

Reducing vulnerabilities via a web map server

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Short CV:

Franck Martin is an ICT specialist working for SOPAC and the Pacific Island Countries. He is vice-chair of the Pacific Islands Chapter of the Internet Society and has worked on the development of Internet in many countries by setting up ISPs or advising ISPs. He has worked on Geographic Information Systems (GIS), doing training or putting in place such systems. He is now ICT specialist for an EU funded project to install Internet map servers to help decision making for reducing vulnerability in Pacific states.

Abstract:

SOPAC is implementing a project funded by the European Union called “Reducing Vulnerability in Pacific ACP states”. The project will use Island System Management as a tool. This tool will be composed mainly of a map server, presenting maps via the web, inside a collaborative environment developed with OpenSource software. Internet is the enabling tool to bring all the stakeholders around the same data and information for better decision making and therefore reduce vulnerability leading towards sustainable development.



Full Text:

SOPAC is implementing a project funded by the European Union called “Reducing Vulnerability in Pacific ACP states”. The project has 3 components, aggregates, water and sanitation, and risk management. There will be data collected based on these 3 components and on the needs of the stakeholders of the 14 Pacific ACP (African, Carribean, Pacific) states. How this data can

contribute in reducing vulnerabilities as data is not information, information is not knowledge, knowledge is not wisdom and all of that is not action? The goal of this project seems presumptuous, only there to please donors with catchy sentences instead of work benefiting the community? What are we, world savers? The link is not obvious but it will appear, thanks to Internet technology.

Many reviews are carried out in developing countries that leads to the production of simple recommendations or at best action reports. Most of the time these reports are not read by interested parties and little is actioned because there are in fact no incentives to change what is already established. Sustainable development comes from the understanding of our environment and how it interacts with us or rather how we interact with it. Development made sustainable requires long term sacrifices against fast gain. There must be a buy-in from the community for the actions recommended in many projects and this is hard to achieve. Reaching the community is essential and therefore the dissemination of the information is critical, however in many developing country information is still considered as power. The withholding of information, like telecom monopolies, stops the path of progress. The information needs to be distributed freely to the widest audience.

Internet is the perfect tool for this task. The information can be both distributed via the official channels as well as to the whole public. There is always a stakeholder in any project that gets forgotten, by distributing the information via the Internet , it ensures that all potential stakeholders will access it. Our project “reducing the vulnerability of Pacific ACP states”, is using as a tool to reach its goal of “Island System Management”. This is another catch term, but it depicts an holistic approach. This holistic approach includes all data that can be collected about an area to facilitate decision making, so that the data can be converted into action.

For this system to be fully efficient, it requires that all decision makers have access to the information in a simple form. As the data that we collect is mainly geographically based, it is obvious to present it inside a Geographic Information System (GIS) or simply spatial system. Unfortunately, most systems requires specialised software that requires skilled operators. This is where the counterpart of the Internet philosophy comes in place: OpenSource.

OpenSource is based on the same principles of the Internet, a widely published standard with no royalties or licensing terms that would stop any group to use the system for reasons of costs or other criteria. By using OpenSource software, the project ensures that all stakeholders will have access to the information at the lowest cost. GIS software is very specialised, fulfilling a niche market, therefore with substantial costs. OpenSource software follows Open Standards, like the Internet it gives all access to the data. This is important as in the aid business, the cost of equipment is sometime not fully relevant as a donor is ready to pay for it, but there is the maintenance and the sustainability of the equipment and the project at stake. Implementing organisation and companies often choose to lock in the recipient with “black boxes” that only skilled technicians from the implementing organisation may modify or maintain. While OpenSource may not be familiar in developing countries, anybody can gain capacity to maintain and modify such systems.

As seen the main data for this project is geographically based and must be presented to a wide audience. As seen the data must be presented as information. The thinking process is to present the

information as a dynamic map to allow any possible analysis. The map should be available over the Internet. One software answers such requirement, the Mapserver from the University of Minnesota. This software presents interactive maps based on raw data from various commercial GIS packages. It also follows the OpenGIS standards which will allow it to interact with other products. The maps are presented as images via a web server. An interface allows the user to query the maps and display the relevant information. While the geographical data can be presented it does not fully ensure user buy-in. There must be an interface to facilitate the collaboration and interaction of all stakeholders holding information. The Mapserver is therefore included inside a web based forum tool: Tiki. This tool offers to easily edit pages as well as file and image galleries and areas to publish logs and articles using no software but a web browser.

Tiki offers this extra functionality to the map serving process: a dynamic knowledge base. Editing web pages is simple and based on the wiki concept. A little parenthesis here, wiki means fast in Hawaiian (a Polynesian language) and tiki means idol in Maori (another Polynesian language). Wiki was developed to create quickly web sites without the user having to learn a specialised software or the principles of good design. The edition of a page is done inside a text box with some very simple tags. Links to other web pages are auto-magically created by using CapitalisedWords. The main formatting and organisation of the pages is left to the application. Some web sites have given anyone permission to modify the wiki pages, creating a fully interactive web site where the whole Internet community is a potential writer. Defacement is avoided by using an historic system where page versions are kept allowing to roll back easily... Tiki adds areas for FAQ (Frequently Asked Questions), file galleries, image galleries and forums. Each page can have comments allowing further interaction between the authors and the readers. This facilitate the creation of a knowledge base where each map layer can be described but even more explained by an expert to the masses, pointing to interesting features in the datasets, supplementing it with images, animation, movies, documents...

How this application, a collaborative map server, can provide wisdom and action? One has to go back to the ISM paradigm.

Historically the monitoring and management of social and environmental factors has been conducted at the issue level, leading to at times fragmented and disparate policies and actions. Recent awareness of the need to view systems in an integrated manner, and manage them taking into account the causal chains and inherent linkages across sectors (agriculture, fisheries, urban development and so on) represents a paradigm shift in thinking. At present however, much of this new thinking remains at the conceptual phase. Project intervention at the individual country level is, therefore, a vital next step in implementing these ideas

It is from this background that the concept of ISM has come about, based on the utmost need, especially for small islands, to view all activities and sectors as interconnected, and to tackle issues of development and vulnerability with the same breadth of focus. Such an approach has implications for the way that research is done and the formulation of resultant policies and long-term strategies that seek to ensure economic, social and environmental sustainability.

Due to the nature of the SOPAC EU Project, and its multi-disciplinary approach to reducing vulnerability of small island states, it is SOPAC's intention to develop a practical ISM methodology. This framework is intended to be a systems-oriented integrated management model of resource management for islands.

Resources are unlikely to be found in urban centres, but the policy makers are. Resources are located in rural areas. Similarly the development of an island is global and not limited to special areas, however the communities in these areas are the primary people affected by decisions taken globally and elsewhere. The local and customary wisdom is lost due to a lack of understanding of the local issues. The benefit for the country is not perceived by the local community because excluded from the decision thinking process and the work of experts that write reports that will never be distributed to the local community. In short these two disparate communities must enter in relation to facilitate the decision process. What better tool than the Internet? Internet is not everywhere, but the development of Internet kiosks in rural villages such as in the Solomon Islands via the PeopleFirstNetwork has shown that remote communities can access the information where even commercial communication companies do not dare to do business.

On the example of PeopleFirstNetwork, many Pacific Islands nation are considering the idea of using radios to be on the Internet. The beauty of the Internet is that it has been developed when 300bauds was considered broadband. There are still many applications out there especially on the Unix/Linux platforms that perform efficiently in very poor network conditions. Global access is also now possible via satellite over the Pacific at reasonable costs. Using DVBIP technology, sharing a satellite channel with other Internet stations, it is possible to get 64kb/s speed both ways for about USD200 a month using a less than a meter dish. The connection is not suitable for running businesses but enough for the use of an Internet Community station. If it was not due to licensing and monopolistic practises these systems would be everywhere in the Pacific. However it shows that the Internet can reach all communities and any application based on Internet Technology can reach all stakeholders at affordable costs. It makes sense now to develop applications based on Internet Technology.

Now the wisdom of the local community can be shared amongst all, this ensures that development is pursued in accordance with the aspiration of the local people, preservation of the environment, improvement of living conditions, community sharing principles, respect of traditional values... Using tiki and the Internet they can know about the perception of their environment decision makers have (through geographically analysed data), they can understand the decisions made and more they can query the decisions taken, participating actively in a democratic process. The democratic process is not necessary as even in traditional society with chiefly systems the elders play the role of advisers and participate actively in the decision process.

The action is finally achievable. The action can to the best of the knowledge and wisdom of all stakeholders be performed towards reducing vulnerability. At each level, each individual in its area of influence can see the local but also big picture and make appropriate decisions. Internet offers this power of easily sharing data, information, knowledge and wisdom amongst a wide variety of the population.

From data to decision, a web based map server using Internet technology and OpenSource is facilitating data sharing. There is a free flow of information between all stakeholders which implies that datasets are no longer costly to share, they just need to be published on the Internet. Organisations and businesses benefit as they can work on base data, avoid duplication of resources for re-entering this base data and enhance the base data with more interesting layers...

This is how this project wants to tackle its goal of “reducing vulnerability in Pacific ACP states” through the implementation of an Island System Management. Internet is an essential pillar of such development bringing a controlled anarchy suitable for the participation of all stakeholders regardless of their gender, skills, or title.

Moreover, the servers belong to the country and are implemented in country. It brings the whole International, regional and local community to participate in the development of local content in-country, in local languages if possible.

So far the servers have been implemented in 7 countries. These countries are Fiji, Kiribati , Papua New Guinea, Samoa, Tonga, Tuvalu and Vanuatu. The main issues in implementing the servers are not technical, but social. How to build an active community that will maintain and update the information? How the community realises that the service has some value?

There are some technical issues, notably getting a full time Internet connection. Price for such commodity is rather expensive (USD2000/month for 64kb/s) and entirely supported by the recipient and not the project. However the server can be also used to connect a whole department to the Internet and offer to all the employees e-mail and web access. Most departments where the servers are located see an opportunity to connect earlier than other department to the Internet. So even if the stakeholders do not see instant value for the mapping server, they already see a benefit: getting the department access to an instant communication system for all employees.

In term of social issues, getting a community around a mapping server is rather difficult. As much as possible the creation of a GIS/RS user group is encouraged to allow the sharing of critical geographical data. Open access data policies are also encouraged to facilitate the uploading of standard geographical data to the mapping servers.

The project benefits also from one member country intern who is in charge, amongst other duties, to train the various stakeholders in operating the mapping server. The intern updates datasets and encourage other stakeholders to participate in the system.

The principal uses of the mapping server are difficult to evaluate, there are missing some key statistics information about who is looking at what, what is getting modified and what data is getting downloaded. However people contact the site administrator with questions and the usage pattern get guessed from this feedback. One main use is from overseas people that are looking for data from their country. They are usually on scholarship abroad with subjects linked back to the geography of their country. They have easy access to fast Internet and are pro-efficient in Internet

searches. They find the mapping servers and use some of the data for their thesis. Another use is teaching geography. Most of the geography taught in the Pacific Islands is about Australia, New Zealand or France. There is little information on the detailed geography of the region. The mapping servers provide this platform where students can view under the guidance of their teacher information related to their country. Another example, is the availability of accurate bathymetric data around the coasts of many islands. This helps the installation of Fish Aggregating Device (FAD) in position where they are likely to stay. Putting a FAD with a cement base on a steep slope is a guarantee that the FAD will slip into the abyss quickly. The bathymetric data on the mapping servers also helps local fisherman in evaluating the best places to find fish. Finally the tourism industry can locate place of interest and the location of hotels to provide a virtual experience to would be visitors. Any possible added value for the tourism market is important for these small economies.

Overall, the mapping servers in countries, provide many uses. These uses are not yet clearly identified but they slowly get integrated with the actions of the various departments that have contributed to the establishment of these mapping servers. With feedback and questions from users the GIS/RS specialists that upload data see slowly the fruit of their efforts and are encouraged to pursue.

Resources:

www.sopac.org/ism
www.sopac.org/maps
www.tikiwiki.org
mapserver.gis.umn.edu
www.opensource.org

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Illustrations:

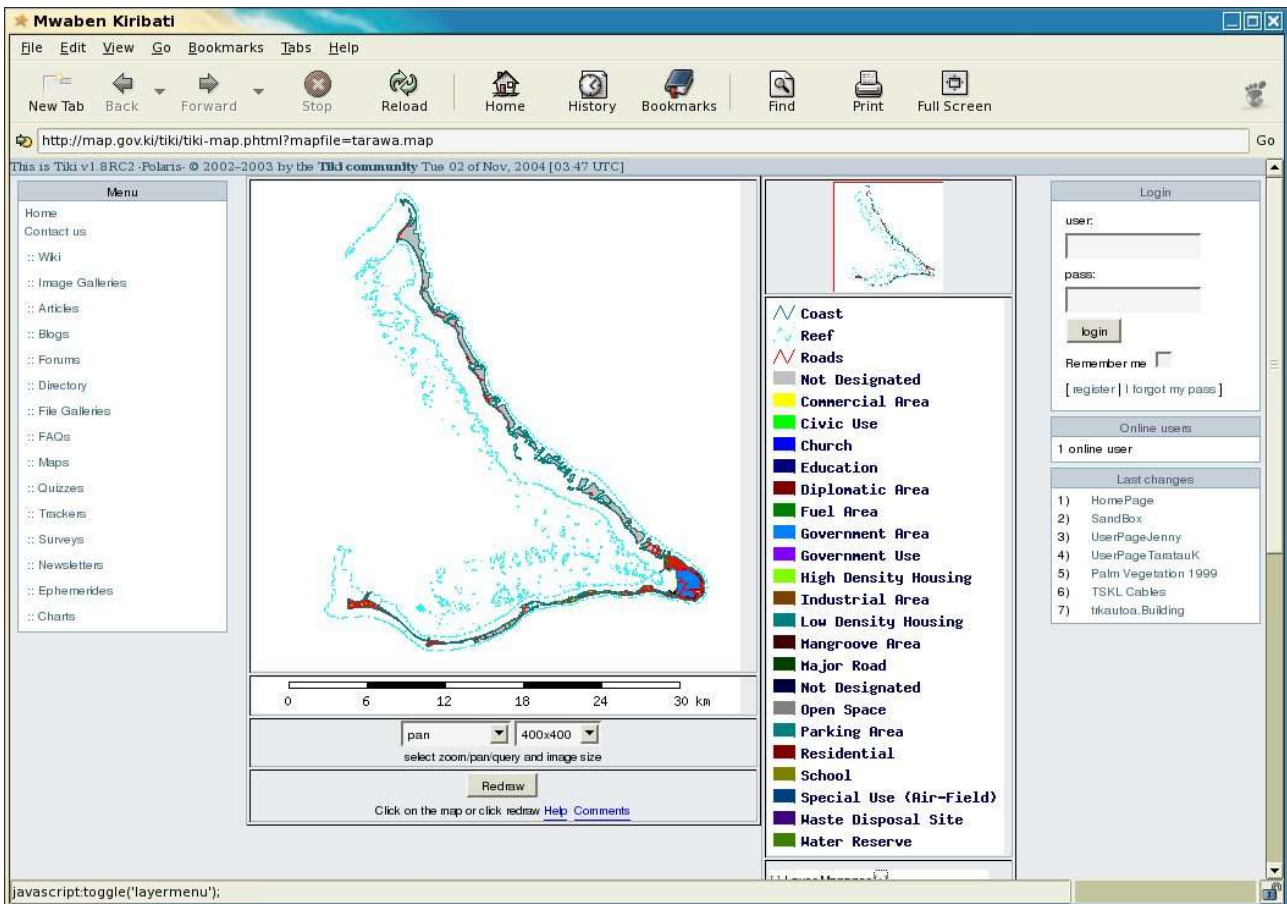


Illustration 1: Mapserver in Kiribati, Tarawa Island

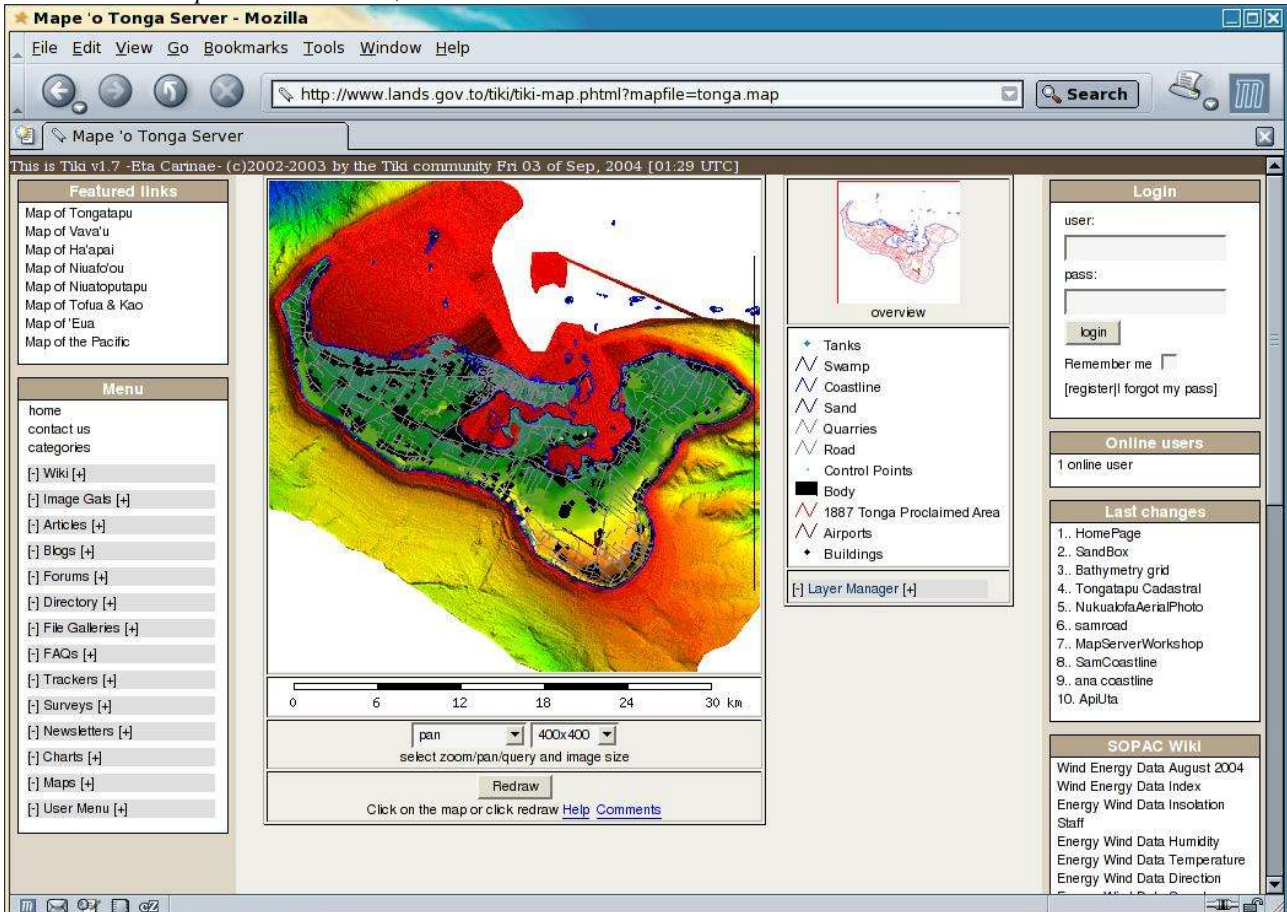


Illustration 2: Mapserver in Tonga, Tongatapu with Bathymetry

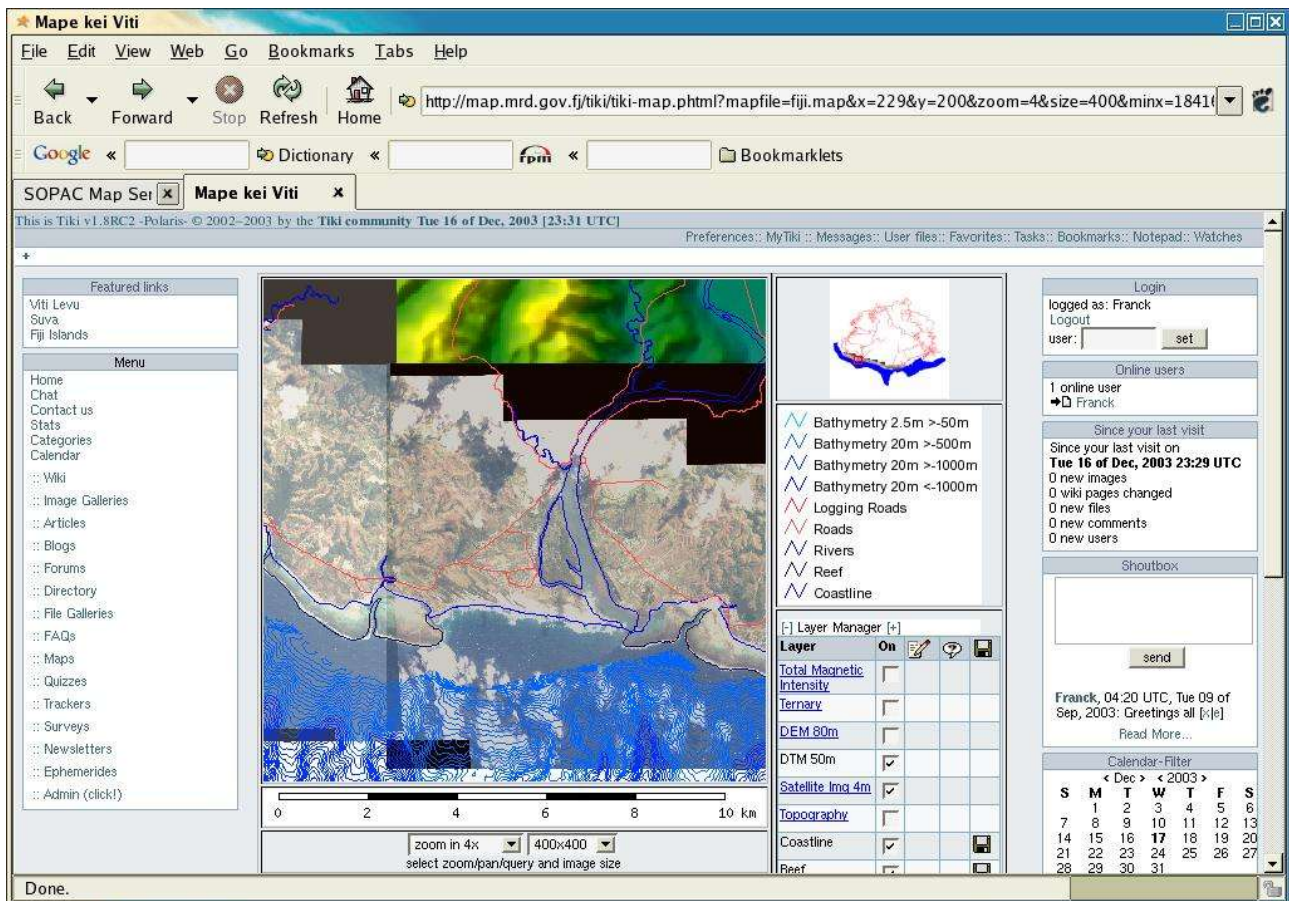


Illustration 3: Mapperserver in Fiji, High resolution imagery of the coral coast

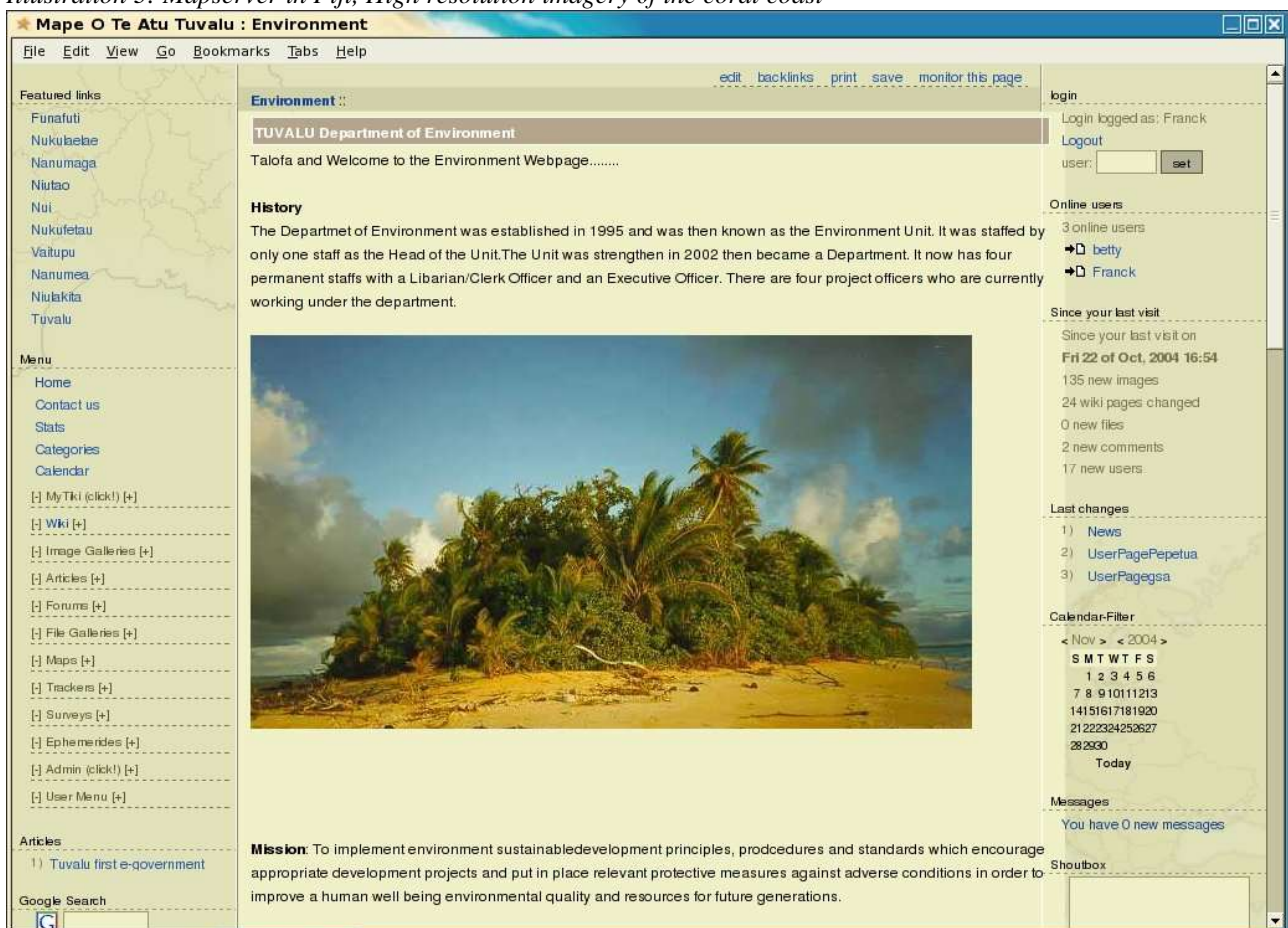


Illustration 4: Mapperserver in Tuvalu, an example of a Wiki Page

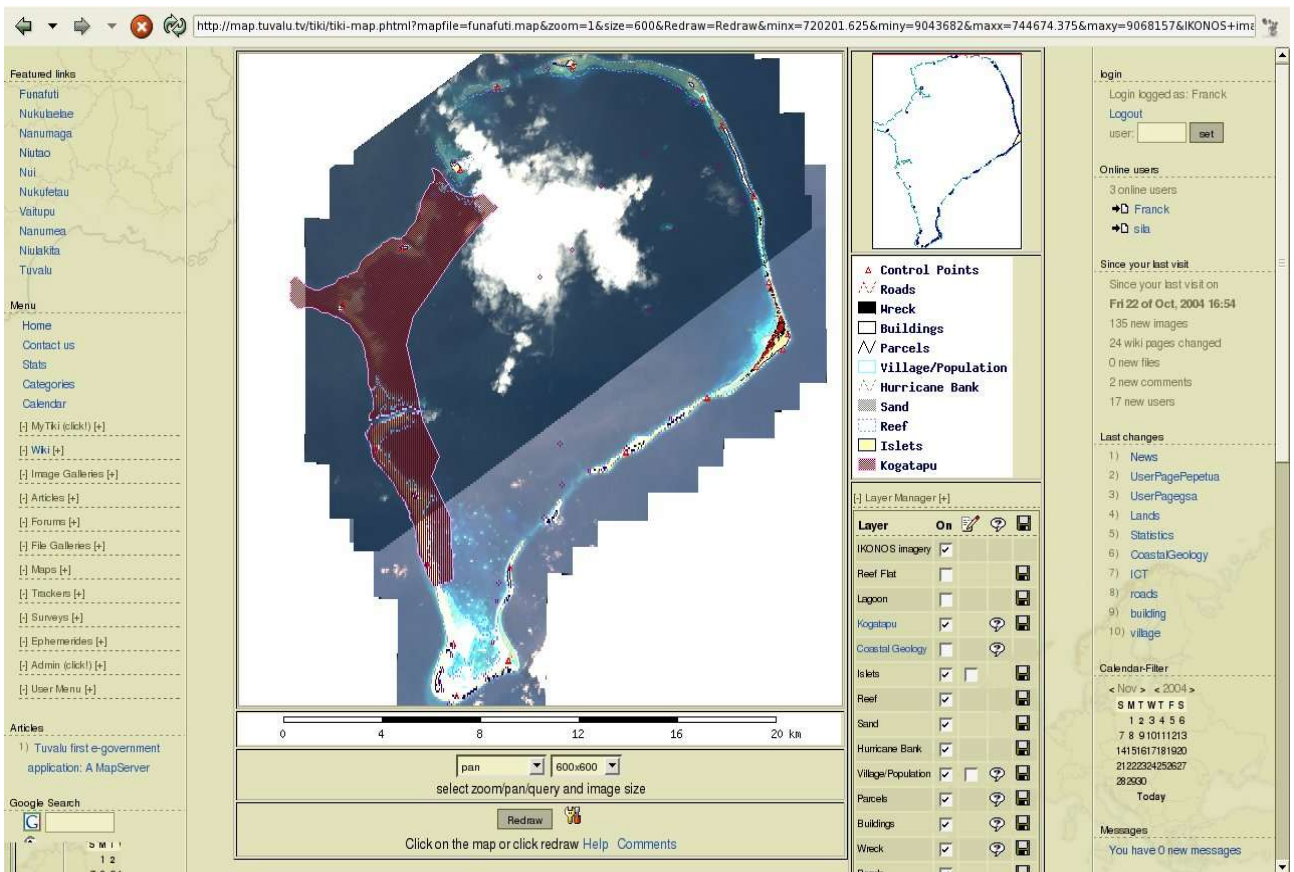


Illustration 5: Mapserver in Tuvalu, Funafuti Island with protected area