

The integration between geospatial and statistical information in Brazil and the Sustainable Development Goals

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Brasil at a glance

BRASIL 	
Land Area	8 515 767 km ²
Sea Area	3 600 000 km ²
States	27
Municipalities	5 570
Population Estimate (2015)	204,5 million

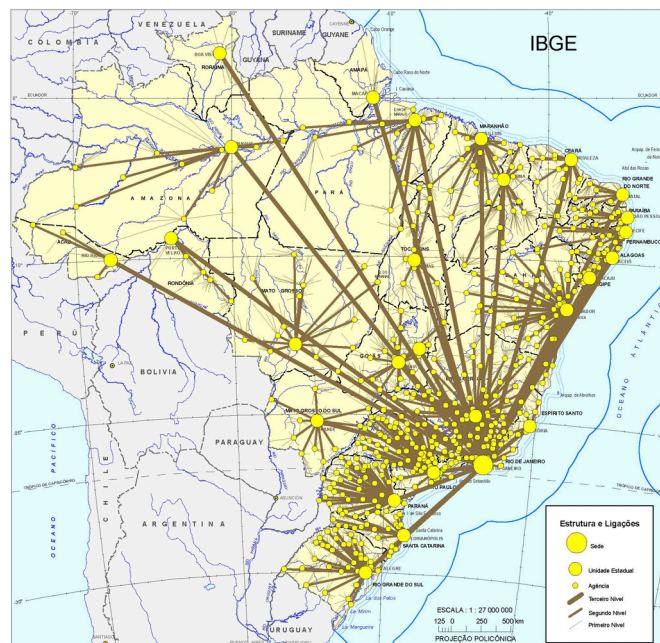


- Production and analysis of statistical and Geographic Information.
- Coordination and consolidation of statistical information.
- Structuring and implementation of a system of environmental information.
- Documentation and dissemination of information.
- Coordination of National Statistical and Cartographic Systems.

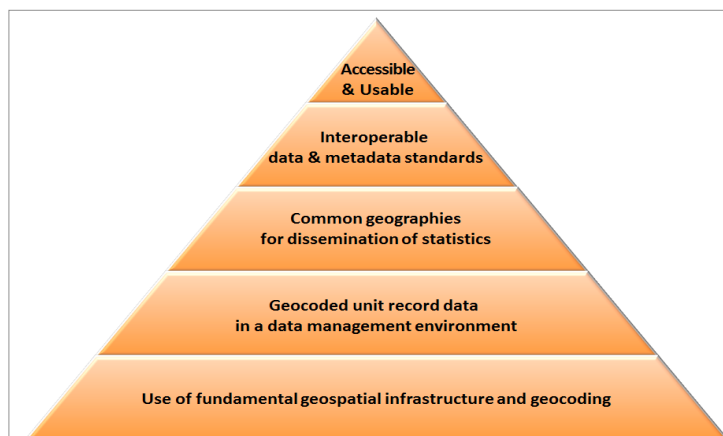
- Created in 1937
- Head Office: Rio de Janeiro, BRAZIL.
- 27 State Offices (6 with cartography and natural resources supervisors).
- 581 local offices.
- 6.000 permanent employees.
- 200.000 temporary employees during the last Census Operation.



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The ONU-GGIM Global Framework as a standard for the integration of geospatial and statistic information at IBGE



Principle 1

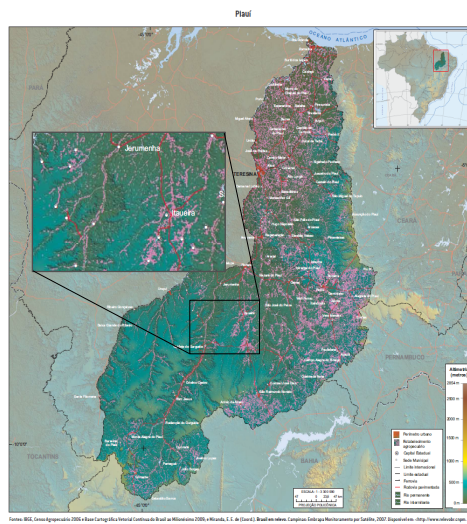
Principle 1 – Use of fundamental geospatial infrastructure and geocoding

- Georeferencing of the surveyed units is made according to the national mapping parameters;
- Used to reference cartographic produced by the IBGE (scales of 1: 25,000 to 1: 250,000) as the basis of census maps.
- Cartography in more detailed scales for use in household surveys is produced directly (small towns) or obtained through cooperation agreements with municipalities.
- Intensive use of images as support for updating the census cartographic bases (mosaic RapidEye across the country in 2011, 2013/14, 2015 and 2017 with a resolution of 5 meters).
- The image mosaics are bought and used collectively by several federal agencies.
- For urban areas, higher resolution images from different sources.

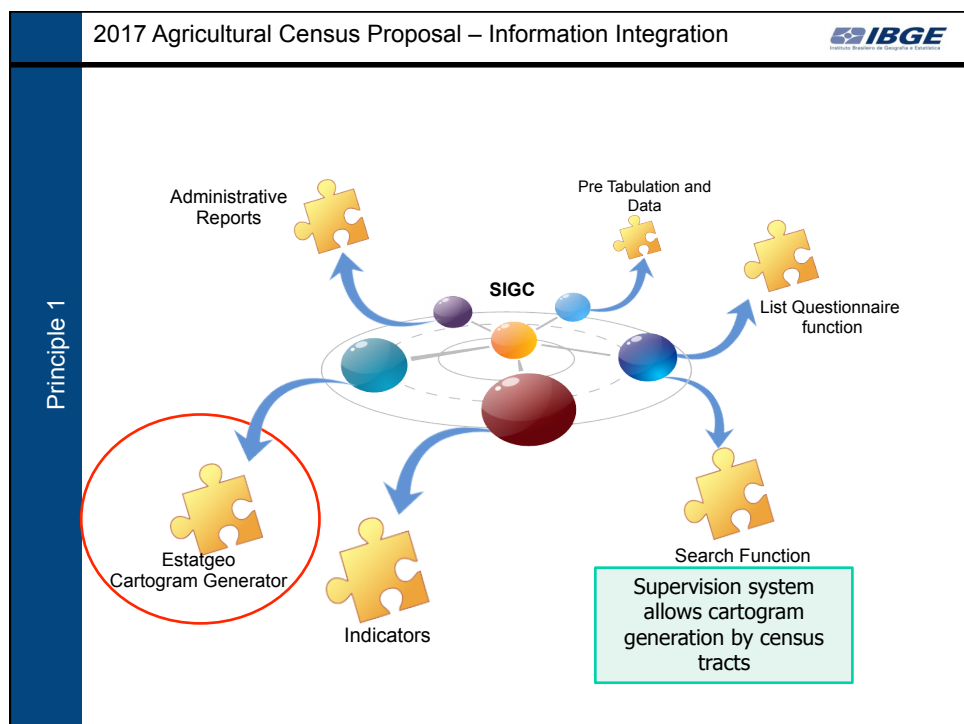
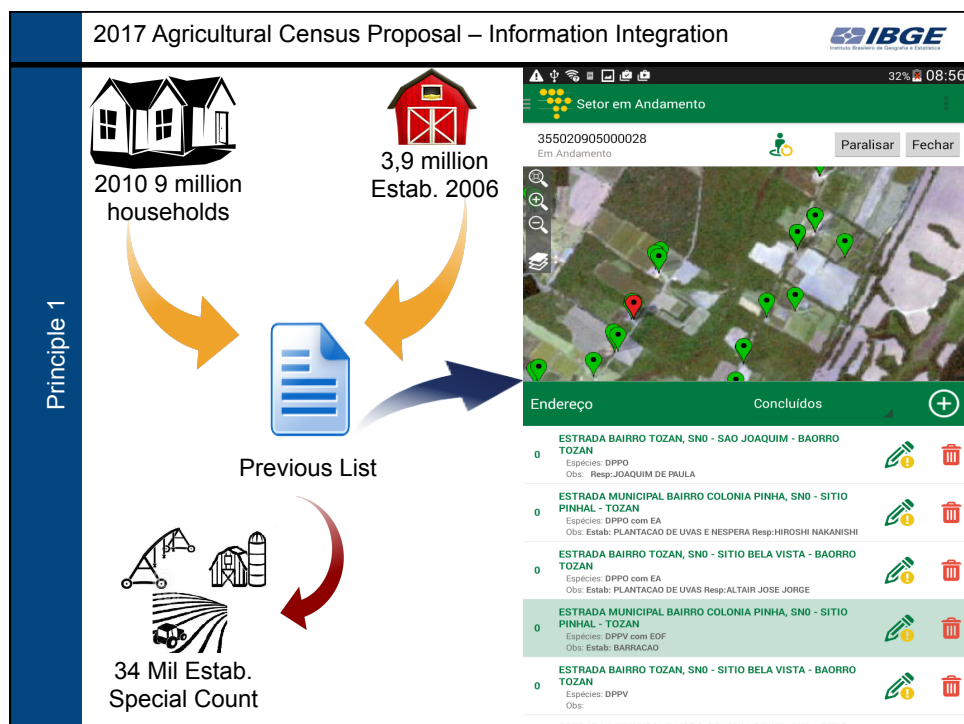
Principle 1 – Use of fundamental geospatial infrastructure and geocoding

- National Address File
 - Geocoding by address in urban areas;
 - Geocoding by coordinates in rural areas;
 - Geospatial base with pinpoint location of households in rural areas and block faces in urban areas, according to the established cartographic parameters;
 - Geocoding of the addresses allows the creation of new cuts for statistical dissemination
- Previous identification of some Geographies;
 - subnormal settlements (slums)
 - indigenous lands
 - urban and rural areas
 - political and administrative boundaries

georeferencing of rural areas: agricultural establishments.



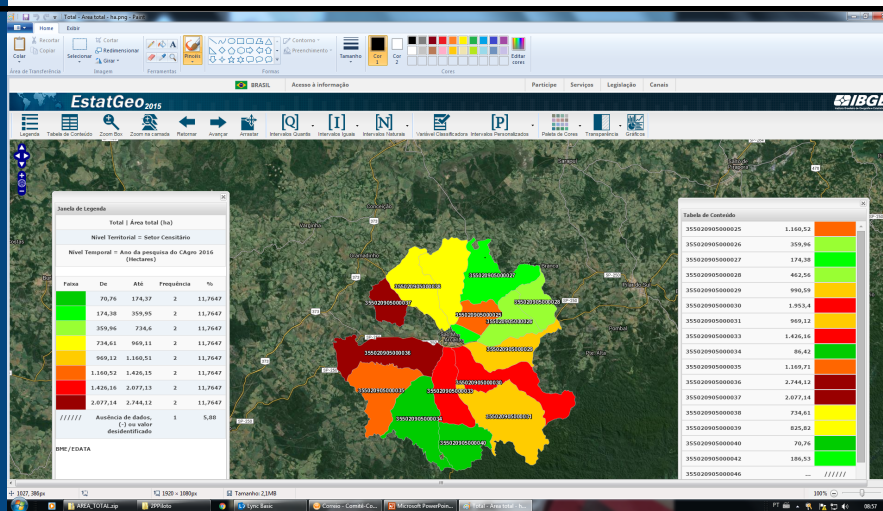
Agricultural census of 2006/2007:
3.9 million agricultural establishments codes by geographical coordinates.
The map shows the distribution of establishments in the state of Piauí.



2017 Agricultural Census Proposal – Information Integration



Principle 1



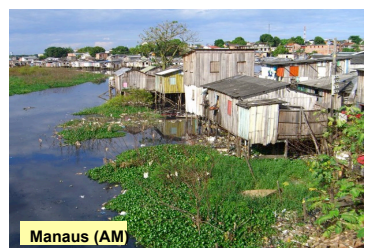
Supervision system allows cartogram generation by census tracts

Previous Identification of “special” areas



Principle 1

pre-identifying, isolating in census tracts, special geographic aggregates, such as subnormal agglomerates, improves the quality of the collection and dissemination, allowing the creation of expansion of areas of specific sample for this type of territory



Pre Identification of “aglomerados subnormais” (Slums) 

Principle 1



Pre Identification of “aglomerados subnormais” with imagery (Slums) 

Principle 1



Principle 1

Principle 1 – Geocoded unit record data in a data management environment and SDGs

- improve the quality of statistical data
- guarantee data for some indicators, as 11.1 (by 2030, ensure access for all to adequate, safe and affordable housing and basic services, and upgrade slums)
- it is fundamental do possibility a integration between statistical data from various sources, included administrative registers, and data extracted directly from geospatial information (georefering using national cartographic parameters)

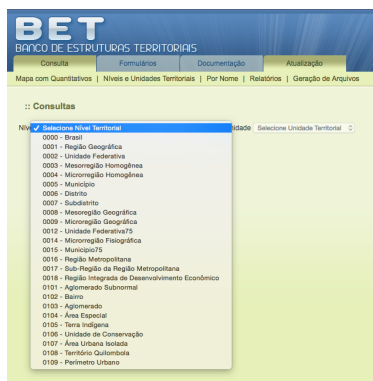
Principle 2

Principle 2 – Geocoded unit record data in a data management environment

- Guaranteed confidentiality of sensitive information
- Monitoring of territorial changes to allow the construction of historical series statistics for sub-national units;
- Geocoding framework that allows the construction of different scales of geographies.
- Availability of a single key that integrates information from the household survey questionnaires with a digital base of rural and urban addresses

Principle 2 – Geocoded unit record data in a data management environment

Territorial Structure Database

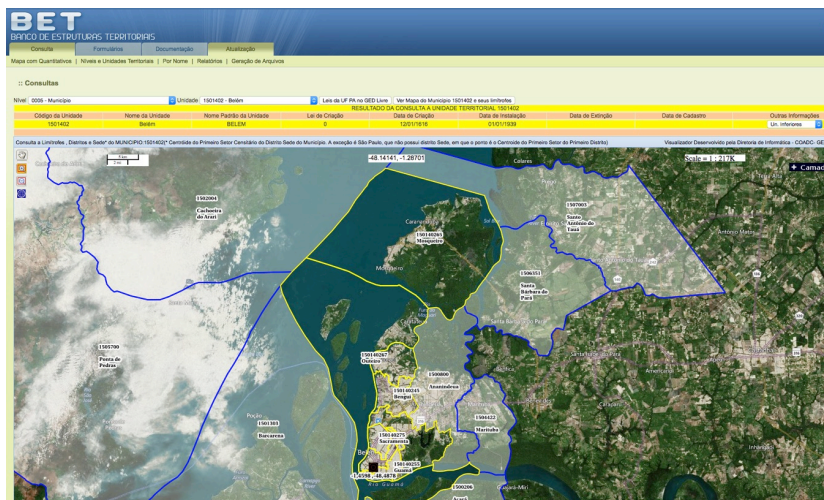


Register of territorial structures with its genealogy, hierarchy, membership and change control

Principle 2

Principle 2 – Geocoded unit record data in a data management environment

The Bank of territorial structures is integrated into a graphical environment



Principle 2

Principle 2 – Geocoded unit record data in a data management environment



BET
BANCO DE ESTRUTURAS TERRITORIAIS

Mapa com Quantitativos | Níveis e Unidades Territoriais | Por Nome | Realtime | Geração de Arquivos

Consultas

Consultas

Nível: 000 - Município | Unidade: 100030 - Pernambuco | Lei de UF PN no GED Livre | Ver Mapa de Município 100030 e seus limites

RESULTADO DA CONSULTA A UNIDADE TERRITORIAL 100030

Código da Unidade	Nome da Unidade	Nome Padrão da Unidade	Lei de Criação	Data de Criação	Data de Extinção	Data de Cessão	Outras Informações
100030	Pernambuco	Pernambuco	9443	10/05/1988	01/01/1989		Pro-Digreg

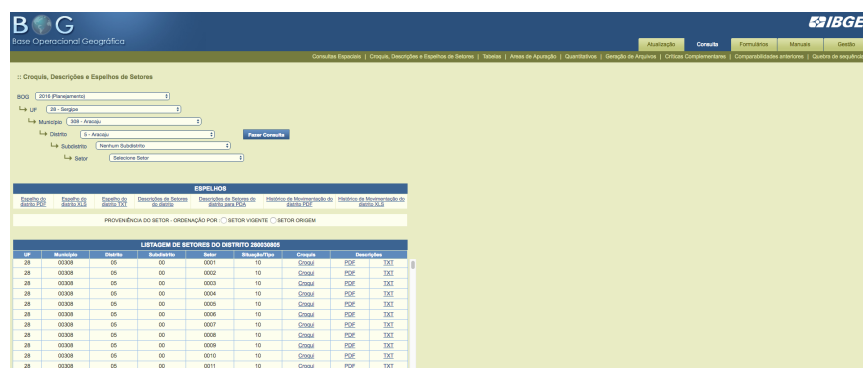
Código da Unidade: 100030 | Nome da Unidade: Pernambuco | Nome da Unidade Territorial: 100030 000 UNIDADES DO CENSO

Código da Unidade: 100030 | Nome da Unidade Territorial: 100030 000 UNIDADES DO CENSO | Data de Extinção: 01/01/1989 | Lei de Criação: 9443 | Data de Criação: 10/05/1988

Bank of Territorial Structures - Example genealogy consulting a territorial cut

Principle 2 – Geocoded unit record data in a data management environment

Geographic Operating Base



BOG
Base Operacional Geográfica

Consultas Especiais | Consultas Especiais e Espelhos de Setores | Tabelas | Áreas de Atuação | Quantitativos | Saneamento de Áreas | Outras Consultas | Comparação de Setores | Gestão de Qualidade

Consultas Especiais e Espelhos de Setores

Estado: 0000 (Pernambuco)

UF: 00 (Pernambuco)

Município: 0000 (Recife)

Dentro: 0000 (Recife)

Subsetor: 0000 (Recife)

Setor: 0000 (Recife)

Para Consultar

ESPELHOS

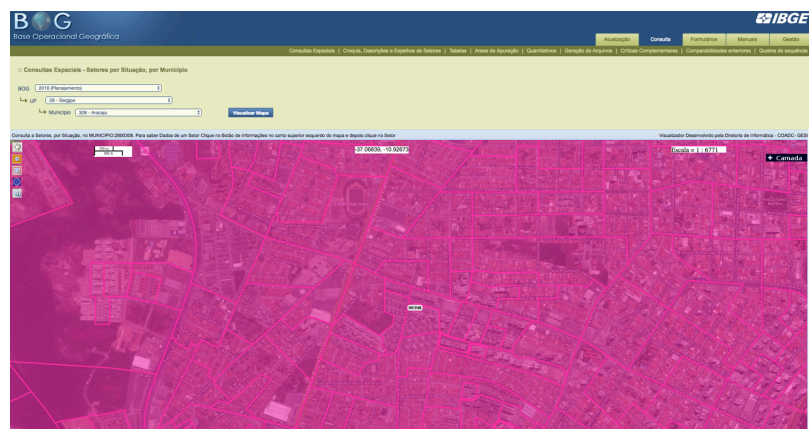
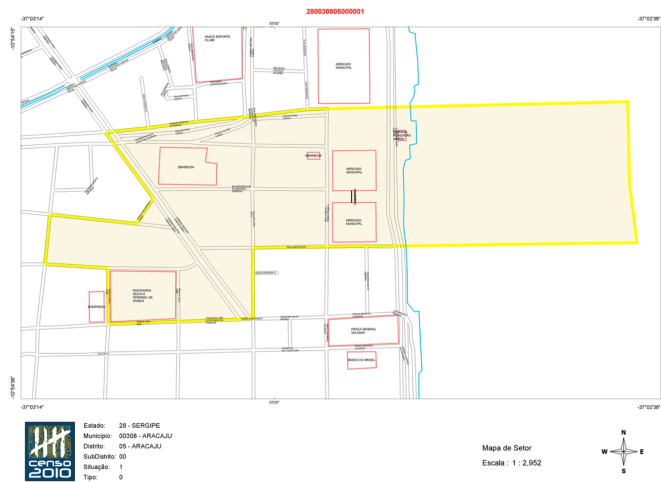
Identificação do Setor | Descrição do Setor | Descrição do Setor | Descrição do Setor

PROVENIÊNCIA DO SETOR - ORIENTAÇÃO POR: ☐ SETOR VIGENTE ☐ SETOR ORIGEM

LISTAGEM DE SETORES DO DISTRITO 280030000

UF	Município	Estado	Setor	Setor	Setor	Setor	Setor	Setor
28	00000	00	00	0001	10	0001	10	0001
28	00000	00	00	0002	10	0002	10	0002
28	00000	00	00	0003	10	0003	10	0003
28	00000	00	00	0004	10	0004	10	0004
28	00000	00	00	0005	10	0005	10	0005
28	00000	00	00	0006	10	0006	10	0006
28	00000	00	00	0007	10	0007	10	0007
28	00000	00	00	0008	10	0008	10	0008
28	00000	00	00	0009	10	0009	10	0009
28	00000	00	00	0010	10	0010	10	0010
28	00000	00	00	0011	10	0011	10	0011

System that allows the management of the census tracts structure, their genealogy, their coding and upgrade process.



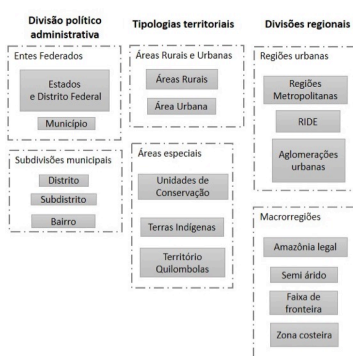
Principle 2 – Geocoded unit record data in a data management environment and SDGs

- Guaranteed confidentiality of sensitive information
- Monitoring of territorial changes to allow the construction of historical series statistics for sub-national units;
- Geocoding framework that allows the construction of different scales of geographies.

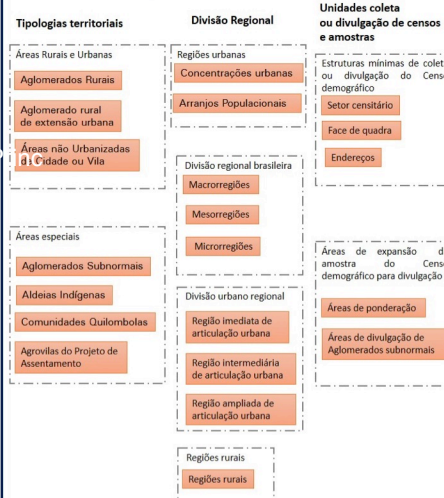
Principle 3 – IBGE's Geographical Framework

Quadro geográfico para apuração e divulgação estatística do IBGE

Áreas legalmente institucionalizadas



Áreas definidas pelo IBGE



Principle 3 – Common Geographies for Dissemination of Statistics

Divided in two Categories:

- Legally institutionalized
- Defined by the IBGE

Main goals:

- Organize and give visibility to common geographies employed in the dissemination and analysis of IBGE surveys and census;
- Enhance and encourage the use of common geographies for the production and dissemination of research;
- Organize an internal update flow and create reference dates for the complete set of geographies (annual)

Principle 3 – Common Geographies for Dissemination of Statistics

Main goals:

- To make it clear to the user which are the common geographic areas used by IBGE, and also their update policy, concepts employed, and the potential and limitation to use each geography.
- Act as a reference for common geographic areas in IBGE's dissemination system (SIDRA, BME, etc.);

Regarding sample surveys:

- In the medium / long term, support the development of new sampling plans that allow dissemination of statistics in other subnational geographies

Principle 3 – Common Geographies for Dissemination of Statistics

Main goals:

- Acts as a reference within the National Official Information System context, facilitating the integration of geographic and statistical information.
- New territorial categories can be added to the picture, such as environmental geographies (basins, biomass, etc.)

Principle 3 – Common Geographies for Dissemination of Statistics and SDGs

- Fundamental to increase the possibility of use of administrative registers as a source of SDG indicator. It's necessary to have common geographies for consolidation and dissemination of statistics based on administrative registers.
- The Expert Group may establish a set of recommended subnational geography for the best monitoring of SDG (rivers basins, rural/urban areas, municipalities, states/provinces, etc)
- It is necessary to establish a set of territorial concepts in order to allow international comparison. (rural/urban, metropolitan region, etc). The establishment of statistical concepts standards area much more developed than geographies concepts standards. (GGIM Americas works)

Principle 3 – Common Geographies for Dissemination of Statistics and SDGs

- it's important to choose a set of subnational administrative units as a recommendation to monitoring SDGs. Is it SALB project enough to this? Is it desirable to propose some set of geographies, yet regionally, like the Nomenclature of Territorial Units for Statistics (NUTs) Europe experience?

Principle 4 – Interoperable Data and Metadata

- Statistical data and metadata are already in the standard DDI and SDMX
- Spatial data and metadata are in the ISO 19115 standard.
- Geospatial information is published in the form of geoservices, following standards of the National Spatial Data Infrastructure.(SDI)
- Data standards and metadata used are highly interoperable.
- Dissemination systems provide data and metadata in open formats.
- There is a work in progress aiming to harmonize metadata in a single model that integrates the DDI, SDMX and ISO19115 standards, using the existing fields in each model and harmonizing classifications.

Principle 4 – Interoperable Data and Metadata and SDGs

- It is necessary to enhance and standardize the integration between statistical and geospatial metadata. Some information as source of data, calculation procedure, concepts used, has to be in the integrated metadata, for example, in a geospatial layer data show a SDG indicator.

Principle 5 – Accessible and Usable Geospatially Enabled Statistics

IBGE has two approaches regarding dissemination of geospatial information and integrated statistics:

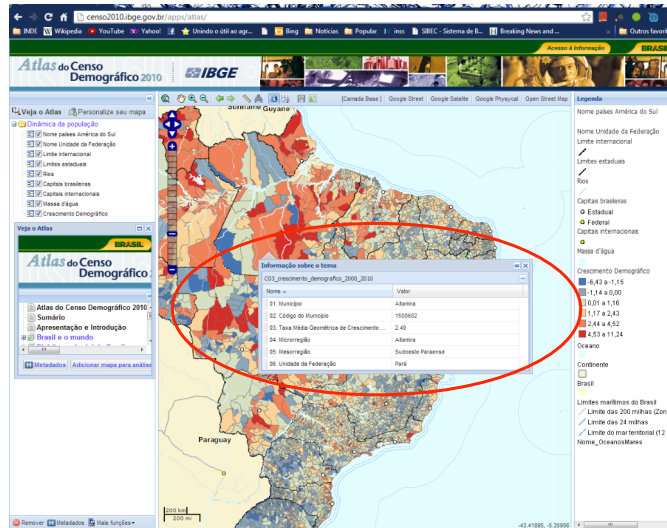
- Digital Atlas system: platform for the dissemination of specific products such as Atlas and research reports.
- Environment EstatGeo: platform for the dissemination of geospatial information and integrated statistics from aggregate tables or queries based on any microdata of surveys and census.

Principle 5 – Accessible and Usable Geospatially Enabled Statistics



The Atlas system, based on geoservices and open formats, is used for the dissemination of specific products, containing final art maps and interactive maps, with access to statistical information.

Principle 5

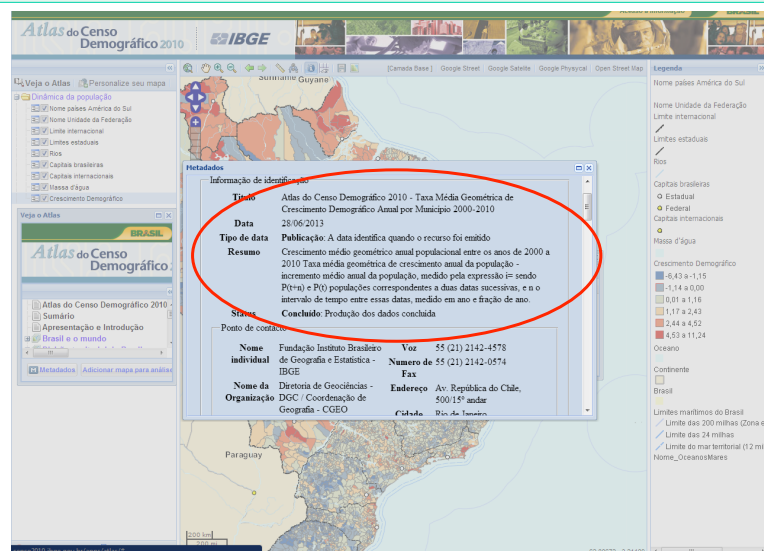


Principle 5 – Accessible and Usable Geospatially Enabled Statistics



In this system spatial metadata is available, but with some of the statistical metadata in the "Summary" field. This integration between statistical and spatial metadata will be improved

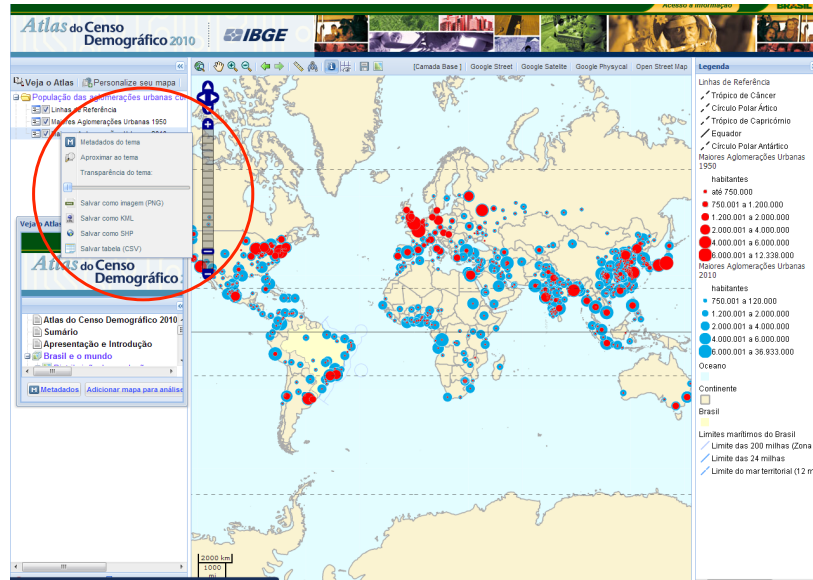
Principle 5





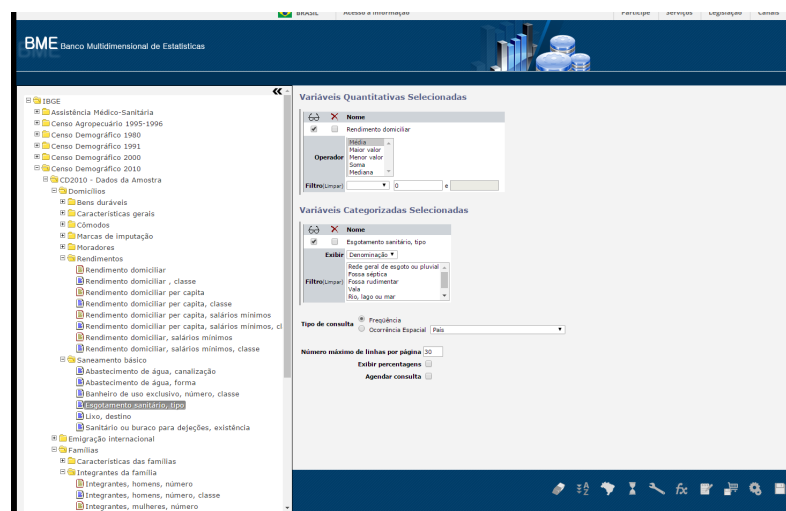
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Principle 5



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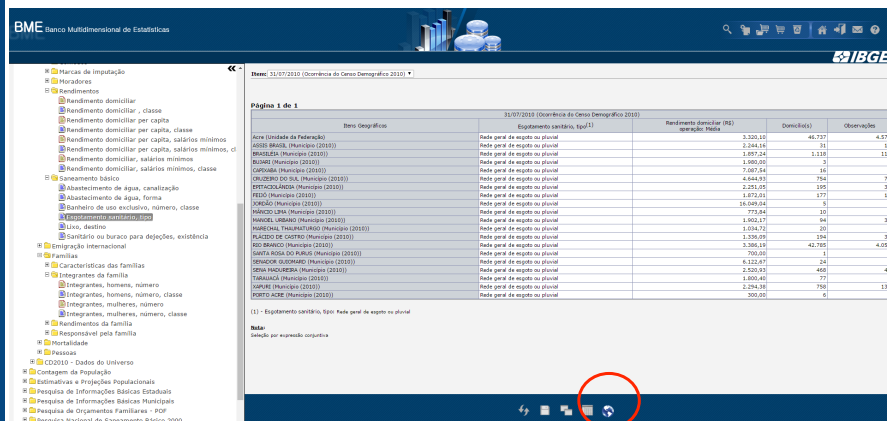
Principle 5





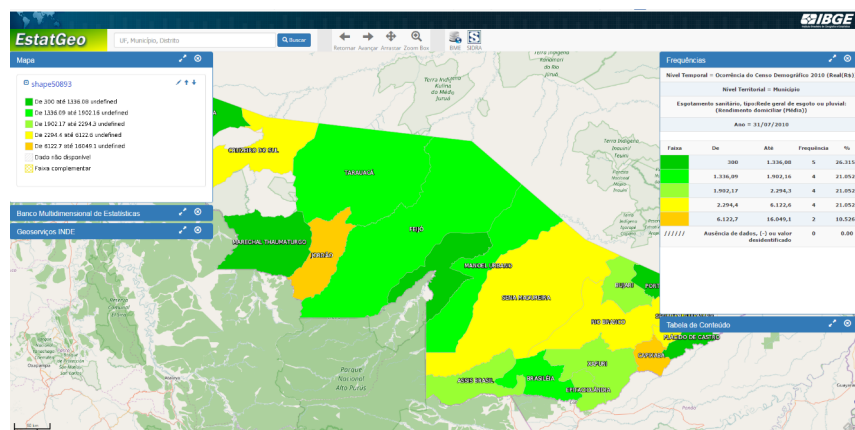
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Principle 5



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Principle 5



Principle 5 – Accessible and Usable Geospatially Enabled Statistics and SDGs

- Accessible and Usable system area fundamental for monitoring SDGs and create policies to achieve the goals, make available staistical and geospatial data in a adequate geographiy.

Other Considerations

- What is the general needs about geospatial information for the SDG agenda?
 - Its possible to make a general recommendations document, linking the GGIM works.
 - Focus also in the use of administrative registers and how to integrate it with geospatial information.

BUT

- It has also relation on how the indicator area produced and witch is the adequate scale for the implementation and monitoring of SDGs...
 - Adequate geography
 - Geospatial information as a direct source of data in some indicators – The group can propose a framework on how to produce statistics directly from the geospatial information.

Other Considerations

- Suggestion: The indicators may have as a source census, surveys, administrative registers, sensors, geospatial information (big data?): the Expert group can propose a framework based in the source of data
- Suggestion: The expert group may propose a Geography Reference Framework for SDGs, including a common concepts of each geography (valid for all sources of data).
- Suggestion: The five principles of Integration of Geospatial information and statistics may be disseminated in the IAEG-SDG, with examples that connect it with SDG (valid more directly to data produced on census and surveys).
- Challenge: local level indicators periodically refresh (Annual) to monitoring SDGs - needs administrative registers.
- Question: What is the fundamental geospatial dataset to allow SDGs monitoring

Thank You !

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