information really only began after we left the villages and we had to more or less pass on the consultation – participation process to the Environmental Protection Bureau and ask them to pick up where we left off.
<p>Development benefits</p>	<ul style="list-style-type: none"> The MIGIS study produced community action plans and a report which can form the basis for development intervention in the study villages. It was recommended that environmental intervention focus on providing basic inputs and further negotiation with farmers to encourage them to: <ul style="list-style-type: none"> Plant riparian buffer zones of 50 metres. Carry out a reforestation programme using appropriate species. Plant protective contour run-off control strips. Plant wood lots. Reduce the consumption of wood as the principle source of fuel. It was recommended that HEPPAP (EU-China Yunnan Honghe Environmental Protection and Poverty Alleviation Project) negotiate agricultural innovations with farmers and pioneer ways in which they (the farmers) could get access to: <ul style="list-style-type: none"> Seeds of higher yielding varieties of rice and corn, and other suitable food and cash crops as are available. Fertiliser Credit to purchase essential agricultural inputs. New temperate crops as recommended and appropriate. Barefoot veterinary doctor. It was recommended that HEPPAP look at the ways in which they could support or renegotiate village action plans as recorded in the MIGIS report incorporating the PRA results for Xiashapu and Shangshapu to meet common objectives. The MIGIS report and summary PowerPoint and ArcView presentations to government agencies met with a strong endorsement of both the methods used and the quality of the results. In the MIGIS report, a strong case was made for development intervention in both villages. This was based in two negative and one positive factors: <ul style="list-style-type: none"> Environmental degradation caused largely by the loss of a protective forest cover leading to rapid run-off, heavy erosion, aggradations of waterways, loss of irrigated fields and falling groundwater yields was reaching a critical stage. Absolute poverty documented by shortfalls in food production and lack of reliable cash crops. Positive social capital represented by the willingness of farmers to prepare ameliorative action plans (construction and planting) and offer their own labour to carry out work has created a milieu with development potential.
<p>Anecdotes</p>	<ul style="list-style-type: none"> In the process of preparing their Action Plans farmers declared a willingness to volunteer labour for reforestation. The MIGIS recommendation that they look at planting riparian buffer zones, presented in Part II of this web site, could not be explored with the farmers. Such work would fit nicely into any extension of the EU-China project. A chance has been opened up for both parties, the villagers on one hand and the Environmental Protection Bureau on the other to negotiate a mutual action programme.