Nationwide Collection, Recording and Provision of Geo-scientific Data: Examples from Ghana, Namibia, Germany and Kosovo

Dr. Andreas Barth
Dr. Frank Schmidt
Beak Consultants GmbH
Freiberg, GERMANY

Beak Consultants GmbH

- Modern Consulting Company
- Geosciences & Environment
- GIS & Cartography
- Planning and implementation of tailor-made software
- High quality standards: ISO 9001:2000 certificate
- 12 years of company experience
- Up to 30 years experience of employees
- Traditional Roots: Geological Survey of the former G.D.R.

Overview

- Non-metallic Resources in Saxony KOR50 (Germany)
- EarthData Namibia
- Geodatabase Kosovo
- Geodatabase Ghana

Common Existing Situation

For more than one hundred years, geo-scientific data were collected on paper. Descriptions, bore hole logs, maps and exploration reports have filled up public and non-public archives with materials of inestimable value. The systematic capture, storage and distribution of this information is an extremely important and expensive activity. Many database systems grew independently from each other even in one organisation. The result is a jungle of information, many redundancies and problems with sharing of information.

1998: Map of Mineral Deposits KOR 50 Free State of Saxony, Germany

- long-term strategic goals for aggregate mining industry: Where are our deposits?
- Attraction of investors
- Environmentally friendly aggregate mining
- Support planning activities: land use planning, planning of infrastructure, urban development, agriculture, national parks,...

Deposit evaluation procedure with GIS

Primary data: regional planning situation
Primary data: mineral deposit & occurrence shapes
Primary data: geogr. base data
Vector data, map of land use
Catalogue of blocking and bounding criteria

Additional geological input

Catalogue: filter criteria

Deposits ranked to their value

Evaluation of deposit value
Deposits ranked to their value
Deposits ranked to their legal status
Evaluation criteria for deposit value
Evaluation criteria for preventive protection
Deposits ranked with regard to their preventive protection

Check of data

Deposits ranked by their status

Application of filter criteria

Deposits ranked to their value

Evaluation of deposit value
Deposits ranked to their value
Deposits ranked to their legal status
Evaluation criteria for deposit value
Evaluation criteria for preventive protection
Deposits ranked with regard to their preventive protection
**Preventive solution of land use conflicts**

- mineral deposits & energy preferences
- forestry preferences
- infrastructure preferences
- urban development preferences
- agriculture preferences
- nature conservation preferences
- other preferences

Spatial planning decision process

State Strategy Plan (covers 10–15 years)
Set of thematic maps
120 pages of text

1 year

---

**Namibia – Geological Investigation and Minerals**

<table>
<thead>
<tr>
<th>History</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic geological investigations &gt; 100 years → many unique documents</td>
</tr>
<tr>
<td>Strong library/mapping section</td>
</tr>
<tr>
<td>Since 1992: GIS capabilities</td>
</tr>
<tr>
<td>Since 1996: Growth of different databases</td>
</tr>
<tr>
<td>Since 2001: Systematic implementation of a central database</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>First diamonds found at the beginning of the last century</td>
</tr>
<tr>
<td>Deposits of U, Cu, Zn, Pb, Au, precious and semi-precious stones, dimension stones</td>
</tr>
</tbody>
</table>

---

**The start of a project: Requirement Analysis**

- Manage geo-scientific data for a whole country
  - 100 years of exploration: reports & maps
  - licences (n ~1,000)
  - mineral deposits & occurrences (n ~1,000)
  - reports & documents (n ~100,000)
  - drill holes, geochemistry, etc. (n ~10,000,000)
  - environmental issues (monitoring, hazardous sites, emissions)
- Manage factual and geometrical data
- Multi-user system with different access rights
- Easy to use
- Open for further growth

---

**Kosova: Background**

- 11,000 km²
- 1.9 Mio. inhabitants
- mainly ethnic Albanians
- under UN Administration since the Kosovo war 1999
- development of a local administration

<table>
<thead>
<tr>
<th>Minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>base metals, silver</td>
</tr>
<tr>
<td>chrome</td>
</tr>
<tr>
<td>lignite</td>
</tr>
<tr>
<td>kaolin</td>
</tr>
<tr>
<td>hard rock, sand, gravel</td>
</tr>
</tbody>
</table>


---

**Requirements Analysis**

- Create pre-requisites for the economic reconstruction of the country
- guarantee transparency of the licensing process, attract investors
- Provide information to any interested party (state agencies, NGOs)
- Guarantee easy and fast availability of data → internet
- Create important pre-requisites for complex land use and infrastructure planning:
  - geology
  - hydrogeology
  - minerals
  - geo-hazards
  - soils
  - contaminations,...

---

**Next step: Data Modelling**

- Addresses: Subjects
- Metals
- Blasting Permits
- Processing Plants
- Bora Island
- Map of Geohazards
- Digital Map
- External Map
- Orthophoto Map
-等高线图

2003 - 2006
Experiences:

Is there an universal information system: NO!

- The general structure of an IMS is always similar: database, GIS, and unstructured information, but
- Local limitations, regulations, and pre-existing features require in almost all cases a tailor-made system design and programming, and
- The very fast development of information technologies requires the adjustment of developed systems as well.

Experiences: data capture process

- Rubbish in rubbish out
- Data capture is expensive, but correct data are essential
- Quality insurance is a complex process
- Data capture must be well organised

Discussion: Information Management Systems

- Requirements Analysis
- Design of Data Model
- Coupling of GIS, database, (web-interface)
- Data Capture and Entry
- Spatial Analysis, Factual Queries, Maps, Reports

Contact: www.beak.de - fschmidt@beak.de