

General Comment 2:

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Here are some of my personal comments on various aspects of the impact of GIS work. This is based partly on the lessons learned at CIAT while working on GIS applications. First I would like to talk about the impact of our work with GIS.

We all work very hard, long hours. Sometimes we end up asking ourselves if all this work is really used by others. All these maps, all these databases! And once the product is finished, we start another project, and we forget about what was done and where we were.

At CIAT we found that it is difficult to run GIS only as a service. Someone comes in the laboratory and asks for a series of maps: "We need to know where the agricultural frontier is; we need a map that shows the extension of forest for the area". We construct the best maps we can with the best and most up-to-date technology. Then the maps just stay on a desk or on a wall somewhere, not always, but often. We generate the products, but the "customers" do not always fully understand the potential of GIS. When we GIS-aware people look at the map with our experience, this map talks to us. But it often does not mean as much to an untrained person: I could say that the impact of this map is less than it should be.

Many people, when it is time to cut the funding, will look at the GIS and say: "my God this is very expensive, all these maps, costly satellite imagery, 20,000 dollars just for software". Then they will look at the impact and may not be impressed.

I think we are quite good at producing quality databases, working with imagery, with computers and software. Maybe we are not that good at doing something useful with these data. To illustrate my point I will take a simple example from a presentation at the symposium, that is: paddy field area estimates based on remote sensing [Ogawa *et al.*, JIRCAS 6th International Symposium Poster Session. Estimation of paddy field area for all weather conditions using RADARSAT and Landsat TM data]. It is a very simple application at first look, but still we have to work a lot to produce reasonable estimates. Since the user's needs, however, are very well defined, we know exactly what is expected and we develop a straightforward method that will provide the expected data. Therefore, there is a high probability of success and adoption of the methodology. Still it takes several years of development before the methodology can be reliably and routinely applied. Thus, even a simple, well-defined problem can take 10 years of development! We better not expect immediate results.

Let us consider a slightly more difficult problem, which was also taken up at this symposium: forest area changes in Kanchanaburi, Thailand [Amano *et al.*, JIRCAS 6th International Symposium Plenary Session. Historical Changes of Forest Area in Thailand: A Case Study of Mae Klong Watershed Research Station, Lintin, Kanchanaburi]. This is a good example of interpretation of time series of aerial photos and satellite imagery, 15 years of data. Therefore, we perform referencing or geo-coding, ground truthing and GPS work. We carry out the interpretation and analysis. We produce the maps, area estimates and summarize them in tables that we give to the decision-maker. Very little may take place subsequently. The decision-maker might look at our results for 5 minutes and decide on the future of this region based on the data. It is not because the work is not good, it is just because there is a communication gap with the decision-maker (or lack of "spatial" knowledge) at this level. Training might be a lot more important than we think, and target not only the "GIS people" but also the decision-makers to help them think spatially. In this example, one field in this table was produced, which is the number of

forest patches. For us, more patches indicate degradation of the natural environment, loss of bio-diversity. Most decision-makers will look at the table and will have no idea how to use the information on forest patches.

I think we need to explain and give some advice on the results we are obtaining. I think we are generating a lot of information that is difficult to understand. We tend to forget that it is difficult because we have worked a lot to get there and gained all these years of experience that we do not value much.

Another difficult problem, which was mentioned by Dr. Skidmore in his closing remarks, deals with sustainable agriculture. "Agriculture" is well defined. The term "Sustainable" is not. What we want to do with international development and agricultural projects, like the ones JIRCAS is managing, is to improve the well-being of the poor by considering not only agricultural production but also natural resources management. We need the participation of the people, not just maps. We need models, econometrics, as well as a wide range of tools. I think that most of the decision-makers are completely lost when we talk about sustainable agriculture: it is a new language that they have to learn. We want to do GIS applications in this area for the decision-maker who is not really aware of all the aspects of this problem.

We also tend to think that our GIS will save the world. We can- and will- do everything. I think it is a risk. Dr. Skidmore mentioned this too: the risk is to lose the focus. We have to focus and find out where we are really strong. At the moment we are being asked to do a bit of everything: participatory research, social economics, econometrics, biophysical models, satellite imagery, etc.

What we learned at CIAT is that we need better data analysis methods like statistics, artificial intelligence. We do not want to invent anything: just use what is available. We need to understand the decision-making process better: this is a way to focus. If the decision-maker is not going to use a water management model to make a decision, there is no reason to develop a water management model. We have to determine what data are actually used to make decisions, and know a little more about policies. We found that it is also good to have an economist on the team! If the GIS teams were composed only of a group of geographers, I do not think that they could accomplish much.

What we will do a lot more - and Dr. Beaulieu has shown some of this [Beaulieu *et al*, JIRCAS 6th International Symposium, Use of GIS in Land Resources Management in the Colombian Orinoco Region] - will be to accompany the decision-makers in the process of making decisions. Then the GIS researchers will become advisers, not only producers of models.

[Separate comment]

This is a comment about influencing people's lives:

We have found at CIAT that if you are well connected with decision-makers that can make a change and apply what they say, then there is more chance of having an impact. In times where everything changes, even governments, we have to be aware that if we are going to be spending a lot of time introducing digital information, such as for land use plans, then these plans will have to be connected to people with the power to implement them. This is a rational way of focusing. At the beginning of a project, you should determine whether your work has a chance of being implemented. If there is a technician at a low level in the hierarchy interested in monitoring forests, we can work a lot, but this will never go very far and will have no impact. If it is the Ministry of Forestry that is interested in putting 10 billion dollars in a series of land use plans, then what we do has a good chance of having an impact.