CASE STUDY
Category: ICTs and Climate Change Monitoring

Climate Change, Innovation & ICTs Project

Centre for Development Informatics (CDI), University of Manchester, UK
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Improving Access to Mapping, Modelling and Scenario-Building Technology in Climate-Vulnerable Regions: Learning from *ClimSAT*

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Initiative Overview

In 2008 a partnership between the regional government of Brittany and UNDP, established a climate science and technology hub in Brest, France: ClimSAT. It was initiated with the primary aim of improving access to information on the impacts of climate change for some of the most vulnerable areas in the developing world. Promising and established state-of-the-art technologies, particularly in satellite imagery, were gathered in Brest and data gathered was then shared with other partners including regional governments in Indonesia, Senegal and Uruguay. The aim was to enable governments and communities to monitor and model the effects of climate change, and to base climate change and development strategies on accurate, location-specific information. ClimSAT was a concrete example of the increased action regional governments are taking to address climate change. ClimSAT in its original form ceased operation in mid-2011 but was integrated into a wider UNEP programme, the Territorial Approach to Global Change, Scientific Services and Knowledge (TASK). This case study sets out to learn from the experiences of ClimSAT.

Application Description

There were three main components of a ClimSAT project: data gathering, data processing (and storage), and data dissemination. Figure 1 outlines these and they are explained further below.

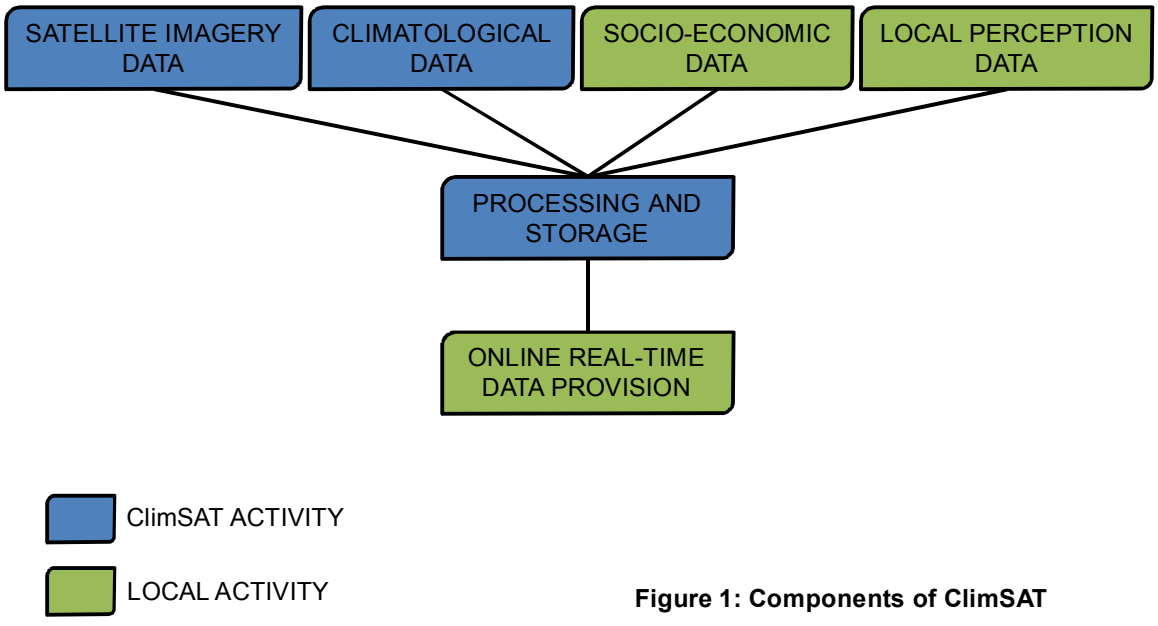

Figure 1: Components of ClimSAT

Data gathering
Four types of data were gathered for any region participating in a ClimSAT initiative:

- Satellite imagery data: regional information was purchased (and/or downloaded) from Space Agencies or partner satellite data providers.
- Climatologic data: historical series were gathered from the US-based National Oceanic and Atmospheric Administration (NOAA) and/or the European Centre for Medium-Range Weather Forecasts (ECMWF).
- Socio-economic data: gathered from local sources by local ClimSAT representatives.
- Perception data: obtained through field surveys conducted by local field teams, with ClimSAT guidance.

Data processing
Data processing was carried out by the ClimSAT team at the l'Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) in Brittany. In particular, the climatologic data for a particular region was reprocessed and downscaled to make it more relevant and usable. The IFREMER supercomputer then processed future scenarios using the historical data gathered, against scientifically-accepted, global standard climate models (known as general circulation models) stored at Berkeley University. This process delivered detailed indicative information on the likely future risks of climate change, specific to each region.

Data dissemination
The real-time data stored at IFREMER was shared with each participating region via the internet. Each project was created by a local counterpart team that was invited for training in Brittany, to enable them to use the technology and make best use of the data. Once the skills had been shared, this team could then use the data autonomously under the remote guidance of the ClimSAT team in Brittany.

(Training covered theoretical modules on meteorology, climatology and oceanography; remote sensing and geographic information systems (GIS); complex systems modelling; and adaptive, energy and mitigation strategies and policies. There was also training on participatory approaches to climate change at the local level, and practical "hands on" training in remote sensing and GIS.)

Formal Drivers

Some of the participating Southern regions were amongst the poorest and most climate-vulnerable areas on the planet – they stand to face the worse consequences of climate change, but are the most ill-equipped to manage. ClimSAT offered an ICT-based platform to remove these significant barriers.

Providing state-of-the-art modelling and impact assessment tools to allow these regions to map and plan for likely future changes – including flooding from sea level rise, deforestation, desertification and changing rainfall patterns – was identified as a particularly strong driver for developing ClimSAT. Allowing developing regions greater access to information and communication technologies that will improve their resilience to climate change was the primary motivation for ClimSAT, through sharing technical capacity, expertise and location-specific impact analysis.

Objectives/Purpose for ICT Usage

The main objective of ClimSAT was to enable climate adaptation plans to better account for location-specific impacts, to better integrate knowledge of future impact into development planning, and to ensure that scenarios were robust by informing them with detailed research of a given area. Pooling resources – expertise, mapping and modelling technologies – was also an important objective.

The ClimSAT hub provided participating regions access to, processing and storage of data and expertise which could greatly enhance their ability to plan for development and adaptation with climate change in mind. ClimSAT's technology provided cutting-edge modelling and incredibly detailed data analysis to regions that do not have the capacity to access and utilise this information alone, due to their financial and skills-based limitations. It also got a network of leading computer and climate scientists to share their skills with participating partners, so that the latter were empowered to use this data in policymaking and strategy building.

Moreover, training local stakeholders in participating developing countries aimed to ensure not only knowledge transfer but also growth in the pool of international actors with knowledge of climate modelling and of utilising impact assessment tools. This, in turn, contributed to the future development of next-generation techniques – promoting collaboration which flows both ways, not just from North to South.

Stakeholders

Figure 2 explains the overall stakeholders involved in ClimSAT and their roles (in brackets) while Table 1 provides a list of the regional government partners.

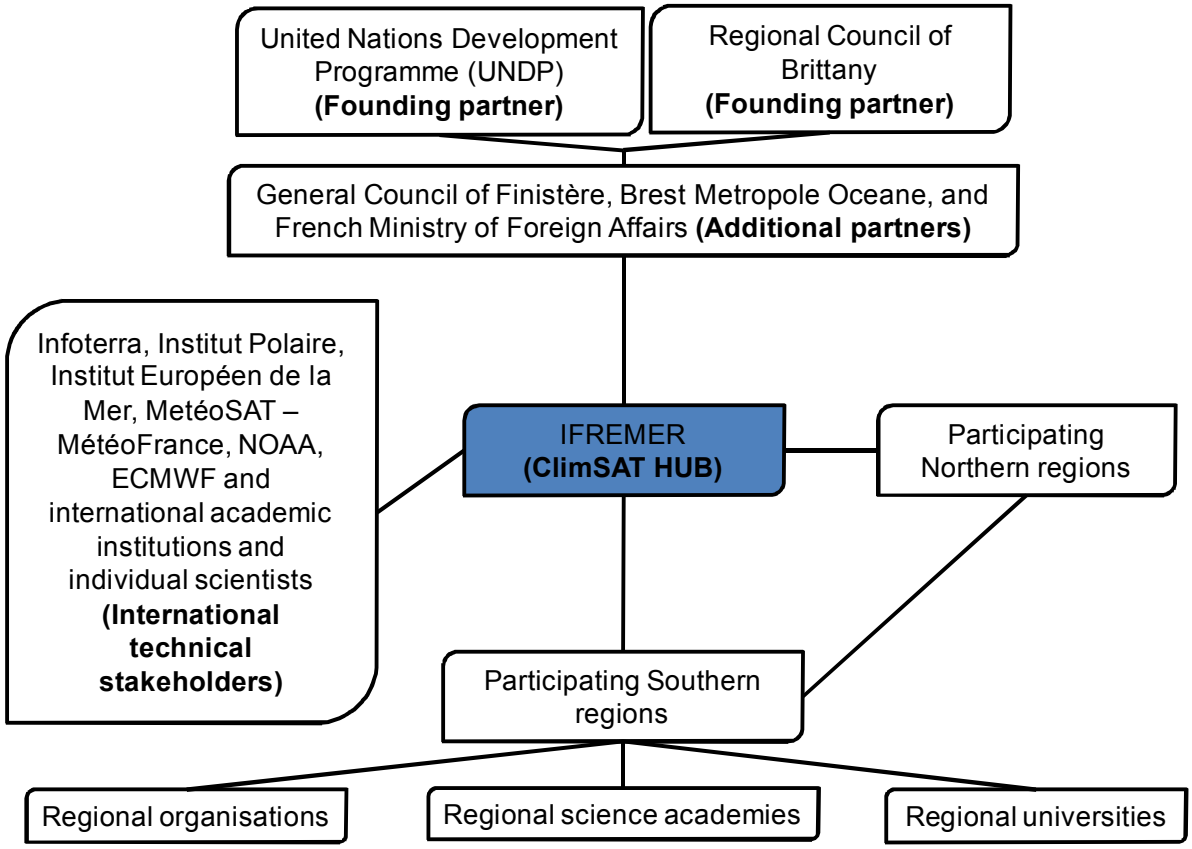

Figure 2: ClimSAT Stakeholders

The founding partners had responsibility for the initiative and for the work on-going at the IFREMER Hub in Brest. The technical stakeholders fed data and expertise into each project – many offered this support in kind. The additional partners have offered technical, political and in some cases financial support to the initiative.

Southern Project Regions	***Northern Partners***
Montevideo Metropolitan Area, Uruguay	Basque Country, Spain
Fatick and Ferlo, Senegal	Région Poitou-Charentes, France
Jakarta, East Kalimantan and Sumatra, Indonesia	Cataluña, Spain
	Wallonie, Belgium
	Piemonte, Italy
Other Southern Regions	***Other Northern Regions***
M'Bale, Uganda	Wales, UK
Cundinamarca, Colombia	Quebec, Canada
	Rhône-Alpes, France

Table 1: ClimSAT Partner Regions

Some of the Southern regions also had access to a Northern region partner. The latter's role was to offer financial and political support to their participating partner. The Southern regions were the focal point of the initiative, with the main objective for Northern partners being to facilitate data gathering and usage in the developing country. However, participation for the Northern regions also offered important learning experiences. Two-way knowledge transfer was an important outcome of ClimSAT.

Impact: Cost and Benefits

ClimSAT's initial ambition was to reach out to 50 global communities. Unfortunately, its budget fell some way short of what was needed for this. For example, in 2011 the annual budget for the programme was €880K, derived from the following sources: regional funds: €280K; UNDP (including Territorial Approach to Climate Change Programme): €140K; private funding: €210K; other sources: €250K.

As a result, projects only commenced in six countries – Uruguay, Colombia, Nicaragua, Morocco, Indonesia, Senegal. Some potential Northern partners perceived the projects as "Brittany's" and were reluctant to commit financial resources to it. Given the financial crisis of 2008, investment for tools such as "ClimSAT" has been seen as non-essential, and therefore the programme struggled to find sufficient resources to operate at scale.

Support was provided for one full time centre Director, via UNDP and but it otherwise varied between individual projects. In Montevideo for example, two full-time posts were financed, which were based at the Ministry for Environment.

Many individual scientists involved in ClimSAT offered their expertise in-kind to the initiative, which was a substantial benefit and cost saving to the programme. Services offered by participating scholars included climatology, environmental modelling, economic analysis, anthropology and cognitive sociology. And while each individual project involved gathering of specific data, and mapping and monitoring specific impacts, the supercomputer and other technical resources in Brest only needed to be set up once, with just one initial outlay.

On reflection, given the limited rollout of ClimSAT and the long term nature of the impact over which the programme was trying to have influence, it is difficult to assess the direct and indirect benefits. While financial benefits and cost savings if models and recommendations are implemented could be large, there is no information about the level of uptake that ClimSAT recommendations generated. Furthermore, if through ClimSAT findings territories become more resilient to natural disasters, then cost savings are likely to accrue, but again it would be difficult to attribute this directly and solely to ClimSAT.

Evaluation: Failure or Success

ClimSAT can be seen as partially successful. At its outset, the programme was expected to be much larger and ambitious targets to engage regions internationally were set. There has however, only been limited implementation – as noted, only six projects were initiated out of the 50 pledged by UNDP.

In areas where ClimSAT has been implemented, there is evidence that the output delivered to communities and policy makers and the information derived on the risks have been useful, and that stakeholders in participating Southern countries have been well-engaged in the process. For example, in the development of Uruguay's *Metropolitan Area Integrated Territorial Climate Plan*, specific information from ClimSAT on watershed and coastal erosion management, agriculture and food security was used.

However, Northern partners have in some cases not actually been as engaged as intended. The link between climate change mitigation and adaptation was not made in any of the projects. Funding was always a major challenge.

Without access to ClimSAT-gathered data, technology and training, participating regions would have struggled to understand or respond so well to the climate impacts they face. ClimSAT helped overcome this by using localised satellite imagery and localised climatological, socio-economic and opinion-based data to deliver extremely specific information. It then offered this information to those that need it most, not just those that could afford it. In this respect, it was a ground-breaking and extremely valuable resource.

Enablers/Critical Success Factors

Bespoke models and analysis. The key enabling factor of ClimSAT was the intricate detail to which scenarios and models were run on a case-by-case basis. As an ICT tool, ClimSAT offered for the first time indicative information on the major climate risks for some of the world's most vulnerable areas and communities. Offering information in an easy to understand, non-scientific format meant that technical information vital for creating better, more considered development plans was being accessed by relevant stakeholders. According to ClimSAT's Director, for example, participants in Montevideo praised the quality of the information delivered, and of the planning that ensued.

Figure 3: Officials from Uruguay Visiting ClimSAT Hub

Inclusive process. The theoretical and practical training given through ClimSAT has been cited as one of the successes of the programme (see Figure 3). As an inclusive and participatory programme, the recipient stakeholders remained relatively close to the technicians operating the systems throughout the programme, from the outset of feeding information into the models, through to delivery of recommendations. This inclusive set up and the sharing of critical information promoted ownership of the findings and empowered decision makers to act on the outcomes.

In-kind expertise and transferable knowledge. The support seen from the global scientific community in offering up expertise and access to technology and resources, often in kind, has been an enabling factor. Moreover, the sharing of findings and models between regions has potential to continue to deliver success from the initiative. While the specific impacts will remain relevant only to particular locations, the lessons learned in running project data through ClimSAT can be shared and improved with each particular project.

Constraints/Challenges

International climate change regime. In St Malo and during the run up to the Copenhagen COP15 summit in 2009, there was much hope for an international response to climate change. The failure of the negotiations dealt a major blow to ClimSAT and weakened the willingness to act of sub-national governments. Northern regions became less likely to enlist in ClimSAT.

Ownership model. Reluctance of Northern regions to politically or financially engage in ClimSAT has derived from the fact that it is seen as Brittany's, or as a French initiative. Moreover, there were significant cultural and operational differences between the bureaucracies of the UN and the partner regional governments which were challenging to work with. The UNDP's role has also been criticised, with commitments made not being delivered through its reluctance to continue to fund the project.

Economic crisis. In the time of austerity brought about by the global economic crisis, projects such as ClimSAT have struggled for investment. Northern regions do not demonstrate the same level of enthusiasm for North-South collaboration when they are forced to make operational cuts themselves – even those involved struggled to maintain their commitments. So resource scarcity across the economy made it difficult for ClimSAT to operate at the scale originally intended. Regions in developing countries therefore remained underinvested in, access to technologies was restricted, and progress was impeded.

Recommendations/Lessons Learned

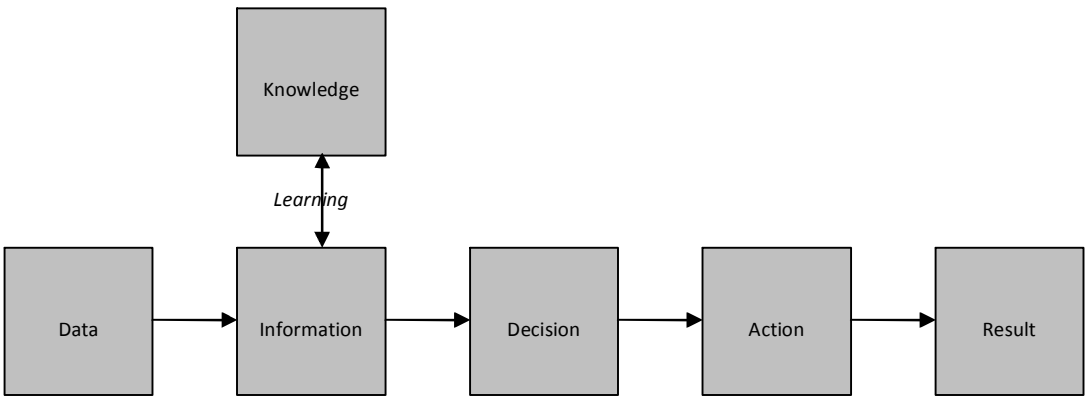

Figure 4: The Information Chain[1]

[1] Heeks, R.B. & Kanashiro, L.L. (2009) Remoteness, Exclusion and Telecentres in Mountain Regions: Analysing ICT-Based "Information Chains" in Pazos, Peru, IDPM Development Informatics Working Paper no.38, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/

Focus on data demand as much as on data supply, and on data use as much as on data production. Projects aiming to provide climate-related information for monitoring, modelling and related uses, should have a design that is rooted in the demand for data. In other words, they must start by asking not "What climate data can we create?" but by asking "What climate data is needed?" (or, more accurately, "What climate data is wanted?"). Without that, there will be uncertainty about the utility of the data outputs.

In a similar way, such projects need to pay significant attention to the access, uptake and utilisation of data by decision-makers and also to the enactment of those decisions, once taken. Put another way, they must attend to the entire "information chain" (see Figure 4) which ensures value from data by feeding decisions, actions and results from that data.

For the whole information chain to run effectively, projects must ensure knowledge is present to enable data to be accessed and understood; that motivations and power are present to enable decisions to be taken; and that other resources are in place to turn decisions into actions. There is evidence in the case of Montevideo that these resources were present but, without these, projects will achieve data production but not developmental results.

Make the link between mitigation and adaptation. While ClimSAT training included information on mitigation strategies, the projects undertaken have not mapped the critical linkages between climate adaptation and mitigation in practice. Efforts should be made to ensure that these elements are linked, and that it is not just adaptation that is the focus. This could potentially be done by altering how the real-time data is shared with developing country partners, so that potential ways of reducing or limiting greenhouse gases can be thought about earlier in the process. The central secretariat for programmes like ClimSAT also has a role to play in balancing data on both areas equally.

Recognise the value of neutral non-profit organisations. UN and government bureaucracies with competing priorities are not the optimal structure for a technology-based initiative like ClimSAT. An international NGO acting as a secretariat for the management of an initiative may encourage diverse Northern regions to enlist as partners. Such a non-profit structure could be seen as more transparent and accountable, and as a single-issue, neutral institution it could leverage more support – financial, political and societal – as a result.

Better promote ClimSAT findings. The findings and outcomes of the initial round of projects developing and utilising the ClimSAT tools have not been widely promoted, yet they are moderately positive. If there is no further UN resource available to staff or support ClimSAT, it is fundamentally important that the learning that has been delivered and the components of the technology that are open source remain accessible and readily available so that the legacy and successful outcomes of this phase of ClimSAT endure.

Use ClimSAT as a model for wider ICT-based climate change responses. ClimSAT has demonstrated that ICT has a role to play in helping society develop responses to climate change and this is a link that could be utilised much more. There is a need for more detailed, context-specific information – such as the data that ClimSAT was harvesting – which needs to be developed across contexts. ICT could potentially offer real-time monitoring of impacts to allow for more resilience, to prevent the worst consequences of climate change, or at least to plan better for them.

Data Sources & Further Information

The case study was developed by the author – Karen Anderton, Independent Environmental Consultant, karenlanderton@gmail.com – via correspondence with Alain Retiere, ClimSAT Director and Renaud Layadi, International Networks Project Manager, for the Regional Council of Brittany.

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Further information about the project and related resources can be found at: http://www.niccd.org

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