The development of Geographic Information a main challenge for Agricultural Education

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Development of Geographic Information

Geographic Information concerns together new processes of measurement and use of territorial informations (remote sensing and aerial photography) and information systems describing a given area as well as specific software tools (merging graphic features and data bases' management) allowing the processing of those data.

These powerful technologies have three specific characteristics :
- they are based on the location of the analysed and/or managed phenomena and then on taking into account their spatial dimension
- they allow to cross together heterogenous parameters localized in the same area of interest
- they allow an exhaustive and homogenous description of a studied geographic area or at least to design spatial models taking in account the scale (geographic resolution and scale of territorial analysis)

Their emergence coincides, in our nations, with the development of new needs of information for all the issues concerning rural areas' management : agriculture, forestry, environment, land planning) :
- for scientific and technical assessments as well as for decision-making in territorial management, the deciders try more and more to localize the intervention, to take into account the proximity and the contiguity of phenomena and geographic objects
- analysis and management procedures are more and more sophisticated and take more and more in account varied thematic dimensions
- the actors of territorial management (farmers, land owners, companies, local authorities, etc.) expect more and more a partnership management of projects and of decision-making ; thus are needed management tools able to process, to exchange and to share more efficiently usable informations.

As an exemple, we could introduce the recent trends in the public agri-environmental policies inside the European Union both in the general conception and in its condition of implementation :

- progressively the European Union has switched from a personal to a localized management : the rights and duties attached to agricultural activities are not only assessed with personal characteristics (farmers, non spatial parameters concerning farms, etc.) but also more and more with localized information (parcels' location, distance from a streamnet, slope, etc.) : each citizen, each economic decider is linked to the area where he practices his activity.

- in the same time, the public services (European commission, national ministries, vocational organizations, local authorities, etc.) develop and generalize at each territorial level, the use of geographic information tools to manage, control and assess public policies.

New vocational skills in territorial management

Carrying out these technologies in territorial diagnosing and management requires specific skills which concern jointly several fields of knowledge and abilities :
- basic knowledge in Geographic Information
- analysis and management of Geographic Information Systems
- running projects and partnerships with concerned actors.

These new tools are carried out in varied institutions corresponding to different situations in management of information systems. The mentionned skills will vary according to :
- the level of diploma (technician, engineer, etc.) and the level of responsibility of the concerned persons
- the requested level of specialization in Geographic Information : designing applications, carrying out sophisticated models, managing large information systems will require high level skills ; on the contrary, carrying out operational solutions and limited information systems will require that a large range of actors reach supplementary skills in addition to their scientific and technical skills (agronomist, forester, etc.)
- the fields of application and use : agriculture, forestry, water management, environmental issues, land planning.

A challenge for Agricultural Education :

The Universities and engineer schools have of course set up high-level (post graduate) specialized curricula in Geographic Information aimed to train specialists in these new fields of skills. These curricula are obviously linked with the research activities carried out in these establishments.

However, as mentionned before, the impact of such new tools on the vocational ranges is not limited to a need of high-level specialists : pecifically in territorial management, forestry, agri-environmental issues, all the actors of these ranges of activities are concerned in their practices and need to have access to a skill of so-called **aware user**. And there is the main challenge in terms of concerned persons and jobs: the chief characteristic of the skills' market will be that need of double skill in Geographic Information.

In such a view, the agricultural education system has to attend to these needs by adapting the curricula to provide to the future (and present) professionals supplementary skills in Geographic Information ; it has to integrate into the curricula designed training courses so that

technicians and engineers could familiarize themselves with these tools and their use in varied ranges mentionned before.

It has also to assume, through continued training, the training of in-firm persons and give an answer to the needs in updating the knowledges and skills that follow from the very fast evolution in concepts and tools.

Last but not least, it has to train trainers and teachers for taking in hands theses new training contents in "non-specialized" training centers and to support them in terms of educational engineering : designing adapted training offers, publishing varied educational tools.

As an exemple, let me introduce the experience driven in French Agricultural Education : the National Center of Studies and Resources in Advanced Technology (CNERTA) has been leading a concerted set of activities to introduce Geographic Information contents in varied curricula of aAgricultural Education as needed by the new trends of vocational practices in agri-environmental issues ; that set of activities includes :

- Trainers' training : offering varied courses for trainers and extension agents
- Educational engineering : carrying out vocational and educational references, designing adapted training offers
- Publishing educational aids : course papers, slides, study cases, CD-ROM
- Supporting a network of concerned trainers, involved in experimentation (carrying out references, tools and aids for trainers).

These activities are driven with taking in account the new trends in Information Technology : more specifically, the development of on-line tools (intranet and internet) has incited us to explore new open supporting and training systems which could be more efficient, more adapted with varied and individual needs : Web services, Intranet mailing systems, collaborative workgroups, FTP services.

A research program will now be lead to assess the first results of these new sets and to improve our methodology in designing open-learning-systems in Geographic Information.

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