

Planning and Regional Sustainable Development Concept Based on the Use of Geospatial Solutions from the Perspective of Macrostrategical Approaches

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Abstract: Identification of complex geospatial solutions and their implementation at the level of development regions represents a key factor in the process of integrated planning and sustainable regional development. Observation and analysis of the regional planning process at the level of ADR Centre on a period of 4 years allowed the formation of an image regarding the development of the regional planning process. The efficient use of GIS technology and development of partnerships with relevant regional actors allows the elaboration of a complex data basis with multiple processing possibilities, elaboration of theme maps and of the analysis ones and spatial modelling based on which the vulnerable points from a social-demographical, economical and ecological point of view may be identified have a high potential (geographical, social-economical) offering a diverse palette in ensuring the process of sustainable development and welcoming the investors. To this end, we tried to suggest an integrated territorial planning based on the implementation of 6 projects oriented on geospatial solutions at the level of development region.

Key-Words: development, region, GIS, geospatial solution, sustainable development, regional development, integrated territorial planning.

1 Introduction

In order to comply to the EU requirements, from the point of view of sustaining territorial development, in Romania were identified eight development regions, on the principle of territorial adjacency, by associating a number of 4-6 neighbouring counties, with the exception of the development region Bucharest_ Ilfov, made up of two administrative units. In the conception of the European Union, the national level (NUTS I) is too high for an efficient distribution of the territorial development funds, and the county one is the most reduced (NUTS III) (Nomenclature des Unites Territoriales Statistiques). Thus, the development regions represent development regions having the rank NUTS II, with a minimum population of 2 million inhabitants. From a structural point of view, the development regions are very heterogeneous. They function only as statistical units.

The establishment of development regions has four major objectives (article 2, Law no. 154/1998), that is:

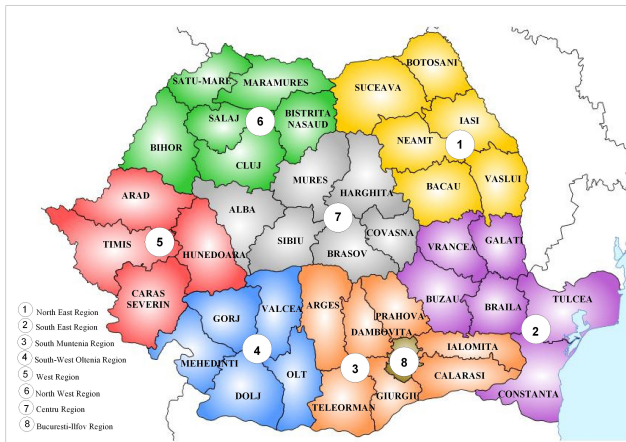
- reduction of interregional lacks of balance by inducing balanced development in developing the disadvantaged areas;
- preparation of institutional framework, corresponding to the criteria to accession to the EU and of access to the structural funds;
- correlation of governmental sectorial policies at the level of regions, by stimulating the institutions and by valorisation of local and regional resources, for the economical-social development of the regions;
- stimulation of interregional co-operation, internal and international, of the cross-border co-operation, participation of development regions to the European activities for the promotion of regional economic and institutional development.

For a good administration, for each region an

Agency for Regional development was established (ADR) functioning in compliance to the Law no. 315/2004 on the regional development of Romania, and which, from a legal point of view, represents a non-governmental organization (NGO) for public utility. The role of ADRs is to contribute to the sustainable and equitable development of development regions by removing the disparities and lacks of balance between the areas of the region, to the use of its inhabitants.

The purpose of the Regional Development Agencies is:

- Elaboration and application of plans and strategies conceived in partnership,
- Efficient use of financial and human resources in assisting human communities,
- Gathering financial resources from European



Union funds.

Fig. 1 Development regions from Romania (after the Green Charter of Regional Development, Bucharest, 1997)

Implementing integrated geospatial solutions at the level of development region represents an important step concerning the use of modern instruments of territorial planning. Efficient management of resources of a territory may be achieved only by using the technology of Geographical Informatics Systems (GIS), this facilitating the elaboration of maps for any type of data with spatial reference.

The use of an adequate geospatial solution, as a modern instrument of planning presents a series of advantages, among which we mention:

- The basis of an integrated territorial planning will be laid down
- Offers the possibility of managing a centralized, complex data basis, at the level of the entire region and elaboration of a diverse range of maps, from the

identification and representation of geographical elements ones to the complex spatial forecast, analysis and modelling ones.

- Offers a support for taking rapid and efficient decisions
- The local authorities, the business environment and the research environment will have the possibility to work in collaboration
- Alignment to European Union standards regarding the use of geospatial technologies and contribution to the development of Spatial Data Infrastructure (SDI)

The process of integrated territorial planning and sustainable regional development must have as basis:

- Detailed knowledge of the region
- Macro-strategic approach from the decision factors,
- Regional development plan (PDR),
- Regional territory fitting out plan (PATR),
- Regional development plan,
- Creation of partnerships with relevant regional actors,
- Administration of funds for the fulfilment of objectives and targets mentioned in the strategy.

At this moment, the PATR concept is not implemented at the level of all regional development regions. Also, the sustainable development concept and strategy exists only at national level and less for each development region.

2 Problem Formulation

Ensuring sustainable development has its origin in the efficient and objective implementation of the planning and fitting out process of the territory based on a strategic thinking. The observation and analysis during 4 years of the regional planning process at the level of ADR Centre, but also a documentation regarding the planning activities within the 7 agencies from the country allowed drawing several conclusions:

- Absence of a strategic concept on long term regarding the efficiency of regional planning process in the perspective of sustainable development
- Absence of a centralized data basis with relevant indexes in the planning process at the level of a region
- very low degree of working in collaboration to the regional actors
- the reduced degree of use of informatics integrated solutions regarding the management of data basis

Implementation of efficient geospatial solutions at the level of development region, and not only to that,

must have as basis:

- ➔ a macro-strategic thinking allowing a complex vision regarding the process of regional development in time, complexity of factors, links between them and anticipation of risks, as well as of sustainability
- ➔ a good knowledge of functionality of GIS technology, of its potential, of the trends in use and development of geospatial solutions and applications
- ➔ elaboration of a resource plan (material, technical, financial, human, risk)
- ➔ mediation and strengthening of links with regional actors involved in the process of regional

planning

- ➔ a special attention regarding a qualitative training of the staff in understanding the functionality of GIS technology, use of geospatial solutions and especially in the perspective of future development of geospatial applications or solutions that it manages

The present paper intends to suggest an integrated territorial planning based on the implementation of geospatial solutions which may represent a support of ADRs regarding the improvement of the sustainable regional planning process.

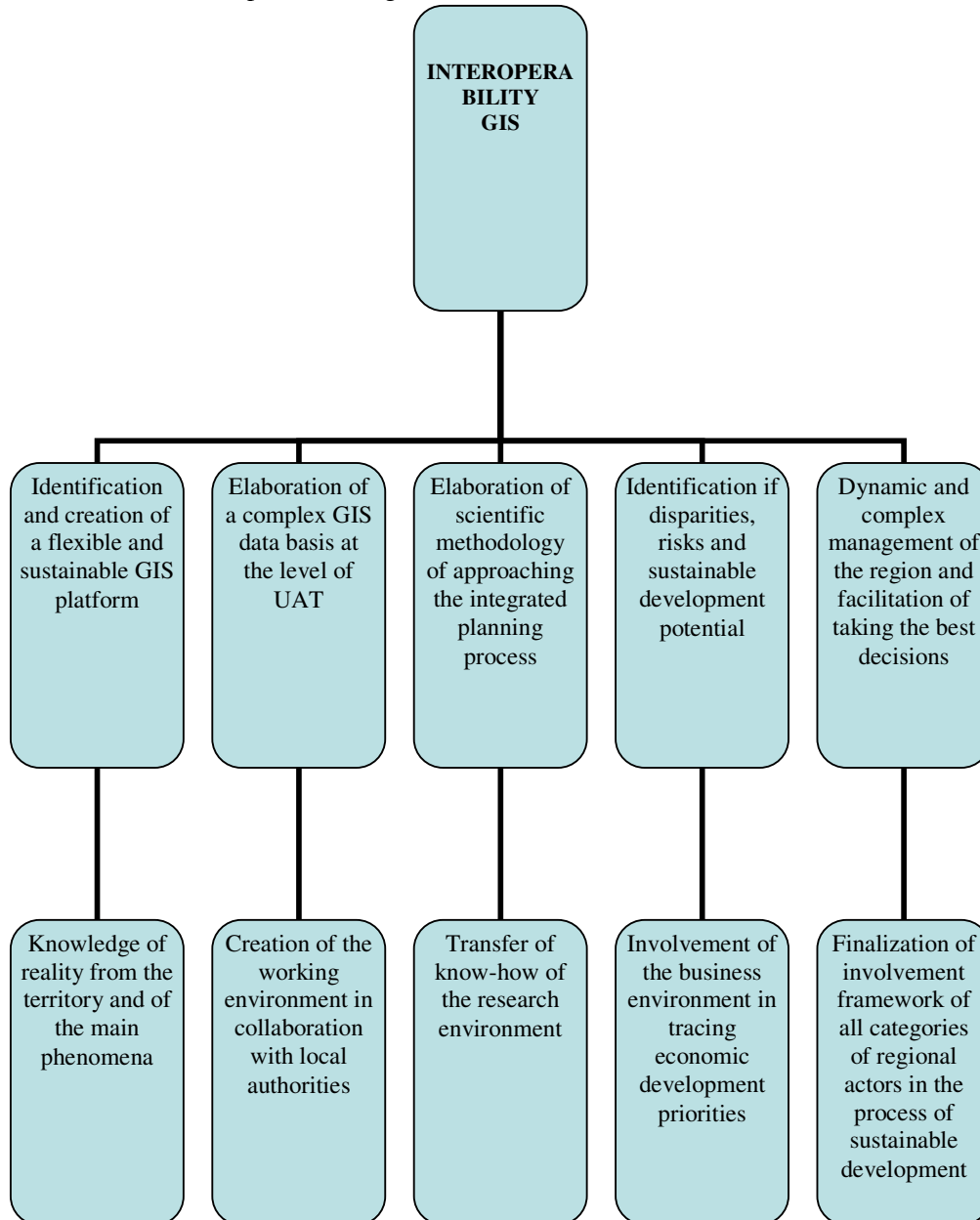


Fig.2 Proposal on an integrated territorial planning concept based on interoperability GIS at the level of development region

In order to ensure the interoperability GIS at the level of region, the elaboration and implementation of projects oriented on geospatial solutions is necessary. To this end, a solution starting from thinking architecture for a regional GIS system oriented on the implementation of 6 consecutive projects was decided.

PROJECT I			
Duration	Partnership	Geospatial solution	Expected results
2 years	County councils in the development regions		A GIS platform at the level of the Region Centre
		Purchase of equipments necessary for the creation of a GIS platform sustainable and flexible with possibilities of extension in future (hardware desktop and server equipments, software GIS desktop and server)	GIS data basis at the level of the Region Centre: limit of the region, of counties, of administrative-territorial units, perimeter within localities, hydrographical network, transportation infrastructure (European, national, county, village roads, railways)
			Application GIS-Server dedicated to the administration of a relational and complex data basis. Architecture and structure of data basis with relevant statistical indexes in the process of regional planning (based on Regional Development Plan and of PATJs of county councils)
			WEB-GIS portal of the Region Centre for the promotion of the region by offering the possibility to generate theme maps for various indexes (geographical, demographical, economic, transportation, environmental, tourism infrastructure, etc)

Fig. 3 Idea of project in order to purchase a flexible GIS solution at the level of development region for the facility of regional planning process and establishment of a partnership with county authorities

PROJECT II			
Duration	Partnership	Geospatial solution	Expected results
2 years	Important regional operators in the field: electric power, methane gas distribution, drinkable water supply	GIS software purchase for the partners who do not benefit from the geospatial technology for the accomplishment and management of data basis	Extension of the data basis structure with the introduction of indexes for the technical-edililitary infrastructure and its correlation with the GIS data basis
			Adding new themes for the technical-edililitary infrastructure at the level of county

Fig. 4 Idea of project in order to extend the existent data basis and the integration of data linked to the technical-edililitary structure at the level of the development region and establishment of a partnership with the relevant regional operators

PROJECT III			
Duration	Partnership	Geospatial solution	Expected results
3 years	County Departments of Land Card Registration	Configuration of the WEB-GIS application for editing, updating or integration of geospatial data at the level of city hall	Configuration of the WEB-GIS application for editing, updating or integration of geospatial data at the level of city hall
	City halls which have representatives in the Regional Development Council (RDC)		Extension of GIS data basis with topographical elements defining the administrative units managed by the city halls
			Extension of data basis with defining sets of indexes for each administrative units
			Adding new themes defining points of interest for the administrative-territorial units

Fig.5 Idea of project in order to extend the GIS data basis existing at the UAT level and ensuring the access at the UAT level and ensuring the access of local authorities from the development region to the data basis in order to complete and update the data

PROJECT IV			
Duration	Partnership	Geospatial solutions	Expected results
3 years	Research environment: universities and research centres from the development region	Integration into the existing GIS platform of certain geospatial applications having as basis scientific methodologies regarding the integrated territorial planning process, approaching various fields	Elaboration of scientific research strategies regarding the sustainable development of the region
			Development of calculation algorithms regarding vulnerabilities, risks, prognosis and tendencies for various fields (demography, economy, environment, etc) based on specificities of regions and statistical and geospatial data existent
			Integration of calculation algorithms in the existing GIS application and development interfaces through which complex maps may be generated having as basis spatial analysis and modelling
			Transfer of know-how

Fig. 6 Idea of project in order to efficiently manage of data basis of the GIS solution based on an elaborated scientific methodology in partnership with the research environment

PROJECT V			
Duration	Partnership	Geospatial solution	Expected results
3 years	Business environment: companies from the development region activating in areas such as: regenerative energies, agriculture, tourism, etc	Integration into the structure of geospatial and alphanumeric data basis existent of relevant indexes regarding monitoring of the economic development process and identification of development opportunities in order to attract new investors	Extension of GIS application by introducing new relevant indexes regarding the economic development and definition of relations between them and the existent indexes based on the development methodology of the research environment
			Elaboration of complex maps of spatial analysis and modelling regarding the area of activity of the important economic agents from the region, generation of reports regarding the existent economic situation and its tendencies
			Identification based on sets of elaborated maps based on sets of elaborated maps of the areas with potential for attracting investors
			Transfer of know-how and facilitation of efficient communication with the business environment in the perspective of sustaining the business environment and identification of adequate solutions of development and attraction of financial resources

Fig. 7 Idea of project for the extension of GIS application in order to draw the objectives and targets for sustainable economic development and establishment of a partnership with the business environment from the development region

PROJECT VI			
Duration	Partnership	Geospatial solution	Expected results
3 years	Emergency Situations Inspectorates (ISU), County Police Inspectorates, SMURD	Purchase of equipments and software dedicated to monitoring in real time	Extension of geospatial application through the integration of data recorded by the monitoring devices and their update in real time
			Purchase of a network of monitoring equipments for the safety, as well as for the easy identification of various accidents in the urban, as well as in the rural area
			Improvement of rapid intervention services through the identification in real time of the best solutions based on the access to data regarding the reality from the field and various traffic conditions
			Efficient management of the development region through the use of complex and dynamic data basis with monitoring possibilities in real time for various events

Fig. 8 Idea of project for the integration in the existent GIS application of the data recorded by the real time monitoring devices and establishment of a partnership with the institutions working in the rapid intervention fields

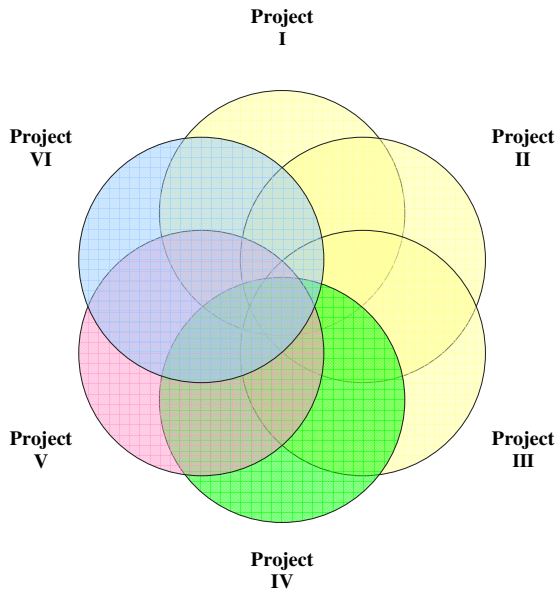


Fig 9 Symbolization of the work in collaboration of partners for institutions involved in the 6 projects oriented on geospatial solutions

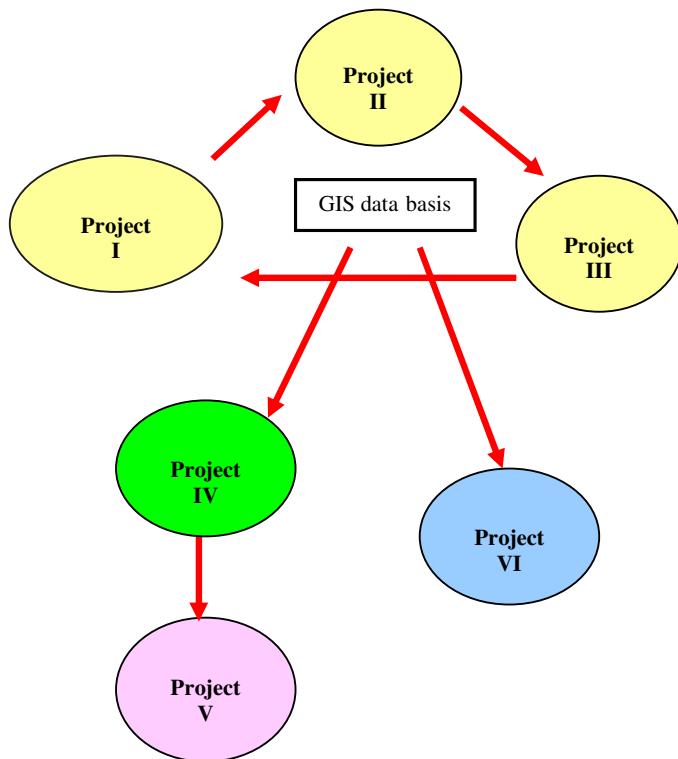


Fig 10 Relations between the 6 projects based on geospatial solutions at the level of development regions in ensuring the integrated territorial planning and sustainable development process

3 Problem Solution

Proposal of a geospatial solution, identification of a partnership, shaping an idea of project and identification of the adequate financing source had as result the materialization of the first steps in implementing an adequate geospatial solution at the level of the Region Centre.

The project aims at laying the basis of achieving a sustainable GIS platform at the level of region with possibilities of extension in the future. The basis of elaboration of the project is as follows:

- ➔ analysis of experience of using GIS in ADR Centre and county councils
- ➔ identification of potential and needs of ADR Centre in ensuring an efficient process of sustainable regional development
- ➔ role and involvement of regional actors in the process of sustainable development at the level of Region Centre

INSPIRE directive of the European Commission regarding the spatial data infrastructure(SDI).

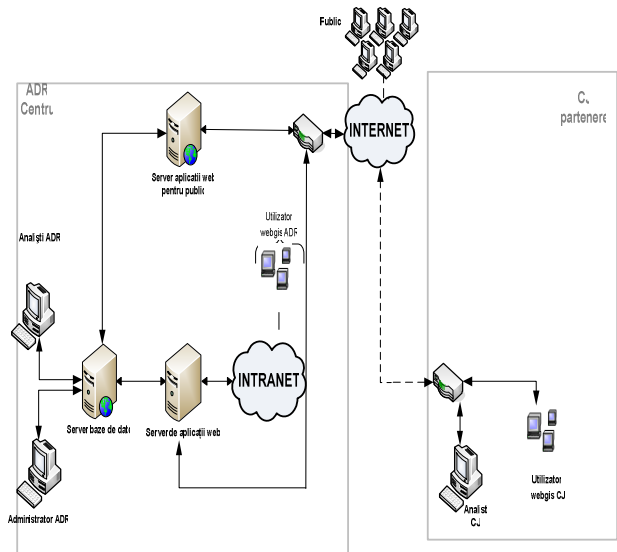


Fig. 11 Architecture of geospatial solution at the level of ADR Centre

Starting from this idea of project, ADR Centre achieved the necessary steps for the elaboration of the project, obtaining in the year 2009 the approval of financing from the Financial Mechanism of the European Economic Space.

The analysis of specificities of the 8 development regions from Romania and the possibility to implement in future of geospatial solutions in the process of regional development allowed the

possibility to formulate conclusions mentioned in the SWOT analysis specified here:

<p style="text-align: center;">Strong points</p> <ul style="list-style-type: none"> - Geographical diversity of regions - Existence of natural resources with valorisation potential - Existence of a cultural and ethnographical patrimony specific to each region - Existence of a tourist potential with high degree of valorisation <p>Existence of bio-pedo-climatic conditions favourable to the development of agriculture and production of biomass in the perspective of adopting an alternative energetic system</p>	<p style="text-align: center;">Opportunities</p> <ul style="list-style-type: none"> - Existence of funds with national and foreign financing - Easy access to data regarding the financing programs - Experience of staff in elaboration, assessment, implementation and monitoring of projects financed from foreign funds - Existence of partnerships with institutions from member countries of the European Union
<p style="text-align: center;">Weak points</p> <ul style="list-style-type: none"> - bureaucracy - very low degree of knowledge of GIS technology functionality by the staff working in the field of planning and fitting out of the territory at local, county or regional level - low degree of opening towards the reorientation of the process of planning having as basis modern technologies 	<p style="text-align: center;">Threats</p> <ul style="list-style-type: none"> - very high price of hardware and software equipments necessary for the implementation of GIS solutions - decentralization of public administrations and misunderstanding of this phenomena by the employees of the respective institutions - difficulties in forming viable partnerships for the implementation of GIS solutions due to financial, political factors (lack of available funds for covering co-financing in projects), etc

Fig. 12 SWOT analysis of development regions by implementing in future geospatial solutions necessary for the improvement of the sustainable regional planning process

4 Conclusion

Access to data, macro-strategic approach and thinking in perspective the regional planning process represent important tools in planning the architecture of the geospatial solution adequate to each separate development region.

References:

[1] Benedek J., *Amenajarea teritoriului si dezvoltarea regionala.*, Presa Universitară Clujeană , Cluj-Napoca, 2004.

[2] Ianoș, I., Humeau, J. B., *Teoria sistemelor teritoriale*, Editura Tehnica, Bucuresti, 2000.

[3] Surd V., *Geografia dezvoltarii si a decalajelor economice contemporan*, Presa Universitară Clujeană, Cluj-Napoca, 1997.

[4] Surd V., *Geodemografie*, Presa Universitară Clujeană, Cluj-Napoca, 2001.

[5] Surd V. (coordinator), *Rural Space and Regional Development*, Editura Studia , Cluj-Napoca,1999.

[6] Surd V., *Geography of Settlements*. Presa Universitară Clujeană , Cluj-Napoca, 2009

[7] ***(1997), Carta verde.Politica de dezvoltare regionala in Romania, Guvernul Romaniei si Comisia Europeana. Programul Phare. Bucuresti.

[8] ***(1998), Leges no. 154, privind infiintarea regiunilor de dezvoltare.

[9] *** (2004), Legea no. 315, privind dezvoltarea regionala in Romania.

[10] *** www.adrnordest.ro, Agentia de Dezvoltare Regionala Nord-Est.

[11] *** www.adrse.ro, Agentia de Dezvoltare Regionala Sud-Est.

[12] *** www.adrmuntenia.ro, Agentia de Dezvoltare Regionala Sud, Muntenia

[13] *** www.adroltenia.ro, Agentia de Dezvoltare Regionala, Sud –Vest, Oltenia.

[14] *** www.adrnord-vest.ro, Agentia de Dezvoltare Regionala Nord-Vest

[15] *** www.adrcentru.ro, site, Agentia de Dezvoltare Regionala Centru

[16] *** www.adrbi.ro, site, Agentia de Dezvoltare Regionala Bucuresti-Ilfov