

# TRAINING METHODOLOGIES AND APPROACHES IN GIS AND REMOTE SENSING FORMEZ EDUCATIONAL PROGRAMMES

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## ABSTRACT

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Formez training courses are designed to train Central, Regional and Local Planning Authorities and young graduate under 25 alike, by using a complete range of Remote Sensing and GIS tools in operational and research tasks for acquisition, processing, analysis, interpretation and transformation of data.

A multi-disciplinary approach, flexible to the different types of courses is adopted.

This paper describes the training methodologies and the combination of GIS and Remote Sensing approaches used to investigate earth resources and monitor environment conditions.

Supplementary study has been done for understanding the results of Formez training activities in terms of job opportunities in the field of Remote Sensing and GIS for young graduates.

## INTRODUCTION

The Formez Training and Study Centre, is an association founded by joint initiative of the Agenzia per la Promozione dello Sviluppo del Mezzogiorno (Agency for the Promotion of Development in Southern Italy), the IRI (Institute for Industrial Reconstruction), and SVIMEZ (the Association for the Development of Industry on Southern Italy).

Through training activities and organizational support Formez programs promotes, implements, and provides services in both the public and private sectors, especially local administrative authorities and small and medium sized enterprises, with the aim of foresting modernization processes based on organizational and rational management techniques.

Formez operates in the following areas:

- **Public Authorities**
- **The productive system**

Formez services are made available to public and private bodies in the South of Italy operating in the following sectors: - agriculture - industry - commerce - tourism - the advanced tertiary sector - professional training and cultural services - social and health care services - education technologies, long distance training and experimental educational techniques - town and country planning and programming - applied scientific research - universities - water administration.

## EDUCATIONAL PROGRAMMES

In 1980 Formez set up a long-term educational programme concerning Remote Sensing. Training on

Geographical Information Systems is part of this programme.

This programme is part of Formez statutory activities.

Up 1987 the courses on RS and GIS were addressed to public officers from Regional and Local Authorities.

These courses lasted 2-4 weeks and their objective was more one of making Public Authorities (Planning Authorities) aware of the possibility to apply RS and GIS techniques to planning, rather than one of training RS and GIS specialists.

In the period 1980-87, 15 short courses and seminars were organised; 210 public officers participated to courses and 1040 were ~~been~~ spent on education.

After these first courses, it was clear that among the various uses of RS and GIS techniques, monitoring the dynamic of the urban growth was an application not being investigated, in comparison with its potential relevance to planning.

Furthermore, are other educational needs emerged, as a consequence of the development and supply on the market of image processing, computer graphic and GIS hardware and software.

A primary educational issue concerned the interpretation of Remotely Sensed images for thematic mapping. Training programmes in this field were addressed to representatives and/or specialists of various environmental and territorial disciplines.

As regards to topography, it is worth doing some considerations.

Due to market, image and/or technical-economical benefits Public Authorities shifted their attitude towards map-making.

In fact, they started to produce digital cartography, in a un-coordinated way and with no standard.

Topography is not one of the educational objectives of Formez. On the grounds of the observation that most Public Authorities commit firms the production of topographic maps, to private.

Formez training objective on this specific topic was one of making Public Authorities aware of map-making methods, problems and process so that they, though not making map themselves, and control and manage the map making process being carried out outside their offices.

The educational objectives have, then, been achieved by providing knowledge on different techniques for making digital maps; on the difference between digital cartography from photogrammetry and digital cartography from digitising and methods and techniques for up-dating digital maps.

A consequent educational topic was that concerning hardware and software specifications, in the sense of providing knowledge and capability to understand and assess the suitability of a system to accomplish one authority's need.

In 1987, according to European Social Funds, Formez activities on RS and GIS were also addressed to post-graduated under 25.

In the period 1987-90 four full immersion courses, about 3 month each, were organized for a total of 1600 hours.

Participants to these courses were from the faculties of Engineering, Architecture, Natural Sciences, Agronomy, Geology.

## METHODOLOGY

The course structure and methodology have changed over time. Due to the different wind of participants a major change, was the emphasis placed on workshops and field activities.

Participants number is 15. Lectures and tutors expertise of different subjects participated to the courses.

Air photo interpretation, cartography, RS and GIS are fundamental subjects of courses.

Ancillary to these fundamental disciplines a number of subjects are though: informatics, CADD, organizational hints.

No other initiatives can be detected in this field in Southern Italy, from either other Educational Institutes or Universities.

Some relevant considerations must be done on *teaching* methods and methodologies in these courses.

Training courses are highly structured. A course consists of modules dealing with different subjects. Modules vary in length according to the specific subject dealt with.

Each module includes theory and applications.

## TRAINING

The applications constitutes the *training* phases of the theoretical part of course. Usually the module on techniques and methodologies of air photo-interpretation is first, then followed by techniques and methodologies of RS; lastly the workshop.

## WORKSHOP

The workshop are designed to apply participants' knowledge of techniques and methodologies of RS and GIS particularly in the context of the planning field.

During the workshop participants are required to work on a project. The project is an individual piece of work which provides and opportunity to carry out analysis through RS and GIS. Analysis is consistent to a defined planning task.

The primary concern of the workshops is not with the ..... application of RS and GIS but with the evaluation of how and what benefits RS and GIS can help analysis in planning.

A second concern of the workshops is with promoting the integration of different disciplinary backgrounds by forming inter-disciplinary groups.

Each group is to write a final report outlining a critical review of techniques and methods applied. It is also to report fully on the findings of the investigation in each disciplinary field. The results of the work are presented to Formez staff.

The Fundamental steps of the workshop are:

- project organisation (definition of objectives, techniques, methodologies, output);

- data collection, analysis, integration, input and transformation.

Consistency with methodologies and stated objectives is ensured through timed meetings with lectures and tutors at different stages of the work.

Beside review of work in progress encourages participants to further achievements.

Grouping people into interdisciplinary groups has proved highly effective as to communicating, mediating and steering different disciplinary approaches towards the achievement of common objectives.

The result is a general improvement of groups' working attitudes.

Teaching methods also consists of seminars held during the workshops. Aim of the seminars is to investigate in more details some specific aspects or topics related to the techniques and methodologies being applied and to the theory of previous modules.

Seminars issues are identified by lecturers according to the class needs. This highly flexible structure allows to constantly check progresses interactively.

These courses adopt a deep immersion approach, and devote 120 hs to air photo interpretation; 90 hs to RS techniques, methods and training; 80 hs to GIS/LIS and relational data-bases 150 hs to workshops; 40 hs to field checks and some 40 hs to related topics. Over 67 days of course there are only a few days off (average 4 including Sundays).

The deep immersion approach has proved highly effective in optimizing the process of apprehension by optimising concentration and attention of participants.

PCs practice takes place during the workshops, so as to minimize formal training on computers and focus on the necessary sets of commands only.

This approach has proved successfully, as compared to courses with formal training on PCs.

## FACILITIES

Facilities available consists of 20 Topcon stereoscopes + parallaxes bars; 10 Sokisha portable stereoscopes; 3 OMI Stereo facett plotters; 1 ZEISS Stereocord + IBM PC + AØ HP draft master plotter; 1 analytical restitutor Zeiss P3 + VIDEOMAP + HP 1000 computer + Tektronics monitor + Planitab Zeiss T 110; 4 workstations PS 2 50; 2 Erdas/PC workstations; and 1 A1 Schhlumberger plotter.

Applicative softwares available are: Erdas/GIS; MAP; PC-ARC/INFO; LION; PHOCUS; VIDEOMAP.

## Other educational projects

Within the framework of its triennial programme for the period 1990-92 Formez has defined two educational lines focussing on GIS. The two lines consist of researches and training projects, addressed to the Public sector and young graduates.

As regards the Public sector, a GIS project is being set-up for the Minister for Cultural Heritage, in particular for its peripheral bodies: the Superintendences.

The project was requested by the Superintendencies, and aims to set up a Gis for the historical centre of the city of Naples.

Formez is to provide coordination and advice and to train the officers who will implement the GIS at various levels.

According to the second educational line, Formez will organize courses on GIS specifically. So far, in fact, training on GIS has been part of RS courses.