

Multidisciplinary Approach to Surveying from Geographic Information Systems

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Key Words: Digital competency, Incumbencies, Water Management, GIS

Summary

It is possible to increase the influence of Surveying in different multidisciplinary projects from the digital training of professionals covering multiple areas. In our career of Surveyor Engineer, the training includes a solid foundation in Mathematics and Physics, Topography, GPS, subjects related to digital competence. .

I will present several research projects that involve areas far from traditional surveying, solve problems similar to those solved in other very diverse countries, which makes them global and allows the development of a pedagogy to think about the construction of the problem and not only to solve it .

Water management on the north of Rosario in the Paraná River delta, agrochemical contamination in seven cities of the province of Santa Fe, archaeological applications and the use of multi-criteria theory for environmental assessment establish a diverse panorama for the projection of surveying into current areas.

One of the projects consists of the analysis of the spatial location of immigrant flows from regions of Spain in the city of Rosario. In another, it was possible to combine the territorial information related to the archaeological works linked to the study of the urban and rural area of Santa Fe la Vieja for the period 1573-1660

The production and systematization of territorial information related to the archaeological works carried out in the southern port area of the city of Rosario, through topographic surveys and the production of specific thematic cartography.

Finally, a sub-basin of Arroyo Pavón shows critical situations with respect to current or potential erosive processes. Based on this, a sustainable use of the soil will be proposed. .

The breadth of this view clearly favors professional insertion.

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1. INTRODUCTION

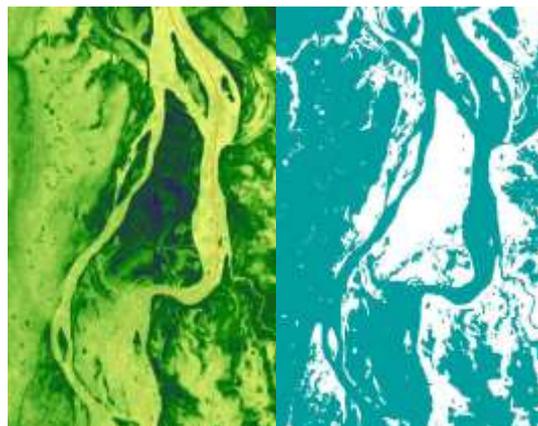
Active participation in large multidisciplinary projects increases the Surveyor's area of influence of activity to previously distant sectors. At the beginning, we may participate in a low rung of the project but as we grow in our digital training we will climb to the higher hierarchies. In our career as Surveyor Engineer, the training includes a solid base in Mathematics and Physics, Topography, GPS, subjects related to digital competence.

To support this thesis I will present several research projects that involve areas far from traditional surveying. I also emphasize that we attack problems similar to those solved in other very diverse countries, which makes them global and allows us to develop a pedagogy to think about the construction of the problem and not only to solve it.

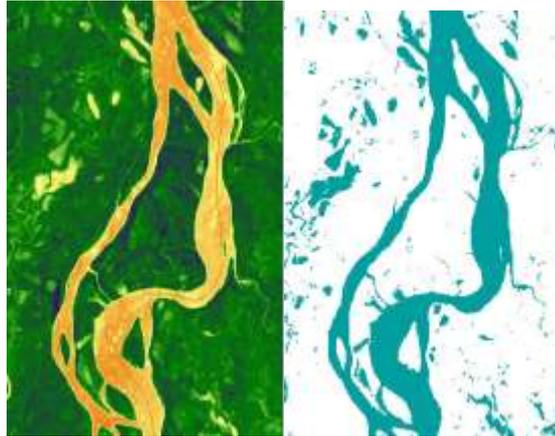
Our Syllabus insists on "understanding and developing new technologies, with a permanent commitment to updating, stimulating a critical and creative attitude in the identification, analysis and resolution of problems"

2. WATER MANAGEMENT

Water management over the north of Rosario in the Paraná River delta with the intervention of National Parks. Satellite images of the area from 1984 to 2020 were used. Water was then calculated according to local criteria.

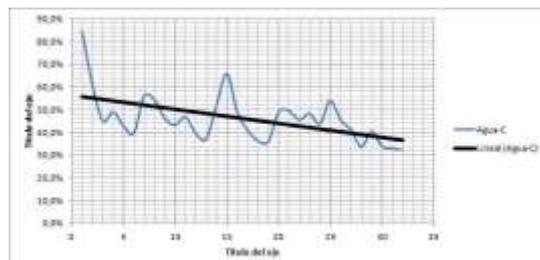


1998 Water 66 %

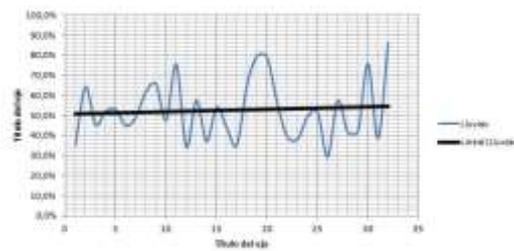


2020 Water 25 %

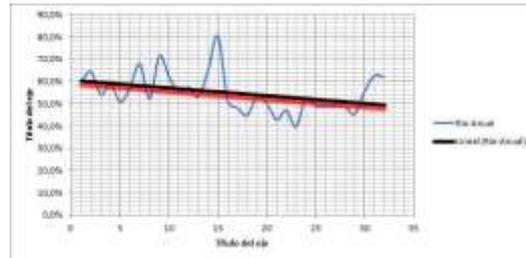
Another way of looking at the presence of water over time. Here are scatter plots with the trend or regression line. They go from 1984 to 2020.



Water by Satellite Imagery - Clearly downhill



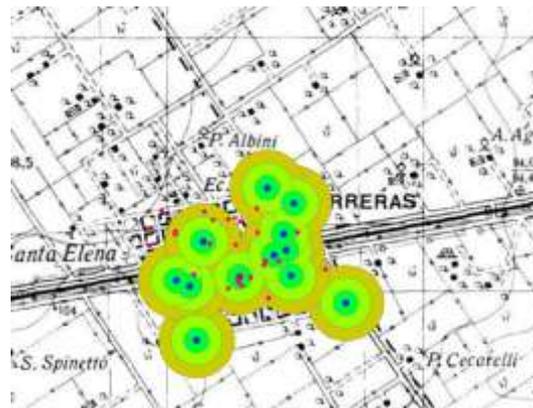
Water by Rain - Slightly rising



Water by river height - Slightly descending

3. HEALTH - ENVIRONMENT

Given the health problems such as male infertility and cancer, especially of the male reproductive system, existing in localities of the region whose main activity is agricultural exploitation, linked to the presence of electrical energy transformers containing PCBs, silo plants and agrochemical storage places, a Geographic Information System was developed with the purpose of representing the surveyed information linking the cases of affected people in relation to the distance to the sources of contamination. The localities surveyed were Alcorta, Carreras, Máximo Paz and Santa Teresa in the province of Santa Fe and the locality of Pérez Millán in the province of Buenos Aires. The base cartography for the implementation of the .GIS. were the topographic charts of the Military Geographic Institute and the georeferenced data obtained in the field were used. Operations were performed linking the number of people affected with the distance to the polluting sources, finding a relationship between them. The tool used was ArcView GIS and the work was carried out in conjunction with the Biodiversity and Environment Research Center ECOSUR.



4. FORT PEACE

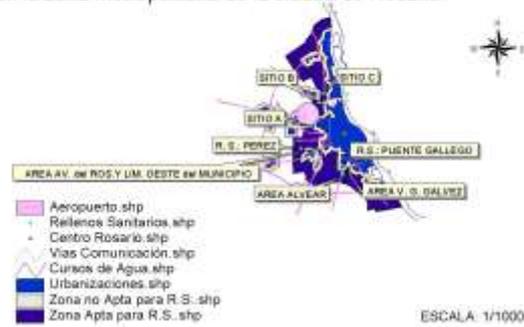
This paper presents the geographic techniques applied to the sites of Fort General Paz, Fortín Algarrobos and Fortín Rifles, (Carlos Casares County, Province of Buenos Aires), within the framework of the Archaeological Research Project Fort General Paz, Comandancia de la Frontera Oeste (1869 and 1877). The primary objective of this stage of the research consisted of locating the precise location of the fort and the main buildings that constituted its core, as well as the different military sites that made up the frontier line located in the present-day Partido de Carlos Casares. To this end, archaeological research was initially concentrated on the General Paz Fort. The work carried out to date has been primarily aimed at identifying the precise spatial location of the Fort and its various architectural components.



5. ENVIRONMENT

It should be noted that in addressing decision problems, the multi-criteria decision support approach does not present the decision maker or group of decision makers with a solution to their problem by choosing a single represented truth for the selected action. As its name indicates, multi-criteria decision support consists of supporting a decision process by recommending actions or courses of action to the decision maker.

G.I.S. de consulta para la obtención de un Relleno Sanitario en la zona metropolitana de la ciudad de Rosario.

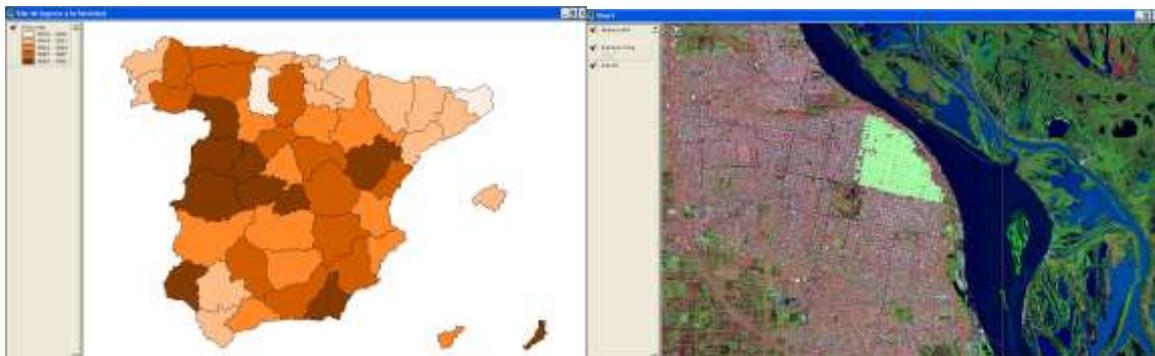


6. SPANIARDS-INMIGRATION

Analysis of spatial location of immigrant flows from regions of Spain in the city of Rosario, Province of Santa Fe, Rep. Argentina with Geographic Information Systems (GIS).

The city of Rosario in the province of Santa Fe was developed from 1854 by the contribution of a large immigrant flow of European origin, mainly Italians and Spaniards. As a result, entities quickly arose that brought together these people, the Asociación Española de Socorros Mutuos de Rosario being the second of its kind in South America.

Based on the archives of this institution, research studies were carried out to analyze, through the use of GIS, the spatial distribution in the territory of the city of the different regional communities of Spain in terms of their time of arrival, the relationship of proximity between the countrymen of the same community, and their spatial dispersion in terms of the vertiginous growth of the locality between its origins and 1950.



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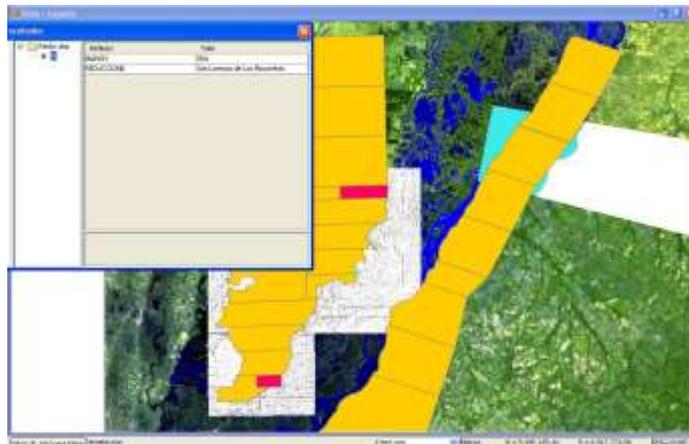
FIG e-Working Week 2021
Smart Surveyors for Land and Water Management - Challenges in a New Reality
Virtually in the Netherlands, 21–25 June 2021

7. CAYASTA

Land use planning in Santa Fe la Vieja (1573-1660). Urban and rural space

Within the framework of a project based in the Department of Archaeology of the School of Anthropology of the Faculty of Humanities and Arts of Rosario, a Program of Historical Archaeology of Santa Fe la Vieja was developed, including an interdisciplinary approach involving Anthropologists, Historians and Surveyors, the latter linked to land use planning.

This approach combines traditional techniques with the use of GPS technology, application of Geographic Information Systems, Topographic Charts, interpretation of aerial photographs, production of cartography and analysis of Satellite Images.



8. SOUTH ROSARIO

This project has registered in the southeastern section of the city of Rosario (Tablada neighborhood) a series of archaeological sites, with chronology of the 20th century, in different preservation situations and of diverse historical significance, with the purpose of drawing up a chart of Archaeological and Sociocultural Potential. In this conceptual orientation, the Project aims to systematize the archaeological subsoil and provide policies for heritage preservation and enhancement of this heritage. Four sites linked to the history of the Port and to the economic activities of tanneries and the use of garbage dumps were identified and municipal protection measures were taken. A GIS was developed to synthesize and territorialize the information obtained. From the Social Anthropological point of view, we

10. CONCLUSIONS

The variety of projects presented shows us the infinite limit of our capacity to create without sticking to the established or the already known.

The writer Franz Kafka chose a surveyor as the main character of his novel "The Castle". In a note to his novel, it is said: "On the choice of the profession of surveyor for the character K various clarifications have been provided. Surveying, as the art of measuring land, suggests an eagerness to order, to establish limits and boundaries, which contrasts with K's uprooted life and his attempts to integrate into the village." This setting of limits and moving them is always our decision.

The breadth of this gaze notoriously favors professional insertion.

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