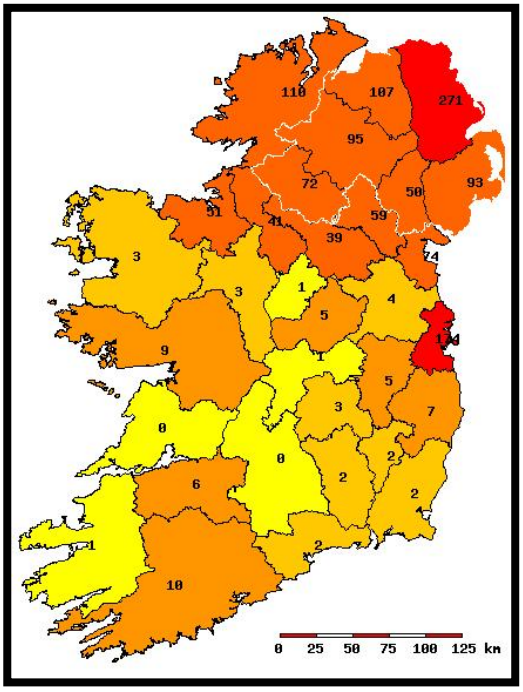
Mapping INTERREG Programmes

Draft Final Report



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Executive Summary

Introduction

In the context of a growing understanding of the role of spatial planning in cross-border projects, ICLRD received funding from the Special European Union Programme Body to:

- Demonstrate how cross-border projects can be mapped;
- Make the information made available to different users in an interactive format to better understand the spatial implications of these improvements; and
- Illustrate and visualize linkages among different programmes that otherwise may not be apparent.

Currently there are no facilities to do this. This report is organized around the following sections:

- Section 1 – Executive Summary--Introduction and Key Findings
- Section 2 -- Description of the mapping application; and
- Section 3 -- Suggestions for future applications.

Key Issues and Finding

- The mapping application is a pilot, a test of the way forward to show the possibilities and constraints in visualizing cross-border information.
- In a relatively short time frame, the project team demonstrated how cross-border projects can mapped and the information made available through a user's web browser.
- The application uses a non-proprietary open-source GIS application, this approach is encouraged by current EU policies.
- Sustainability was incorporated into the mapping platform by integrating it with the BorderIreland database. This creates a dynamic mapping application that remains current and can show the location of new information as the data is entered into the BorderIreland database.
- For the new funding cycle of cross-border programs (2007 -- 2013), it will be important to collect information on the location of projects.
- Data consistency and geo-referencing are major challenges in developing mapping applications. Geo-referencing mapping projects within the Republic of Ireland is more time consuming given the lack of postal codes.
- The mapping application can be extremely useful to SEUPB, north/south bodies, local authorities and NGOs in facilitating monitoring and evaluation activities and the listing of best practices.

Timeframe

The project proceeded according to schedule and agreements noted in the March 20, 2006 Letter of Offer. The programming and development of the mapping Programme was completed end of October, 2006. A summary of the major activities include:

- During May and June, the project team focused on identifying potential users of the system, reviewing how other web-based mapping programmes work and agreed on the general design parameters including the use of non-proprietary open-source GIS package (Mapserver) and the type of data (BorderIreland) to develop a working model. This initial analysis was presented at a SEUPB meeting on June 29, 2006.
- During July and August the project team met and held conference calls to work out technical issues including how to access and use the BorderIreland database and link it to mapping databases. Using an initial series of queries identified by the team, the software programming was developed to link queries to the BorderIreland database and a GIS application.
- During September and October the project team focused on developing a working model that was made accessible on the web. Documentation was also developed and is available.

Project Team

The design team draws upon the core strengths of each institution involved:

- Staff of the Centre for Cross Border Studies (CCBS) defined the types of queries to be mapped and provided access, advice and when necessary made adjustments to the BorderIreland database.
- The National Institute for Regional land Spatial Analysis (NIRSA) provided the technical expertise to develop the computer programming that linked the database to the GIS applications;
- The Institute for International Urban Development (I2UD) provided technical advice on the design and the web interface and developed a collaborative web site to facilitate exchanges among the team.
- Other ICLRD partners were available on a consultative basis for the project.

Project management among the partners was facilitated by a collaborative website that allowed the team to post comments and review the model as it was developed. Regular conference calls were scheduled to facilitate project management.

Key data collected through liaison with key stakeholder organizations.

Given issues of incompatibility with North/South data, the team chose to use the BorderIreland data base to build a working model. Lessons learned in working with this data base, including the type of information that is required to spatially orient projects, can be applied to other data bases in the future.

The BorderIreland database is an online searchable database of activities, publications, funding and contacts relating to policy development and practical cross-border co-operation since the early 1980s. CCBS has collected and centralized a considerable amount of data on cross-border activities on health, transport, agriculture, environment, tourism, education, economic development, community development, culture, sports and arts. Critical to the long-term sustainability and relevancy to users, the database will be continuously updated in the future.

The geographical area covered by this project includes the INTERREG III A programme area in N. Ireland and the Border Counties. This is being accomplished by using the BorderIreland data base. While the working model for the mapping interface may focus on a particular set of border counties to develop the model for the mapping application, it can be applied to other INTERREG III A programme areas.

Data Maps constructed using key data sets.

After identifying typical user queries and types of data to be mapped, the team began to develop the software program to link the queries to the database and link the location data to exact/near-exact points on a map. This process is easier in Northern Ireland given the use of postal codes.

1. *Postcode database on Northern Ireland.* This postcode database provides the necessary geographic references (Easting and Northing) to link the location of a project or organization to a map.
2. *GeoDirectory for the Republic of Ireland.* The Republic of Ireland does not have postal codes in place. GeoDirectory is a complete database of every building in the Republic of Ireland that includes a postal address, a unique 8-digit identity number and x, y coordinates for linking to GIS maps.

A full description of types of maps and information available follows in Section 2, Description of the Mapping Application.

System tested on a specific sector.

In the early stages, the team decided to concentrate on projects that have specific locations (point data) such as the location of an implementing organization. The option of showing projects that have at least two end points such as a road was technically difficult given the challenges in address matching.

The pilot mapping programme is a working version that has been thoroughly tested using the BorderIreland database. BorderIreland is planning to incorporate this new mapping capability into its BorderIreland website.

Preliminary Report produced to guide workshop discussion.

Rather than producing a preliminary report as a hard copy, the team developed a live web-version of the mapping programme that was reviewed by the project team. The use of programme on the web allowed the technical team to make necessary adjustments to the programme.

This draft final report will be circulated among potential users who will be asked to beta test the pilot programme that is accessible via a web site using a password. A series of questions will be provided to help in obtaining feedback on the mapping programme as well as potential future uses. These will be incorporated into the final report.

Workshops

The project team has presented the pilot mapping programme in a series of workshops and conferences including:

- June 29, 2006 Members of the ICLRD project team made a presentation on the initial work to the Measure Panel Members Advisers in Monaghan.

- October 19, 2006 a small working session with the project team and ICLRD partners was held in Armagh.

- November 9, 2006 a summary of the pilot program was presented at the ICLRD conference held in Newry.

Equipment

A laptop was acquired for the project and will be also used for further cross-border research work by the Centre for Cross Border Studies as noted in the letter of agreement.

Budget

The allocation of project funds reflected the original proposal including staff costs associated with identifying key design issues, developing the necessary software programming and linkages to the database and the drafting of the final report.

Description of the Mapping Application

The Application

The basis of the project was to **identify relevant data of cross-border projects and develop a pilot application to display the information in a mapped form**. The project team chose to use an existing dataset rather than spend an extensive amount of time accumulating, reviewing, verifying, sorting and formatting raw data.

The dataset collected by BorderIreland was chosen as an ideal platform to build the project around since it contained a number of complex and interconnected entries that could be mapped and linked to descriptive text. Overall the project aim was to create a pilot application that would show users how information contained in datasets similar to that of the Border Ireland dataset could in mapped using little changes to the code.

After choosing the dataset, the project team reviewed options on how to present the information to the user. There are two basic choices in this area: a web based application or a stand alone application that is installed onto the client's system. For ease of use, ease of accessibility and given the nature of the application the decision was that the application would be a web based one (Figure 1) accessed via a client's internet browser with little or no extra requirements on the user's part in order to use the application.

The database can be stored remotely on a server and the application stored on the same, or a separate, server. All the user needs is the URL of the server to use the application. No extra software is required and no hidden settings need to be changed.

With the two main choices made for the project all that was left was to write the software code that links the dataset to the mapping applications.

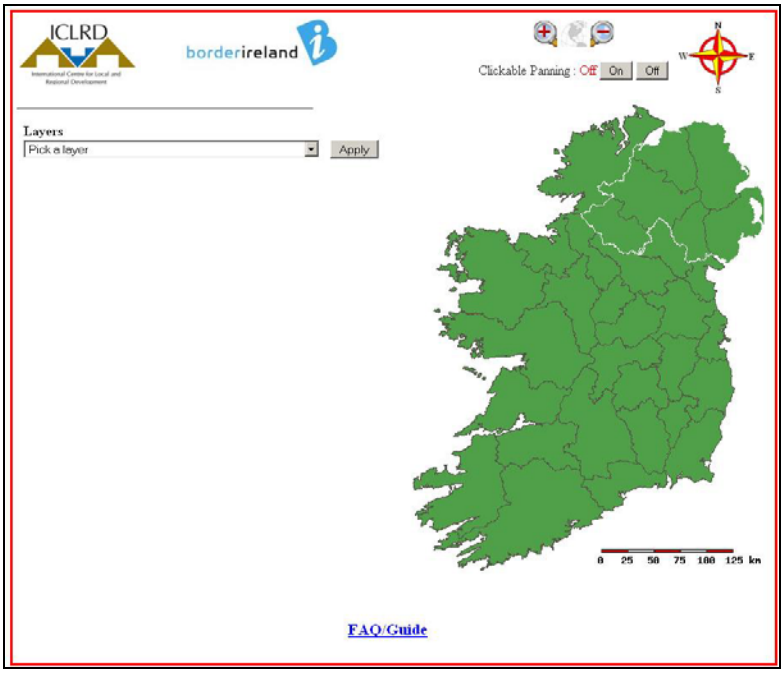

Figure 1-- A screenshot of the application loaded

Key Features

To develop the pilot application, a series of twelve queries were identified for mapping (Figure 2). This allowed the project to meet the following objectives:

- Test how a cross-border dataset can be mapped;
- Develop best approach to presenting the data to the user.

The pilot application currently generates maps and text descriptions for each of the twelve queries shows below.

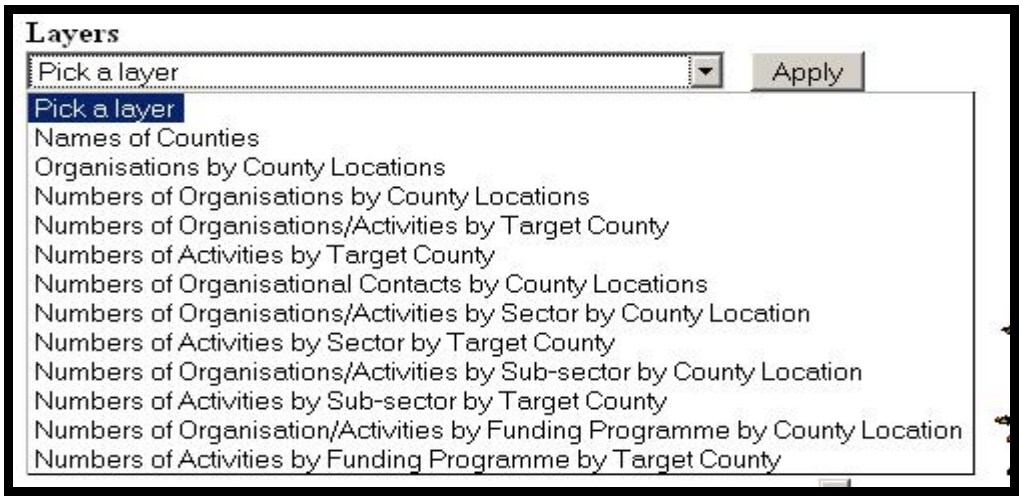

Figure 2, the queries and layers the user can choose from the menu

The user is presented with a series of "layers" that are linked to the database; as a layer is selected and applied to the map the application updates and displays the information in a graphical manner, via the map and the colouring of each of the counties (Figure 3).

In addition to displaying information in numerical and text form to the user, the maps are also coloured according to an optimal classification breakdown of the data returned from the load layer. This colours the map in a spectrum from yellow, being the lowest, to red, being the highest, and value in a given area. It allows the user to see at a glance where elements are more concentrated or they can read the values on the map to get a more precise reading.

A dynamic legend is also generated with each query and resulting view to clarify how the information on the map is presented to the user. The legend shows how breaks in the colour spectrum relate to values in the map. It is created based on the different options that the user selects and changes as options and datasets change (Figure 4).

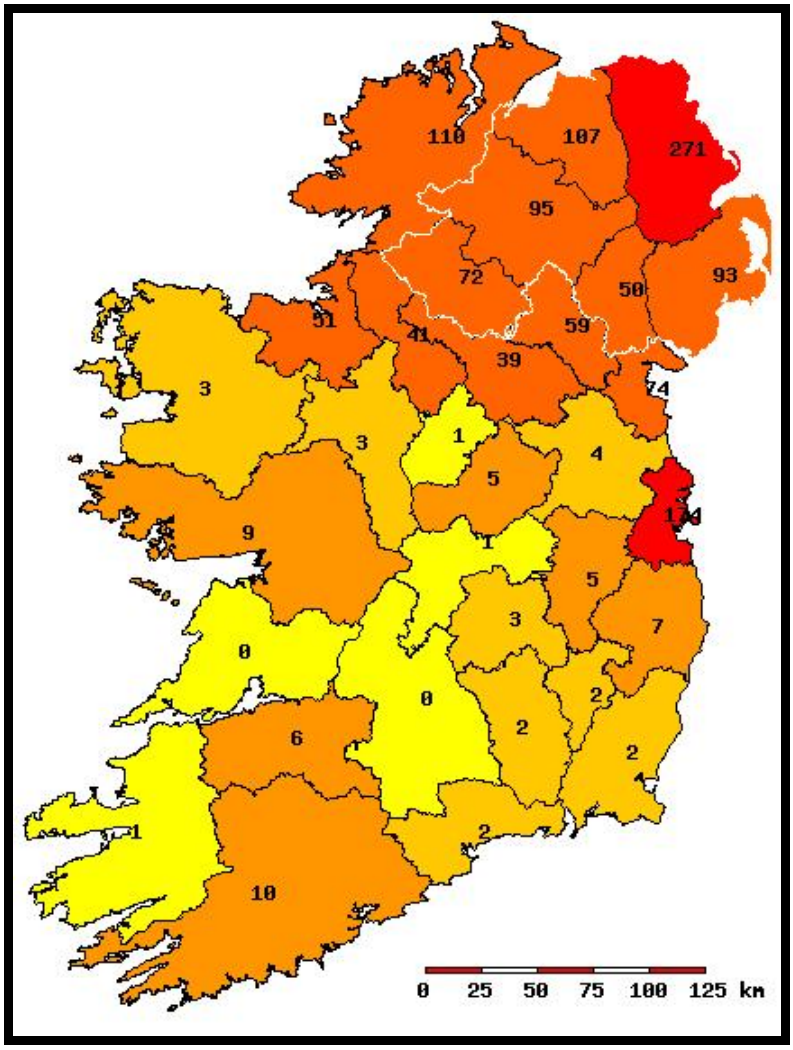

Figure 3, Example of Map Display

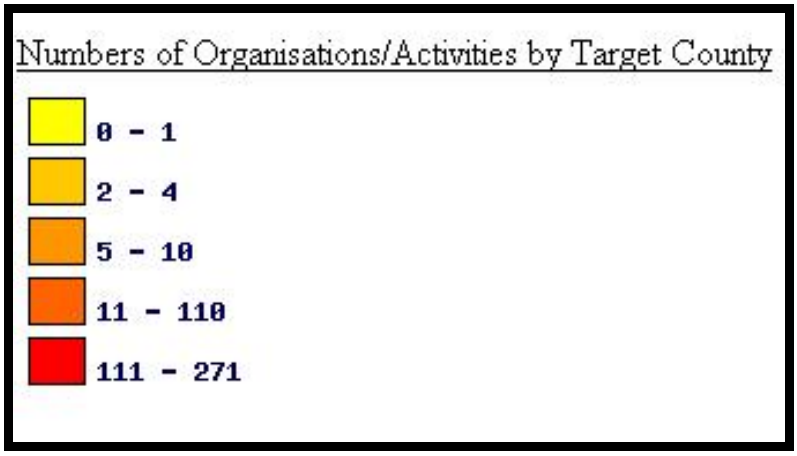

Figure 4, Example of a legend with colour breaks

The map is interactive using the mouse. When a user loads up one of the layers and generates a map, they can then click on any area of the map and extract further information from that specific area. This

information is displayed to the left of the map in a small scroll box (Figure 5) where the user can see more details for the given county. By selection one of these entries the application will load up a second webpage which contains a more detailed description of the single entry.

Figure 5. The map above created this info box by clicking on County Sligo

Other Features

Other features included in the application include the ability to zoom in and out of the map and pan the map to change the central point of view. The user has full control of the magnification level of the map and two different methods to pan the map to a position of their liking (Figure6).

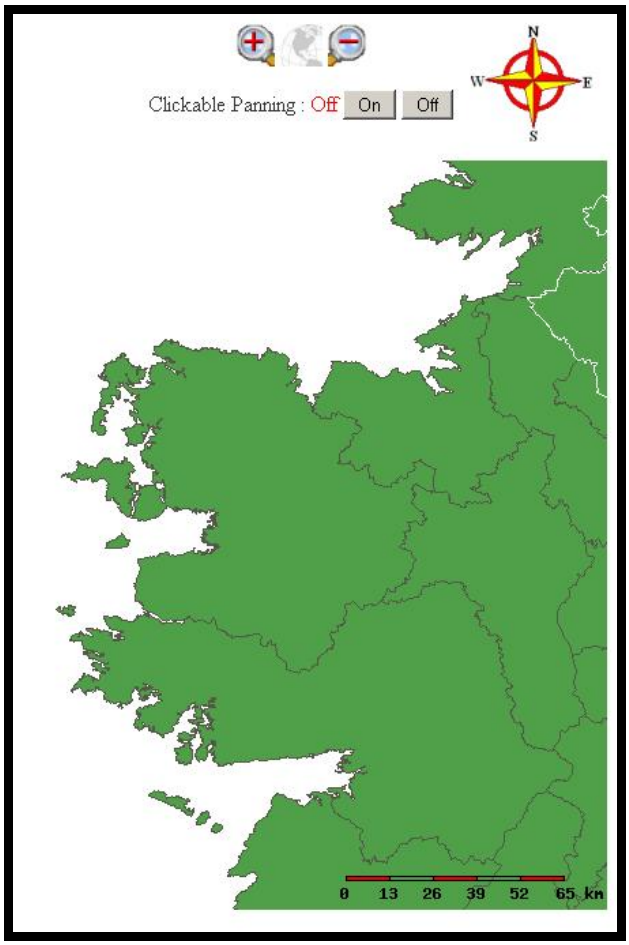

Figure 6, a zoomed and panned map

Testing

The application was tested rigorously in its final stage by all members of the project team. Any "bugs" found were investigated and corrected. Some of the bugs were visual in nature, legends overlapping areas of the map or regions of the map remaining unchanged after a layer was loaded. Others were linked to a mislabelled query call.

The application was also tested on both cross browser and cross operating system to accommodate as many user environments as was possible. It currently works in all operating systems with the user input triggering the correct response from the application. [1]

Future Applications

Next Steps and Options.

1. **Finish geo-coding southern counties**. Given the difficulty of geo-coding data from the Republic of Ireland, the pilot application needs additional work to geo-code additional data to provide a fuller picture of the location of organizations and cross-border projects.

2. **Review options for integrating the mapping software programme into the BorderIreland database**. The current pilot application can be integrated into the BorderIreland website, we need to determine the amount of effort to accomplish this.

3. **Identify new queries that would be useful to cross-border groups**. The current pilot application will be beta tested by reviewers who are assisting the BorderIreland application. The review will be helpful in identifying new queries.

4. **Explore potential linkages to other programmes such as the Regional Research Observatory**. The pilot mapping application and the census mapping programme developed by the Regional Research Observatory were both featured in a presentation at the Nov. 9, 2006 ICLRD conference.

   The two projects serve complementary purposes with the SEUPB mapping programme tracking the location of cross-border projects and providing information while the RRO mapping software provides sophisticated tools to analyse cross-border census data including demographic information within specified distances from facilities.

   It would be useful to identify potential operational linkages between the two mapping programmes which can vary from simple electronic referral links on the respective websites to more sophisticated linkages, for example identifying the location of existing facilities and demographic information in catchment areas.

5. **Support SEUPB programmes outreach and evaluation** by providing linkages to the SEUPB Successful Projects online initiative and providing evidence for programme evaluations/ reviews. This information provided can also be of use to government departments, the North-South Ministerial Council, other North/South Units, local authorities and the community voluntary sector as well as researchers focusing on north

[1] Cross browser issues were identified that present, there are no solution for. When viewed in FireFox the layers menu will expand the drop down section so that all titles of layers are visible for the user to read. In Internet Explorer 6 and below this does not happen.

Programming additions to the pilot application

Currently, the pilot mapping programme is fully functional and has more features than the project team had hoped to have upon completion.

There are a number of design features that could be added to the application to enhance functionality and ease of use, these include:

1. **A text based search option**. At the moment the user cannot type in a requested organisation or activity and hit a button to have the information displayed on the map. They can only load a layer that the organisation or activity is in and select the county it is based in to load up the scroll box of information. Ideally a user may not know what county the activity or organisation of interest is located in and wish to type in the name and perform a search that way.

2. **Modification to the point's layer**. Currently, the locations in a county of each administering organisation can be shown. These points can then be clicked on by the user to display the title of the organisation. It may be useful to have an organisation point, when clicked, remove all other points from the layer and instead load up different coloured points in the other counties that represent the activities that the same organisation is involved in.

3. **Identification of actual project locations**. Currently the queries show the location of projects by administering organization rather than the actual location of the project. For example, if a cross-border group is administering a project improving 6 community centres in different locations, the map will show the location of the administering organization rather that the actual locations of the community centres. The pilot mapping programme is capable of showing the location of the actual project if the information is collected, currently this data on cross-border programmes is not collected.

4. **Illustrating non-point data**. The programme as currently can graphically illustrate the location of specific location, for example a community centre. A future addition of the programme would be to develop the capability to show the location of cross-border projects such as roads which is technically more difficult to illustrate on a map.

5. A **drag panning system**, similar to the one presently seen in Google earth and Google maps. Currently the user can only pan the map around the screen by clicking on the Clickable Panning option or by using the Compass Panning option.

6. Add "**to save and print maps functions"** of integrated and searchable information to allow users to integrate visual display into their own work.