



The World Bank



Republic of Albania

Republic of Albania
Ministry of Public Works, Transport and Telecommunication (MPWTT)
Sheshi Skenderbej Nr. 5, Tirane

Urban GIS Expert to Assist in the Preparation of 8 City Inventories
Project ID No. P096263

ASSIGNMENT REPORT

Assignment A1: Brief Capacity Need Assessment

29th October till 11th November, 2007

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1. BACKGROUND

The Government of the Republic of Albania (GOA) and the World Bank have initiated the Land Administration and Management Project (LAMP) to improve the efficiency and effectiveness of urban planning and land management. With the aim of completing regulatory plans for the eight cities of Durres, Shkodra, Vlore, Kamez, Berat, Korca, Lushnje and Gjirokaster, the Government of Albania has instructed these cities to develop baseline information and city inventories. The Urban GIS Expert's task is to develop methods and templates for collecting baseline information, train municipal staff to gather and collate data, and to coordinate the efforts of national experts recruited to facilitate city-level inventory activities. Finally, the aim of the Urban GIS Expert is to incorporate all this data into a GIS system to facilitate planning processes. See Terms of Reference in Annex 1.

2. CURRENT ASSIGNMENT TASK - ASSIGNMENT A1

Undertake field trips to the eight municipalities, and while working with municipality staff, draw up a brief capacity need assessment, which will assess the current situation of eight participating municipalities, on the following subjects:

- (a) The range of their knowledge and experience using computer-based applications
- (b) The way they react and what they expect from the usage of GIS
- (c) When and where they will use GIS
- (d) The tasks the GIS users will perform with GIS when implementing the Urban Development Plans and Regulations.

3. SUMMARY OF TIME SPENT ON ASSIGNMENT

The consultant spent a total of 14 days in Albania. See assignment itinerary in Annex 2 below.

4. ACTIVITIES

Field trips were undertaken to the eight municipalities, where an introductory meeting was usually conducted with the mayor, and a detailed meeting was held with the Director of the Municipal Urban Planning Office and his/her staff. In addition, members of other municipal departments were also present at these meetings (e.g. Public Works Department). In these meetings, the current GIS capacities of each city were evaluated, according to the following topics:

- Software
- Hardware
- Network Communications
- Database:
 - GIS-compatible formats

- relevant graphic and tabular data in other digital formats
- relevant data in hard-copy format
- relevant data that staff would like to include in GIS system
- GIS user skills
- Computer-based skills
- Perception and attitude towards GIS by municipality staff

In parallel to the above field trips, a number of meetings were held in Tirana with representatives of various agencies. This was done in order to investigate the possibilities of obtaining relevant and updated data sources for the municipal inventory mapping project from these agencies. In addition, the aim was to examine the existing GIS capacities at national level, with an eye on national-regional database integration and coordination. Meetings were undertaken with the following agencies:

- Albanian Military Topographic Institute
- Immoveable Property Registration Office (IPRO), Ministry of Justice
- ALUIZNI (Informal Building Legalization Agency)
- National Institute of Statistics (INSTAT)
- Urban Planning Department of Municipality of Tirana
- Civil Registration & Address Modernization Project (OSCE-funded project)

5. MAIN FINDINGS

General

The situation regarding existing municipal GIS capacities of the eight cities is varied, but the overall situation is not encouraging. Municipalities often lack the complete array of elements necessary for successful GIS functionality, namely: software, hardware, database and user skills. Those that do have some of these necessary elements, usually do not have them at the required levels of functionality. An overall evaluation of the current GIS capacities of the eight municipalities is given in Table 1 below.

Municipality	Software	Database	Skills	Hardware	Comments
Shkodra	Good	Good	Good	Average	NGO involvement
Kamza	Poor	Average	Poor	Poor	Co-PLAN involvement
Durres	Poor	Poor	Poor	Poor	
Vlora	Poor	Poor	Poor	Poor	
Korce	Poor	Poor	Poor	Average	
Lushnje	Poor	Good	Poor	Poor	Co-PLAN involvement
Berat	Good	Good	Poor	Poor	Co-PLAN involvement
Gjirokastr	Good	Average	Good	Poor	NGO involvement

Table 1: Evaluation of current GIS capacities of the eight municipalities

Note: this table refers to GIS capacities and standards only, and not general computer-based capacities

The city of Shkodra stands out as an exception among the all the eight cities due to its successful capacities, which are probably due in a large part to NGO involvement in the past. These capacities would probably have been even higher, if project funding had been maintained. Nevertheless, Shkodra has a solid base to build upon.

The cities of Kamza, Lushnje, and Berat all have some average to good GIS elements, but not enough to create the critical mass for a successful GIS project. Their capacities have also been positively influenced by NGO involvement. Durres, Vlore and Korce all have reduced GIS capacities.

Software

Five out of the eight cities have no GIS software at all, while the other three cities have one copy each of ESRI desktop software (viz. ArcView). Gjirokaster has a more updated version of ArcView, namely ArcGIS 8.2. All of the existing ESRI software is outmoded, and it is highly recommended that it be updated in order to take advantage of currently available software functionality, as well as avoid software/hardware/data compatibility issues.

Software maintenance and user-support frameworks were not apparent at any of the municipalities using the GIS software. It is highly recommended to enlist such a framework in order to ensure operational smoothness by minimizing the effect of software malfunction.

Despite the lack of GIS software, CAD (Computer Aided Design) desktop software and user skills are common in all eight municipalities (see "User Skills" paragraph below). In fact, the CAD platform functions as an effective medium of cooperation and data transfer between municipal departments (e.g. Urban Planning and Public Works), as well as between the municipality and national bodies (e.g. IPRO's cadastre data). Here too, there is little evidence of standardization, maintenance and user-support.

Hardware

Desktop computers are installed in all the municipal departments visited, but there is a definite shortage at all the municipalities of quality computers suitable for graphic editing, analysis and viewing. In some cases the staff resorts to bringing their own computers to work in order to utilize up-to-date software. Any serious GIS operation will need computers with good processing power, generous internal memory, and quality screens.

Functioning large-format color plotters exist at seven out of the eight municipalities, while small-format printers were evident at all the municipalities.

No digitizing tablets were observed or reported during our visits. It is safe to say that on-screen digitizing is an excellent alternative to using digitizing tablets, with the latter becoming largely obsolete.

Network Communications

None of the municipal departments visited had a reasonably functioning fast Local Area Network (LAN). Server-client architecture, departmental and interdepartmental data-sharing, pooling of enterprise resources (e.g. plotters and printers), etc., is largely dependent on the existence of an efficient and reliable LAN network.

On the other hand, nearly all of the municipal departments visited had Internet access, but generally of low speed, accessibility and quality. Any efficient web-based GIS Server solution demands the existence of a fast and robust Internet connection.

Municipal spatial data

Existing municipal GIS-compatible data was examined for the following characteristics:

- metadata: the description of the data, which includes information about:
 - thematic description and data format
 - attribute data: the tabular descriptive data of the geographic entities
 - coordinate system: spatial reference of the data
 - data accuracy (determines map scale)
 - collection date
 - data source and collection method
- database schema (structure and relationships of database tables)
- data maintenance methods (e.g. updating)

No organized metadata records were located in any of the municipalities. Therefore, as many metadata details as possible were collected during visits, by close examination of the data and by interviewing municipal staff. A detailed municipal data list is presented in Annex 3 below.

The vector data examined was either in ESRI shapefile format or in AutoCAD DWG format. Both are “flat-file” formats, and not relational database formats, and therefore no existing (or planned) database schemas were observed. The small amount of raster data observed usually consisted of orthophoto coverage, or registered aerial photographs, all of varying quality.

Surprisingly few feature attributes were encountered. It was often clear that the shapefile data had simply been converted from AutoCAD format, due to the standard CAD attribute fields evident in such shapefiles.

The data examined was either in the Albanian National Coordinate System (Gauss-Kruger, Krasovski/Pulkovo 1942) or the UTM (WGS84) Coordinate System. Sometimes it was apparent that there were system transformation issues (e.g. Shkodra).

It was generally difficult to validate with any certainty the collection accuracy of the spatial data, the date of its collection, as well as the data collection methodology and source type.

Data maintenance methods were vague, imprecise, and undocumented. In a few municipalities, there was evidence of data maintenance by local NGOs or local private GIS firms (see reference below to external organizations)

A large amount of spatial data in non-GIS digital format was noted at the municipal level. Most of this data is in Autocad DWG format, and as noted above, no metadata records are available. It seems that a lot of rule-based editing will need to be performed in order to enter this data into a GIS database, while other issues such as

coordinate systems, data accuracy, and attribute information will also have to be examined.

Other digital data with a spatial component or relevance is also available, usually in spreadsheet or word processor format, while often digital photographs are available in various graphic formats.

A considerable amount of relevant data is available in hard-copy format, especially historical and current landuse plans, of both strategic and regulatory nature. If this data is to be included in the municipal GIS for planning or supervision purposes, it must be digitized or scanned, and the issues of coordinate systems, data accuracy, and attribute information examined.

Municipal staff often described relevant data that they would like to include in the GIS system. The source of this data would often be municipal utilities or national agencies. A data-entry, data maintenance, and presentation methodology should be established for these data sources.

Non-Municipal Spatial Data Sources

- **Albanian Military Topographic Institute:**
The Institute is responsible for producing a variety of cartographic products, including hard-copy topographic maps at the following scales: 1:10,000, 1:25,000, 1:50,000, and 1:100,000. All of these products are spatially referenced in the Albanian National Coordinate System. These products are not up-to-date, apart from a reported new 1:25,000 series, for which publishing is meant to start during 2008. High-quality scanning of the 1:25,000 series as well as part of the 1:10,000 series was reported to be underway.

In addition, the Institute distributes 1:50,000 scale hard-copy maps produced in collaboration with the USA agency NIMA (National Image and Mapping Agency – now called NGA: National Geospatial-Intelligence Agency). These products are updated to 1999, and are spatially referenced in the UTM (WGS84) coordinate system.

The Institute's 1:25,000 and 1:50,000 scale series may be suitable background cartographic material for city-based GIS projects, since they exhibit a standard graphic "language", as well as indicate the regional context of the city.

- **Immovable Property Registration Office (IPRO), Ministry of Justice:**
IPRO, as part of its property registration scope, has produced a cadastral layer that includes coverage for all the eight cities. The cadastral borders are in AutoCAD DWG/DXF format, while the attribute data resides partly in a relational database, and partly in hard-copy format. The spatial data is acceptably accurate at scales of 1:500-1:1,000 in urban areas, and at 1:2,500 scale in rural areas. The data is spatially referenced in the Albanian National Coordinate System (Gauss-Kruger, Krasovski/Pulkovo 1942). IPRO is at present in the midst of a large-scale modernization project, which will produce a highly automated property registration updating procedure, as well as a GIS-compatible cadastral database.

This database will be of vital importance for any regulatory planning initiative, and so the solving of the coordinate conversion issues is of utmost importance.

- ALUIZNI (Informal Building Legalization Agency):
This agency is in the process of acquiring an updated (2007) high-resolution basemap coverage of large parts of Albania, including the eight cities in our component. The coverage is spatially referenced to the UTM (WGS84) coordinate system, and it is due to include the following products:
 - orthophoto: specifications indicated 8 cm resolution ground-pixel in uncompressed TIFF/TFW format.
 - vector basemap data (planimetric coverage), at 1:500 scale, in the following vector formats: ESRI shapefile, AutoCAD DWG/DXF, Microstation DGN, and including the following themes:
 - roads (collected as polygons i.e. delineation of road surface and shoulder/pavement)
 - railways
 - buildings
 - linear water features
 - polygonal water features
 - walls and fences
 - Digital Terrain Model (DTM): a point grid of 10 meter/20 meter intervals, as well as breaklines, in DWG-format file.

A copy of both the orthophoto and the vector data were received for examination purposes, as was a copy of the production specifications. The following points were observed:

- orthophoto: a 24cm ground-pixel resolution JPG/JGW format copy was received, and not as stated in the production specification. There seem to also be issues regarding extended uploading times for the orthophoto files, which could theoretically be resolved by compression into one of the fast upload formats available today (e.g. MrSid, ECW).
- vector basemap data: in effect, about 20 layers are present in the ESRI shapefiles, but they are not coherently described by any means (e.g. product specification, shapefile properties, layer file) and therefore it is not clear what the layer names mean. The entities are simplistically divided into point, line and polygon themes.

Nevertheless, this coverage is the most worthwhile option for basemap data provision for the regulatory planning phase of the eight cities in this component. This is due to the standard collection methodology, the existence of certain production specifications, and the fact that the data is up-to-date. On the other hand, it is important to note the problems associated with this dataset, namely:

- Ironically, both the vector and raster dataset is too detailed for planning purposes at the generally agreed-upon scale of 1:5,000. Therefore some form of generalization will have to be performed on the data, in a methodical and rule-based approach.
- The lack of information regarding the vector layer names will demand time and effort to try and interpret their identity.

- The DTM is yet to be supplied. Once it arrives, contour lines and point heights will have to be generated, as well as other relief-oriented end-products.
- **Albanian National Institute of Statistics (INSTAT):**
INSTAT maintains only hard-copy maps of the enumeration areas (census tracts) in the eight cities in this study in 1:5,000/1:10,000 scale. Towards the 2011 census, INSTAT plans to digitize the enumeration area borders, with the cooperation of a European organization. Digitization is scheduled to begin in 2009. This means that an alternative solution for the mapping of socio-economic statistics for the regulatory plans for the eight cities will have to be found (e.g. scanning, geo-referencing, and on-screen digitizing). Statistical data is available from the 2001 Population Census, and various Living Standards Measurement Surveys, the latest of which was in 2005.
- **Urban Planning Department of Municipality of Tirana:**
The GIS project at the Tirana Municipality is an impressive endeavor in terms of database, application functionality, and user-interface. It certainly provides an example of a locally successful, planning-oriented GIS, and perhaps can serve as a model for GIS implementation for the eight cities in our component. The web-GIS interface was developed in conjunction with the GTZ development organization.
- **Civil Registration & Address Modernization Project (OSCE-funded project):**
This project is interested in cooperation in order to determine a methodology and a technological approach for the delineation and maintenance of a spatial address database. At present, this project is at the tabular data entry stage, and has no geospatial data at all. This database will potentially be an important future data source (e.g. socio-economic data).

Computer-based skills

General computer-based skills are at acceptable levels in all the municipalities visited. As mentioned above, CAD (Computer Aided Design) skills are very prevalent, which should be taken into account with regard to both GIS capacity building as well as to spatial data entry methodology. Other types of software programs commonly used by municipal staff are spreadsheets, word processors, and graphics packages.

Perceived role of GIS

Apart from the municipal staff met in Shkodra, it is generally clear that municipal staff in the eight cities does not have a clear understanding of the essential characteristics and capabilities of GIS, and especially of the analytic possibilities of GIS. GIS is perceived as a similar tool to CAD, and that at most GIS is a means for producing attractive-looking and effective cartographic products.

On a practical level, municipal staff is keen to adopt up-to-date computer equipment, software and methodologies. They are positive about the possibilities of introducing GIS into their departments in an effective manner.

Most of the municipal staff-members interviewed are supportive of the idea of using GIS as an integrative tool for both management and policy-making tasks within the entire municipality, and not just on a departmental level. They were also keen on the idea of utilizing GIS as a tool to encourage Public Participation in Planning (PPP), via an Internet kiosk in the lobby of the Municipality, or via a Municipal GIS web-site. A successful example of such a web-site is that of the Municipality of Tirana.

Role of external organizations

It is interesting to note that the municipalities with any advanced GIS capacities are those who have had cooperation with outside organizations, both local and international. In addition, it is clear that once funding for these cooperation projects ends, the GIS activity is generally not maintained at an acceptable level.

For example, Co-PLAN, a local urban development NGO has been involved over the past few years in basemap and thematic data collection, analysis, and presentation in the cities of Berat, Kamza, and Lushnje. The outputs of these projects are generally of good quality as inputs to a regulatory planning system, but are not standardized on a national basis, there is no data maintenance methodology, and the everyday use of the data by the municipalities is mixed. In all three municipalities, there are no skilled GIS operators, despite the presence of GIS software in one of the municipalities (Berat). There is no available metadata, and ongoing activity and support of these projects by Co-PLAN seems to be intermittent, probably due to funding issues.

Shkodra and Gjirokaster are examples of successful GIS operations that were established within the framework of the involvement of European bodies (i.e. EU INTERREG; Urban Institute of University of Florence; Marche Regional Government in Italy) in local projects, sometimes together with local NGO's (e.g. "URBalk Institute"). Base-line data and planning-oriented thematic data were successfully collected, but once funding for the projects was halted, database maintenance was discontinued. Despite this, it is encouraging to note that in Shkodra, two municipal departments continue to utilize the GIS on an ongoing basis (i.e. Urban Planning and Cadastre Departments). In addition, quality GIS skills are still available locally at the "URBalk Institute".

6. CONCLUSION & RECOMMENDATIONS

Despite the overall unfavorable situation regarding GIS capacities in the eight cities, there is indication of good potential for planning-related GIS projects. In order for this to occur, the current lack of suitable software, hardware, and networks should be corrected; durable databases should be established; and user-skills should be consolidated and improved.

A firm basis for spatial data handling skills exists at municipality level, due in part to the widespread use of CAD software. In addition, NGO involvement seems to ensure more successful GIS implementation.

The potential for effective municipal spatial databases exists, due to a large amount of digital and non-digital data sources available, both at a municipal and at a national

level, and also in terms of basemap data and thematic data. These data sources demand coordination, processing and/or digitization in order to be included in a GIS database, and are in need of subsequent database maintenance methodology.

It is important to introduce data collection standards to ensure quality databases. Metadata standards are also of great importance, both for data distribution and for data maintenance purposes. It is advisable to stay as close as possible to EU standards in these instances.

Ongoing or future municipal plans, studies, or data-gathering activity should be coordinated with any existing municipal spatial database, even if it is a less than ideal database. This is to enable integration with existing data, prevent spatial conflicts, avoid superfluous efforts, and enrich the existing database.

Despite a lack of appreciation for the unique characteristics of GIS, all of the municipal staff interviewed displayed a firmly positive attitude to the implementation of GIS at both the departmental and municipal level.

7. ACTIVITIES PLANNED FOR NEXT STAGE

As described in the Terms of Reference for Urban GIS Expert to Assist in the Preparation of 8 City Inventories, the next stage involves developing an approach to completing the formulation of city inventory, based on the comments and suggestions provided by International Urban Planning Advisor, the Urban Planning Department within the Ministry of Public Works, Transport and Telecommunication (MPWTT), and municipalities' staff.

ANNEX 1: Terms of Reference

The Government of the Republic of Albania (GOA) and the World Bank have initiated the Land Administration and Management Project (LAMP) to improve the efficiency and effectiveness of urban planning and land management. The Government has requested that every municipality should develop a Regulatory Plan by 2008. The overall goals of the LAMP project are to enhance property registration and tenure security, improve urban planning, land management and development control, formulate property valuation and taxation systems, and provide financing for urban infrastructure investments and services. LAMP consists of three components: (A) security of tenure and registration of immovable property rights; (B) municipal land management; and (C) municipal investments

This TOR is an element of the municipal land management component of LAMP (Component B) which includes the following coordinated activities for eight cities (Durrës, Shkodra, Vlore, Kamez, Berat, Korca, Lushnje and Gjirokaster):

1. Drafting of a national law on territorial planning
2. Formulation of national regulations on master plans, zoning, subdivision and building code regulations
3. Preparation of urban plans and development control regulations and

infrastructure capital investment programs.

With the aim of completing regulatory plans for the eight cities, the Government of Albania has instructed these cities to develop baseline information and data collection to support the work of an International Urban Planning Advisor. The advisor will develop methods and templates for collecting baseline information, train municipal staff to gather and collate data and to coordinate the efforts of national experts recruited to facilitate city-level inventory activities. The GIS expert will work closely with the International Urban Planning Advisor to ensure that inventories are fully integrated into an appropriate city-level GIS framework.

The participating municipalities will receive financial and technical assistance for:

- (a) Updating of aerial photographs
- (b) Conducting a comprehensive survey of existing land uses (in mapped and tabular format)
- (c) Identification of existing capacity, service quality and spatial patterns of infrastructure systems (water supply, wastewater collection and treatment, solid waste, streets, storm drainage, electricity supply and distribution)
- (d) Creating inventory of cultural heritage assets
- (e) Identification of critical environmental issues and threats
- (f) Collation of existing socioeconomic conditions (including poverty mapping), housing and businesses
- (g) Identification of critical urban development issues and challenges.

The Urban GIS Expert will support the inventory activities described above, and incorporate them into a GIS system to facilitate planning processes. The GIS expert will work with the eight municipalities to develop city base maps and thematic maps to spatially organize information on existing land uses; infrastructure networks and facilities; cultural heritage assets; environmental constraints and threats such as floodplains, geohazards, and groundwater aquifer recharge areas; and socio-economic data pertaining to households, businesses and institutions.

ANNEX 2: Assignment Itinerary

Monday 29th October, 2007

- Travel via Vienna to Tirana

Tuesday 30th October, 2007

- Introductory Team Meeting
- Field trip to city of Kamza – meeting with Liljana Cengu (Architect)

- Meeting with Pjerin Marku & Oerd Bylykbashi, Albanian Cabinet advisors regarding government policy pertaining to the public distribution of digital spatial data in Albania.

Wednesday 31st October, 2007

- Field trip to city of Durres – meeting with Mayor Vangjush Dako, Petraq Koto (Director of Urban Planning Office), Eng. Ina Xhakoni (Environmental Specialist), and Ermal Lama (Architect/Urban specialist).

Thursday 1st November, 2007

- Meeting in Tirana with Ms. Sonila Jazaj, Deputy Chief Registrar, Immoveable Property Registration Office, Ministry of Justice.
- Meeting in Tirana with ALUIZNI (Building Legalization Agency) representatives Kristaq Qirko (Director of GIS Sector) and Lorenc Cala (GIS specialist).
- Meeting in Tirana with INSTAT (Albanian National Institute of Statistics) representatives.
- Meeting at Municipality of Tirana with Dritan Agolli - Director of Urban Planning Directorate

Friday 2nd November, 2007

- Field trip to city of Lushnje; meeting with Eduart Bushi (Director of Urban Planning Office) and staff members Eriselda Buzi & Arjola Dylia (Civil Engineers).
- Field trip to city of Berat; meeting with Mayor Fadil Nasufi, and with Sllavi Dhrami (Director of Urban Planning Office) .

Saturday 3rd November, 2007

- Field trip to city of Shkodra – meeting with head of Municipal Urban Planning Office Aida Shllaku

Sunday 4th November, 2007

- Reporting on field trip findings

Monday 5th November, 2007

- Meeting in Tirana with Roberto Bianchini, GIS expert for Southern Coastal Zone Management Project
- Meeting in Tirana with Eng. Miranda Zeka, Director of Albanian Military Topographic Institute
- Team meeting: meeting with Urban Planning Consultant Angelo D’Urso.

Tuesday 6th November, 2007

- Second meeting in Tirana with ALUIZNI representative Lorenc Cala.
- Travel to city of Gjirokaster.

Wednesday 7th November, 2007

- Gjirokaster Municipality: meeting with Fredi Mamani (Director of Urban Planning Office)

Thursday 8th November, 2007

- Field trip to city of Korce: meeting with Mayor Niko Peleshi and his staff, as well as with Municipal Urban Planning Dept. head Marsila Bitri (Director of Urban Planning Office)
- Travel back to Tirana, and undertake meeting with Belita Manka, procurement specialist with World Bank

Friday 9th November, 2007

- Meeting in Tirana with Frank Nan & Elmars Svekis of the OSCE regarding the Civil Registration & Address Modernization Project
- Team Meeting

Saturday 10th November, 2007

- Field trip to city of Vlore – meeting with Leonard Jaho (Director of Urban Planning Office)

Sunday 11th November, 2007

- Tirana: meeting with Environmental Consultant Peter Nelson
- Concluding Team Meeting.
- Travel home via Vienna

ANNEX 3: List of data

Municipality /Agency	Digital data	Hardcopy data
Shkodra	<ul style="list-style-type: none"> ▪ No orthophoto; aerial photos from around 2000. ▪ Vector data in ESRI shapefile format: <ul style="list-style-type: none"> - Urban base-line data (buildings, streets) (2003). - Cadastre - Topography (2001) - Roads (2001) - Hydrography (2001) - Municipal planning boundary (2001) - Historical zones (2001) - Landuse zones (2001) 	<ul style="list-style-type: none"> ▪ Development plan: 1:5,000 scale hardcopy map; approved 2007. ▪ “GIS-Albania” produced 1:5,000 scale hardcopy map of historical assets (2007). ▪ “Archaeology Map” – restricted building zones (3 zones) (scale?)
Kamza	<ul style="list-style-type: none"> ▪ Road system coverage (dwg) (existing & planned) including road surface area, road length, pavement length & surface per block (“nucleus”). ▪ Buildings coverage (dwg) including owner name & no. of floors (text) ▪ Orthophoto 2007; not georeferenced 	<ul style="list-style-type: none"> ▪ Co-PLAN initiated Landuse & Social Infrastructure Plan in 2002, including map of population density
Durrës	<ul style="list-style-type: none"> ▪ Building (including no. of floors) & street coverage via private company (“GIS-Albania”); collected from satellite imagery 2004/5; large accuracy errors (up to 50%!); functional delineation of public buildings (schools, institutions, historical buildings, hospitals, sport/leisure); no topographical coverage; dwg format. ▪ Accurate map of port (scale?); dwg format. ▪ Recent (date?) Master Plan for historical quarter by Italian institution; based on “GIS-Albania” coverage; unclear scale; graphic file format (jpeg). ▪ Orthophoto: coastline only; georeferenced; source: ALUIZNI data ▪ “Archaeology Map” – restricted building zones (3 zones) (scale?) 	<ul style="list-style-type: none"> ▪ Local utilities (“enterprises”) have own paper maps: <ul style="list-style-type: none"> ○ Water (scale 1:500) & wastewater ○ Solid-waste disposal ○ Urban transport (buses)
Vlora	<ul style="list-style-type: none"> ▪ 2004: development study plan of city centre (190 ha) – scale 1:4,000 – undertaken by Albanian firm – plan & base-data are CAD-based - apparently available (Autocad format). 	<ul style="list-style-type: none"> ▪ 1996: comprehensive regulatory plan – scale 1:10,000 ▪ Historical assets list – no map. ▪ 1:1000 (?) scale map of historical buildings (bad quality copy) ▪ “Archaeology Map” – restricted building zones (3 zones) (scale?)

Korce	<ul style="list-style-type: none"> ▪ dwg-format photogrammetry of entire city; including cadastre (supplied by IPRO); accuracy scale: 1:2,500; date: 1999/2000 ▪ Above map subsequently used for landuse planning purposes: delineation of historical center; identification of characteristic neighborhoods (e.g. south-eastern part of city); delineation of city's urban area ("Yellow Line") ▪ New water and sewerage network: KFW (German Development Bank) funded; should include digital map ▪ Solid waste: KFW funded; new regional landfill; should include digital map 	<ul style="list-style-type: none"> • Hard-copy approved regulatory (zoning) plan; 1989; scale 1:5,000. ▪ Non-mapped data with mapping potential: <ul style="list-style-type: none"> - Report: geological & seismic risk - Strategic development plan - Environmental action plan - School pupils: dwelling; school category - University students: home address (local & regional) - Chamber of commerce: firms, employees, employee's insurance - Municipal tax payments - Retired citizens - Police data - Hospital data ▪ Municipal enterprises as sources of data: <ul style="list-style-type: none"> - Street lighting - Parks - Public building maintenance - Road maintenance ▪ National phone company: has plans for expansion
Lushnje	<ul style="list-style-type: none"> ▪ Co-Plan initiated Regulatory Planning Plan in 2003; scale 1:5,000; good cartographic product. ▪ 2006: dwg-format coverage via private company ("GIS-Albania"): <ul style="list-style-type: none"> - residential buildings (incl. no. of floors) - public buildings - streets - topographic contours (lack height value!) ▪ 2006: zoning analysis & design study of city center by Development Studies Institute-Tirana and "ARPA Studio" called "Urban Study of City Center"; included: planned changes in building heights & densities, infrastructure capacities, urban design; some new buildings approved within framework of study output; graphic output in jpeg format. 	<ul style="list-style-type: none"> ▪ 2007: proposed water supply network; German consultant; 1:2,500 scale; hardcopy only – was digital copy supplied? ▪ 2003: electoral zone map ▪ 2006: sewage network; 1:2,500 scale

<p>Berat</p>	<ul style="list-style-type: none"> • 2005: urban base-line photogrammetry by “GeoConsulting”; includes topography; (scale?) 	<ul style="list-style-type: none"> ▪ Hardcopy thematic maps produced during comprehensive study (output scale: 1:6,000) via Coplan & “GeoConsulting” (2005-2007): <ul style="list-style-type: none"> - Municipal administrative zones - Water-supply infrastructure - Waste-water infrastructure - Telephone infrastructure - Primary schools & service areas - High schools & service areas - Kindergartens & service areas - Clinics & service areas - Wind flow (annual) - Property: municipal & state assets - Environmental constraints: <ul style="list-style-type: none"> • Factories • Wastewater outflow points (into river) • Solid-waste landfill • River flood-risk zone - Historical spatial development - Potential development zones - Trends in spatial development: <ul style="list-style-type: none"> • Informal building areas • Proposed border changes - Solid waste collection zones - Road system - Road surface categories (including proposed roads) - Historical assets - Socio-economic questionnaire results mapped using histograms ▪ “Archaeology Map” – restricted building zones (3 zones)
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Gjirokaster	<ul style="list-style-type: none"> ▪ 2001: EU Interreg-funded project for restoration of historical city ▪ Reported: <ul style="list-style-type: none"> - Seismic study of historical city undertaken - Orthophoto from 2001: scale 1:500; complete city - Orthophoto from 2005: scale 1:500; only city centre - Addresses of families receiving welfare - New water-supply lines - Main sewage lines - Historical streets ▪ Observed: <ul style="list-style-type: none"> - Hard-copy photogrammetry output at scale 1:5,000 from 2001 - Includes landslide barriers and sustaining walls - Base-map ESRI shapefile layers (from photogrammetry above?): <ul style="list-style-type: none"> ▪ Roads ▪ Buildings ▪ Vegetation ▪ Elevation ▪ Hydrography - Thematic layers: <ul style="list-style-type: none"> ▪ High voltage electricity network + transformers ▪ Development zones in historical city (UNESCO) 	<ul style="list-style-type: none"> ▪ 1000 buildings in historical city, with georeferenced photographs; attribute data for buildings from survey exists in paper form only; includes: <ul style="list-style-type: none"> - no. of floors - no. of useable rooms - existence of electricity, water, wastewater infrastructure - building use by floor - entrance type - vehicle access - general building typology - conservation status - original characteristics - structural damage - materials - floor type - roof type - decorations
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