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Using Community Information Systems to communicate traditional knowledge embedded in the landscape

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Introduction

Including indigenous peoples and their knowledge in decision-making is increasingly seen as pivotal for achieving sustainable development and the conservation of biodiversity. But indigenous communities often remain isolated from decision-making processes. Their knowledge remains an under-utilised resource despite recognition of the positive contribution that it could make (Lawrence and Warren, 1999; Bhattarya, 2004). One reason for this is the communication constraints that exist between indigenous communities and decision makers.

Many indigenous communities also face the accelerating loss of their traditional knowledge. This is due to rapid economic, political and cultural changes at the global – and local – level. Not only is better communication needed with outsiders. indigenous communities see an equally important need to communicate their knowledge within the community, particularly between generations. Increasingly, they are using digital information communication technologies (ICTs) for a range of different purposes to facilitate this exchange and communication of information, for example, on land use planning, advocacy, and documentation of intangible cultural heritage.

Many rural and indigenous communities have strong traditional ties with lands and resources. So the ability of Geographic Information Systems (GIS) tools to store, retrieve, analyse and present spatial (or land-related) information has made this genre of ICTs of particular interest. Yet GIS requires a steep learning curve, a strong commitment to keeping software and operator skills current, and a deep wallet.

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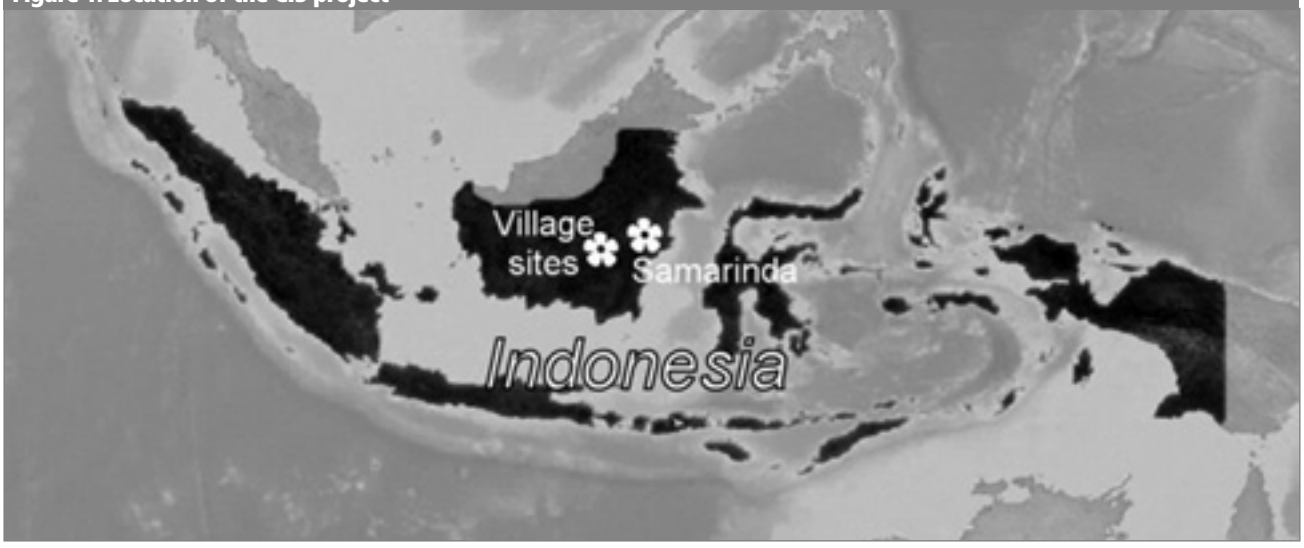
Also, much land related cultural information is shared in the form of stories and legends, using metaphor and sophisticated local terminology (Johnson, 1992). Much of this essential cultural context might be lost if the information is presented using two, or even three, dimensional maps – or even transcribed to written text. Can GIS succeed in expressing the unique relationship between people and place? Or does it mould indigenous peoples' knowledge into a more Western conception of space? (Harley, 1988; Rundstrom, 1995; Kyem, 2004).

Figure 1: Location of the CIS project



This article examines alternatives to typical GIS. Using the example of a participatory action research project in Indonesia that we were involved in, we consider how to support indigenous communities in expressing, documenting, visualising and communicating their traditional and contemporary land related knowledge using geographic ICTs. The technologies used were selected on the basis of their appropriateness for recording and communicating land-related traditional knowledge, as well as their simplicity and low cost. The final product was called a Community Information System (CIS).

Developing a CIS in West Kutai

Our project took place in West Kutai in the province of East Kalimantan, Indonesia (see Figure 1). We collaborated with two neighbouring Benuaq Dayak villages, Benung and Tepulang, the University of Victoria in Canada, Konsorsium Sistem Hutan Kerakyatan – Kalimantan Timur (SHK-KalTim, a local non-governmental organisation), and the Centre for International Forestry Research (CIFOR). The project ran in the two participating communities for a period of 20 months. Villagers in both communities still follow a traditional way of life. Their culture, language, and traditional knowledge (*adat*) are very similar.

Recently, significant political decision-making has been decentralised to the district level. The issues of land ownership and resource rights are at the forefront of the political agenda in Indonesia, particularly in areas where natural resources remain plentiful. For the inhabitants of Benung and Tepulang, proving their relationship to their traditional lands – and expressing this to outsiders – is now of great significance. It might impact on their rights to secure land tenure and/or harvesting rights to resources. So CIS was examined as a potential tool to express this relationship and communicate it to people outside the community.

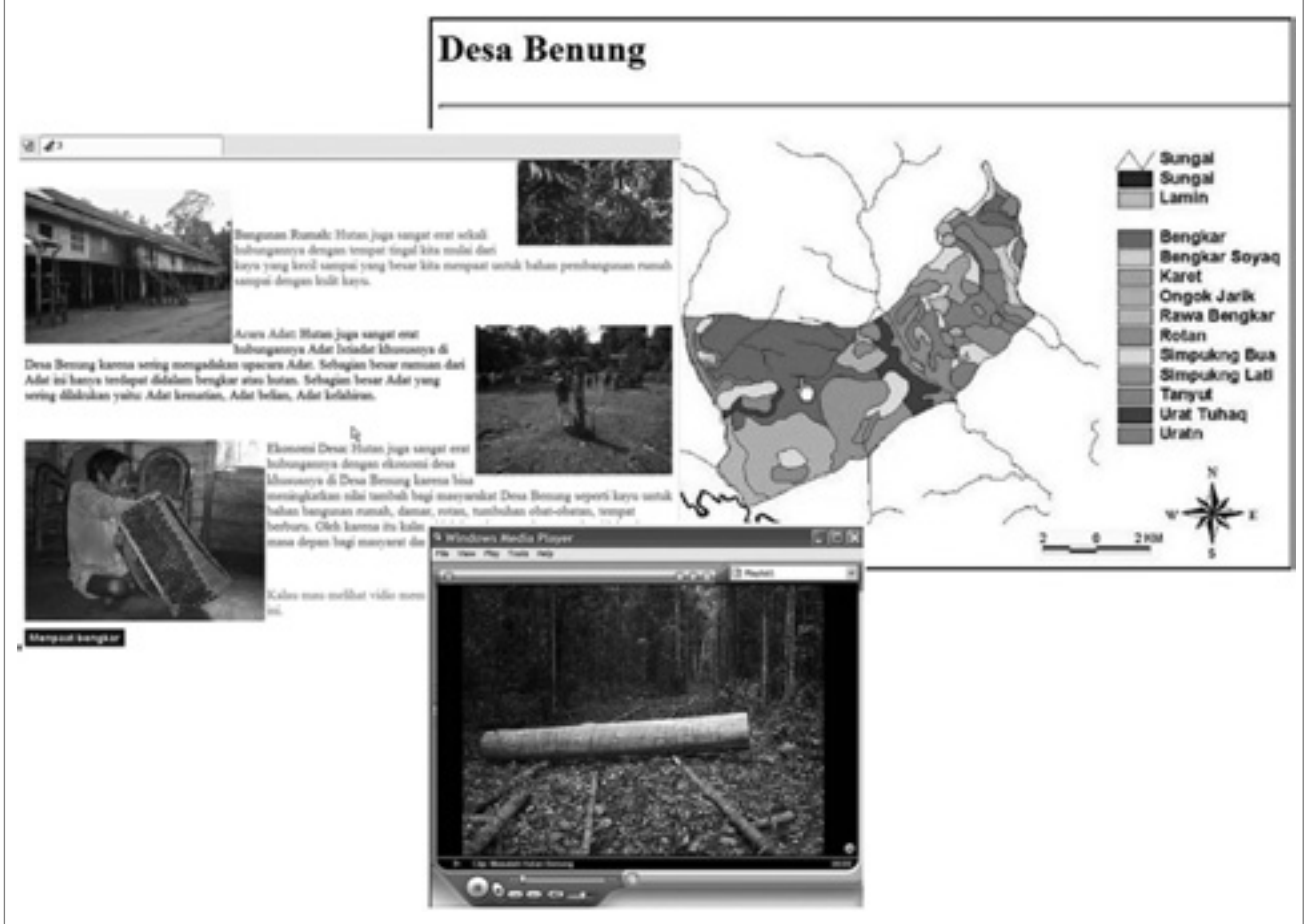
Defining a Community Information System

In our project, a Community Information System (CIS) is defined as a digital map-based multimedia information system. Community members document their knowledge using digital video, digital photos and written text. It is stored on a computer and managed and communicated through the interface of an interactive map. The digital hyperlinked map of the communities' traditional lands consists of points, lines and polygons that could be clicked on to link the viewer to related multimedia and textual information.

Participatory processes were central to this CIS project. Community members shaped the CIS objectives and determined what information to record. Community operators were then trained in the use of the equipment for information gathering, editing and management.

The role of external technology intermediaries was to introduce the project, to facilitate the early stages, to supply the necessary technologies, and to train community members in their use. They took care to foster a feeling of community ownership over their CIS, to ensure that the project was not overwhelmed by an outside agenda. All the information and tools used by the communities for this project have remained with the two communities.

Figure 2: Example of a CIS, including the interactive map, digital photos and digital video



The project process

The flow diagram in Figure 3 outlines the steps of the participatory process used. Each step is described in more detail below.

Introducing CIS to the community

The first step was to introduce the CIS concept to the two communities. We discussed how the systems might benefit the community, and asked the community, as a whole, whether they wanted to take part in this research project. This was done using community meetings. We showed them examples of a CIS and demonstrated potential applications using drama skits and hand-drawn diagrams. We made it clear that this was a research project and that there was no certainty that it would in any way benefit the community. Both communities agreed to participate.

Figure 3: Flow diagram showing the steps followed in the development of the CIS

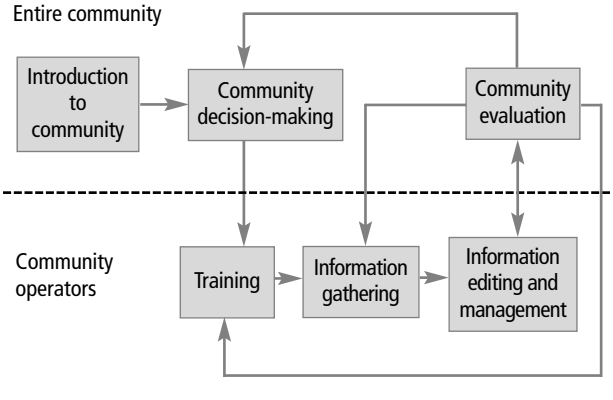


Table 1: Matrix used to structure the process of decision-making in developing a CIS in Benung

What information?	Information source	Responsibility
The history of how the village and the longhouse came into being	Lama (male) Djung (male) Ipuy (male) Ranaq (male)	Nado (male)
Village boundaries	Lama (male) Djung (male) Ipuy (male) Banyak (male)	Kitong (male) Djung (male)
The village *potensi* (a term used to describe the economic potential of the village resources).	Nado (male) Mino (male) Djung (male)	Not known
Culture, including *belian* healing ceremonies.	Ramid (male) Lama (male) Lasa (male)	Not known
The *ladang* process	All villagers	Kitong (male) Djung (male)

Community decision-making

The initial introductory meeting was followed up by a series of community gatherings facilitated by members of SHK-KalTim. Using decision-making matrices (see Table 1 for an example of the matrix developed in Benung), community members determined:

- what information to collect;
- who in the community would act as the source of that information;
- who in the village was to be responsible for collecting that information;
- when they were to collect that information;
- who in the village would be trained initially in the use of the video, camera and computer equipment;
- how the data would be managed and communicated;
- who would have access to the information stored on the computer; and
- how the equipment would be stored, maintained and used by community members.

Capacity building

Once the initial community decision-making was completed, training began. The training was divided into two sessions. The first session was open training for anybody in the village who wanted to learn how to use the camera and video equipment. The second session taught community operators (two men and one woman in each village) to use the computer equipment.[1] These community operators were selected during the community meetings, using village-generated nominations and an open vote. The limitations of the equipment meant that a maximum of three people could be trained. These operators received an intensive four-week computer training programme. As they had never used the equipment before, their training began with basic computer and file management skills. They then received training in how to capture, edit and process digital video and images and link them to a digital map of their traditional lands. This map had been produced earlier in collaboration with SHK-KalTim, using participatory mapping processes, and was digitised by community members.

After the initial training, less intensive training for computer operators and other people interested in the CIS continued for another ten months.

Information gathering

Information gathering began soon after the community had determined what type of information to include in their CIS. The technology intermediaries began by briefly demonstrating the main features of the video and camera equipment, before handing them over to the community. Afterwards, the technology intermediaries continued to provide ongoing

[1] The university researchers had requested that at least one operator be a woman.

assistance with using the equipment. This training approach was referred to as 'learning by doing' and allowed for skill sharing in a practical and applied manner. This style of training proved very effective.

Information editing and management

Early information gathering overlapped with initial intensive computer training. We planned this deliberately so that the computer operators could be trained in video and photographic editing and file management whilst using relevant information that could be immediately included in the CIS. Soon after information gathering, villagers could see the information displayed and accessed through the map interface.

Evaluating the CIS Content

Community members regularly gathered to view the CIS data and to discuss the quality and content of the images and video. These gatherings were informal forums, though facilitated by a technology intermediary. They allowed community members to suggest how to improve the training, the information gathering process, types of information to gather, and the editing, management, and presentation of the information. This was an important a feedback loop. It improved the quality and content of information being documented and stored within the CIS.

For example, the community made recommendations for more training to improve video sound quality. They had been unable to hear a certain elder speaking clearly on video. As a result, the operators requested a special training session for this.

Uses of Community Information Systems

Over 18-months, the technology intermediaries monitored the computers in Benung and Tepulang. Both communities documented, produced and stored large quantities of information. It can be broadly classified into four major categories:

Cultural information

This includes intangible cultural heritage information, e.g. descriptions of traditional land and resource use systems, traditional dances and songs, and ceremonies that were recorded as community and family mementos.

Documentaries

This includes information recorded at specific events in anticipation that this might be useful for communication with outsiders or as evidence in the future. Examples include recording promises made by a timber buyer to community leaders and recording evidence of illegal logging on community lands. But both documentary examples had a risk attached to them. Community members were very conscious of not widely sharing the information relating to the illegal logging for fear of the information generating unnecessary conflict.

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Political information

This includes statements made by people within the community to mobilise political support for a cause, and/or to create alliances with more powerful stakeholders. For example, the community made a video explaining their views on why they should be allowed to harvest timber using traditional management systems, showing what practices they would employ. This video explained the management process to outsiders, including members of the regional government.

Commercial information

Some video information was stored and distributed on Video Compact Disc (VCD) to groups outside the village that had requested it. The operators were paid 200,000 Rupiah (approximately US$50) per VCD produced. These VCDs included the process of carving a large commemorative wooden statue and the documentation of several traditional ceremonies.

People in both Benung and Tepulang varied in how they thought the CIS should be used depending on their gender, age and status in the community. Younger and middle-aged men were more focused on documenting and communicating information about boundaries and land uses, evidence of illegal incursions by other villagers, and political statements about the community's vision for ecosystem-based logging. Some of this information was instrumental in resolving disputes over illegal logging in the traditional lands of Benung. Elders and women in both communities were

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concerned about the loss of traditional knowledge, particularly local history, culture and customary laws, and used the system to record these types of information for future generations.

Evaluating Community Information Systems

Over a 20-month period, both villages created a functional map-linked CIS. However, not all the information was managed and accessed using the interactive map interface. Community members, computer operators and outsiders positively evaluated the map interface, both as a useful organisational tool for land-related information, and as a way of enabling people to explore and learn about the communities' relationship with the land. But computer use statistics showed that the map interface was little used by community members. This is partly because it was easier to access specific multimedia information directly (and in particular video files) using the default file management software. Villagers also tended to want to access specific things – rather than take a guided tour of the CIS via the map interface. The interface might have been more important if the CIS contained more location-specific information that needed to be organised and managed spatially.

To be sustainable, the participating communities must also be able to manage and maintain the equipment, and continue adding information to the CIS system after the technology intermediaries have left. Benung's overall computer usage remained high afterwards, as members continued to gather video and photographic information and store it on the computer. They also found new and innovative ways of using the CIS. For example, they began to package and sell their skills to outsiders using VCDs to generate some cash income – an additional incentive to use and maintain the CIS equipment. A strong indicator of sustainability was Benung's willingness to pay for the repair of the video camera when it was broken, as well as update computer supplies. Long-term sustainability of CIS therefore seems quite likely in Benung.

In contrast, Tepulang showed a significant drop in computer usage while technology intermediaries were away. The main reason was because of a conflict between community members, due to one operator's monopolisation of the computer. This conflict was linked to a wider, pre-existing power struggle taking place within the community. Sustainability of the project appears less likely in Tepulang.

Overall, the sustainability of CIS appeared less dependent on technology and related skills and more on:

- the pre-existing conditions such as the level of community cohesion;
- the maturity of the operators;
- the level of leadership provided in the project by the village leaders versus outsiders; and
- the commitment to applying participatory approaches that gives the whole community the ability to influence the development and use of the CIS (see Box 1).

Box 1: Feedback from Benung

'I think the process has been good because it has always relied on community meetings. By including as many people as possible, the benefits are spread to many more people. It is very important to engage the community and to be as open as possible, as many projects do not do this; they only visit the village chief. By being open and honest with the village they will be more likely to support the programme.' (Ori, 33, Benung).

Conclusion

Our experiences working with the communities in Benung and Tepulang have shown that the CIS has been useful to them. The capacity existed within the communities to use the tools as well as plan, build and manage the system. But pre-existing community dynamics and political structures were very important. Without support from the leaders and elders, others would have been less likely to invest the time required to create CIS. This is an important consideration for other groups wanting to establish a similar project. There must be a functional and respected leadership and they need to be seen to be supportive of a CIS project.

The participatory process and decision-making was vital. It contributed to the communities taking ownership over the CIS and wanting to continue to develop and add information to the system. In particular, it was important to include women as computer operators. The women in Benung and Tepulang gathered cultural and historical information that might not otherwise have been gathered or included in the CIS. In fact, the women's recordings of their traditional songs gained much recognition throughout West Kutai, and the songs were even played on the local

radio station. So it is very important that these tools and technologies do not become the exclusive domain of the men in the community.

Our experiences demonstrated that multimedia tools were a helpful medium to represent the relationship between the communities and their traditional lands. Whilst the map component of the CIS was less important for community members, they still felt that it was an important and worthwhile tool for managing and communicating information to outsiders. So we recommend that generating maps for the CIS should be an integral part of the process. Maps generated by outsiders or companies should **not** be used as the interface for the CIS.

Decision makers in rural and marginalised areas of developing countries increasingly recommend policies that promote technological adoption (Davison *et al*. 2000). However, despite their enthusiasm it is important for policy makers to remember that the focus should remain on people, organisations and processes rather than the technologies themselves. The challenge is to introduce and use ICTs that are relevant and suit the needs of local communities – and to recognise that the technologies are only tools to facilitate a broader social process of communication for self-determination in development.

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