THEME POWERING A DIGITAL FUTURE

AMERICAS GEOSPATIAL FORUM

Environmental Economic Accounts in Brazil

Session Natural Resources – SEEA Framework nas Ecosystem Accounting

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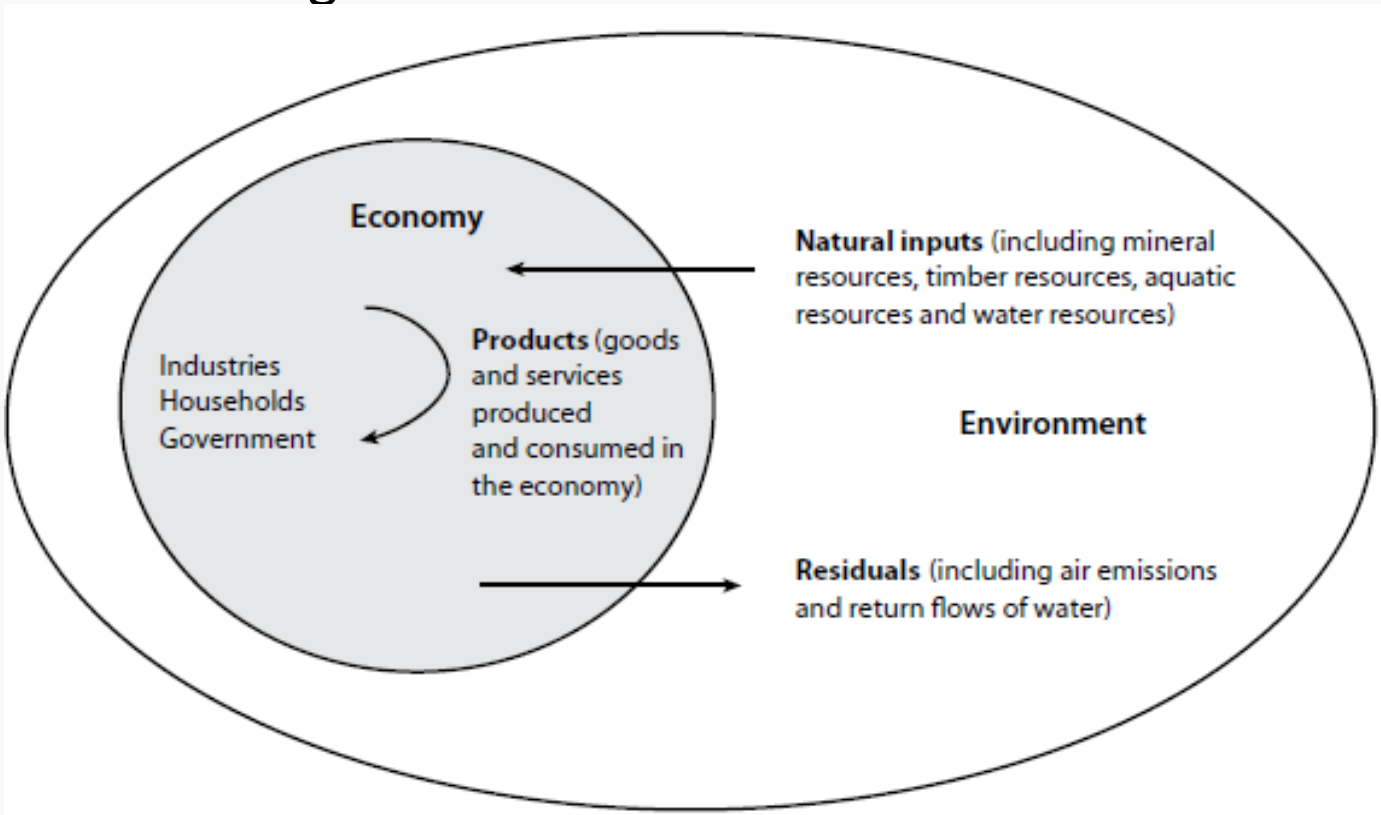
Americas Geospatial Forum
México – out 2019

System of Environmental-Economic Accounting (SEEA)

- The **SEEA Central Framework** was adopted as an international statistical standard by the UN Statistical Commission in 2012
- The **SEEA Experimental Ecosystem Accounting** complements the Central Framework and represents international efforts toward coherent ecosystem accounting

System of Environmental Economic Accounting



SEEA accounts

SEEA-CF (Central Framework)	• **Assets** • **Physical flows** • **Monetary flows**	• Minerals & Energy, Land, Timber, Soil, Water, Aquatic, Other Biological • Materials, Energy, Water, Emissions, Effluents, Wastes • Protection expenditures, taxes & subsidies
SEEA Water; **SEEA Energy;** **SEEA Agriculture, Forestry and Fisheries**	Add sector detail	As above for • Water • Energy • Agricultural, Forestry and Fisheries
SEEA-EEA (Experimental Ecosystem Accounting)	Adds spatial detail and ecosystem perspective	Extent, Condition, Ecosystem Services, Thematic: Carbon, Water, Biodiversity

Why use an accounting framework for the environment?

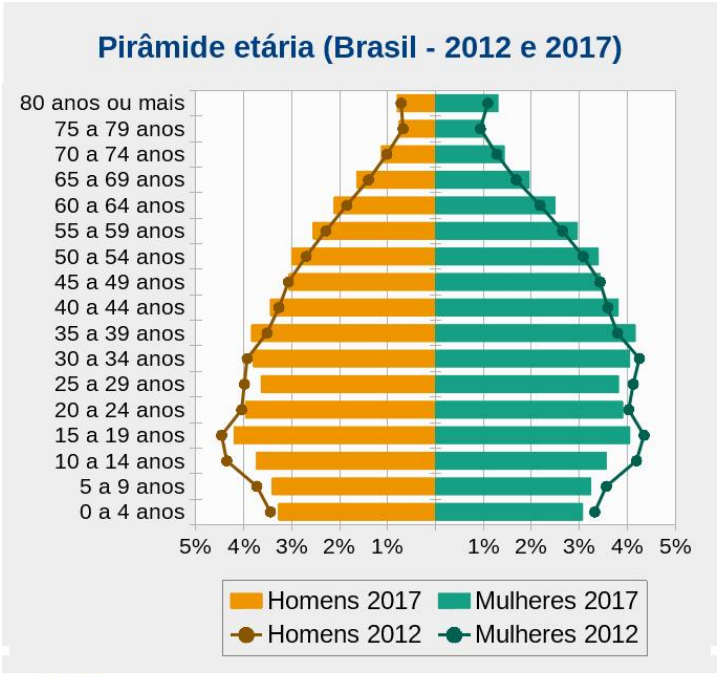
- Presents environmental and economic information together in a consistent way
- Allows for environmental data to be integrated with existing System of National Accounts measures
- Provides:
  - International comparability
  - Broad credibility
  - Replicability
- *Transforms **data** into **information***

IBGE Mission

To portray Brazil with **information** necessary to the knowledge of its reality and the exercise of **citizenship**.

Geography

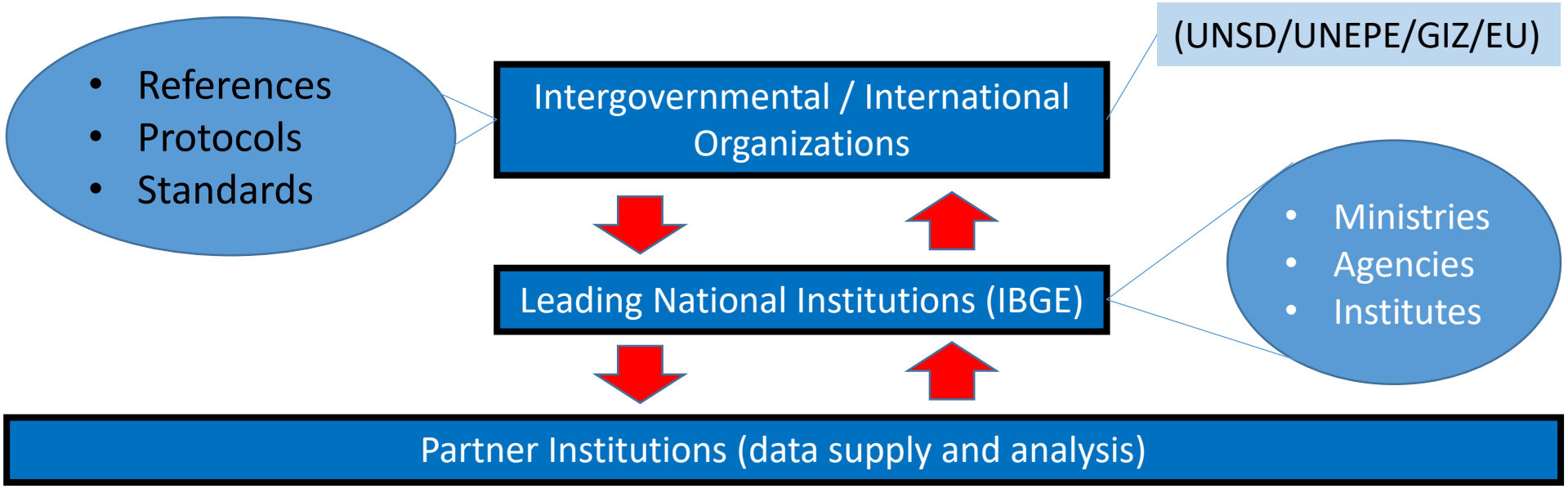
Statistic



IBGE educa

Fonte: IBGE, Pesquisa Nacional por Amostra de Domicílios Contínua (PNAD Contínua) 2017

Institutional Arrangements for SEEA in Brazil



Water
- IBGE
- ANA
- MMA
- Others

Energy
- IBGE
- EPE
- Others

Forests (Timber Resources)
- IBGE
- MMA
- SFB
- Others

Ecosystems
- IBGE
- MMA
- UFRJ
- Others

Forests (Timber Non Resources)

Physical Land Cover and Use Accounts

Biodiversity Accounts

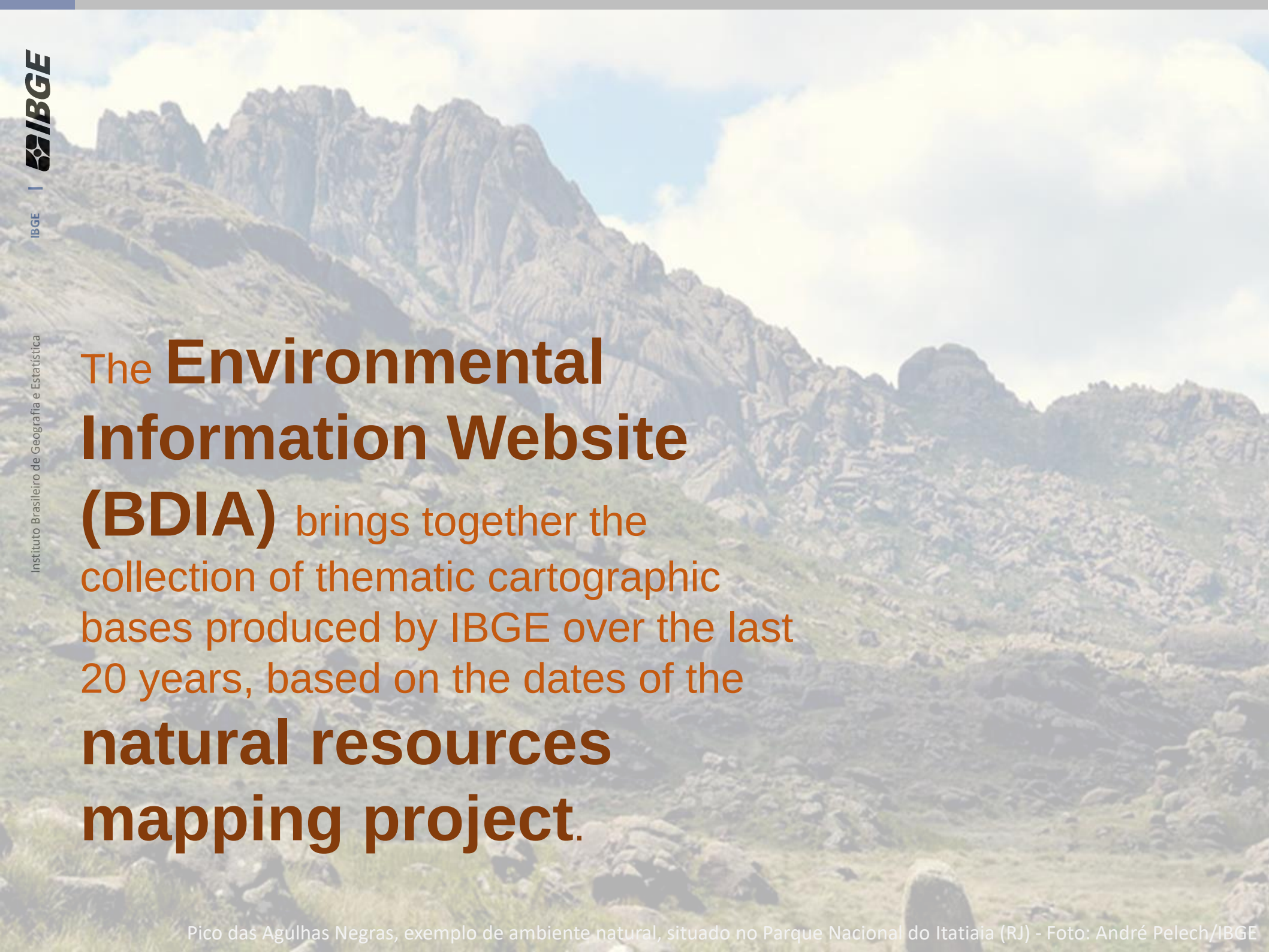
In development stage
Second post

In development stage

First post

To develop

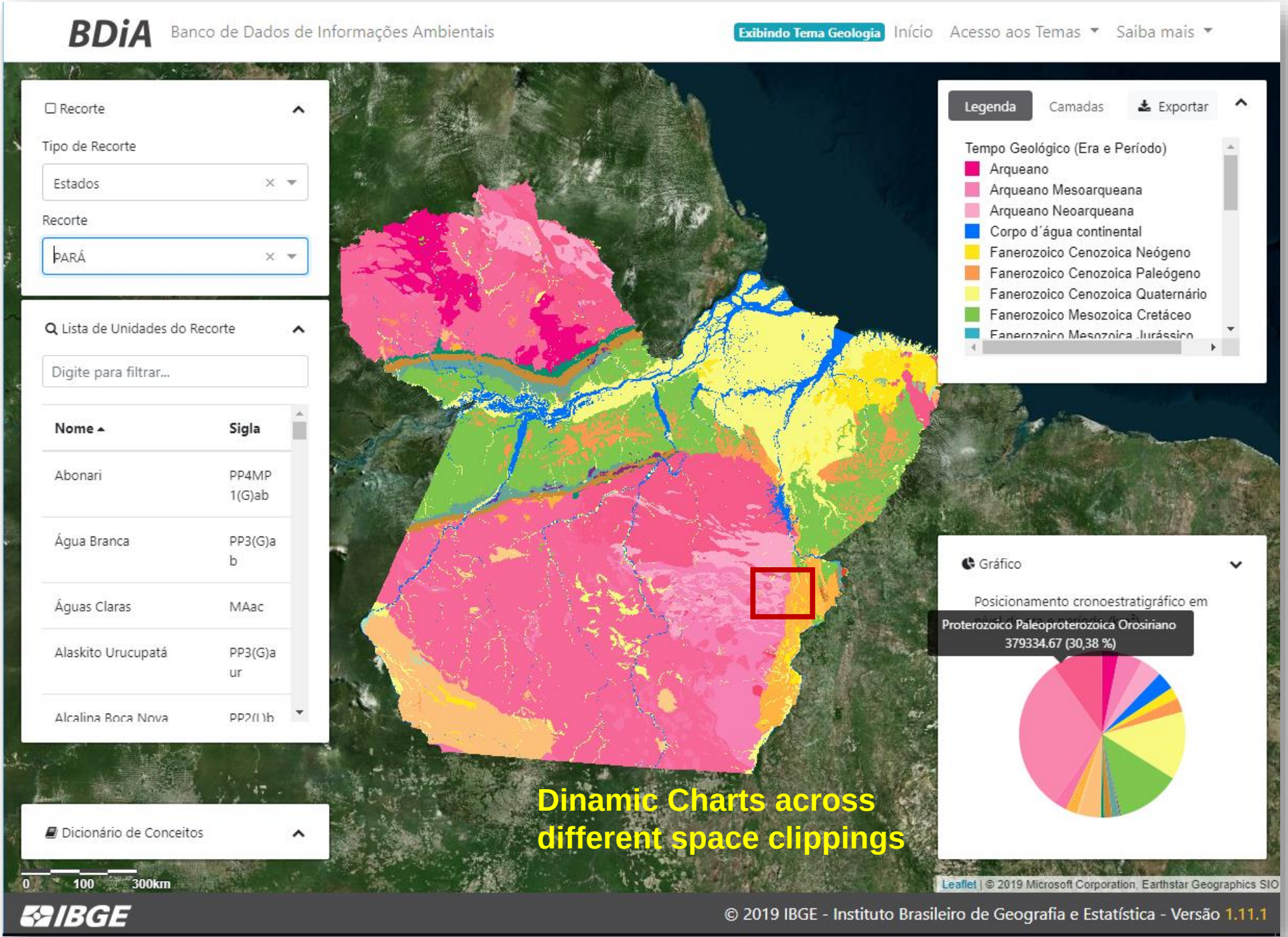
The **Environmental Information Website (BDIA)** brings together the collection of thematic cartographic bases produced by IBGE over the last 20 years, based on the dates of the **natural resources mapping project**.



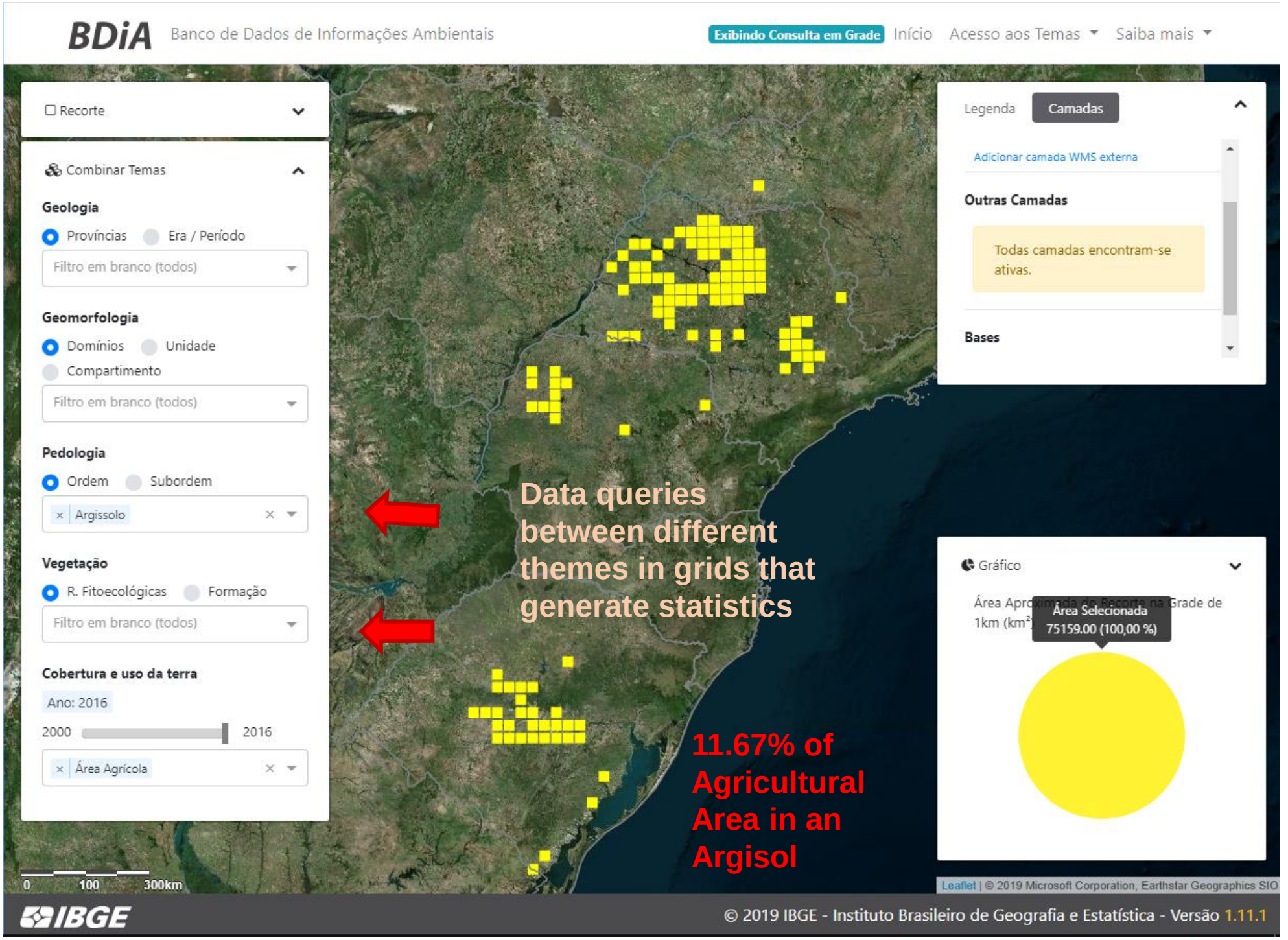
Pico das Agulhas Negras, exemplo de ambiente natural, situado no Parque Nacional do Itatiaia (RJ) - Foto: André Pelech/IBGE

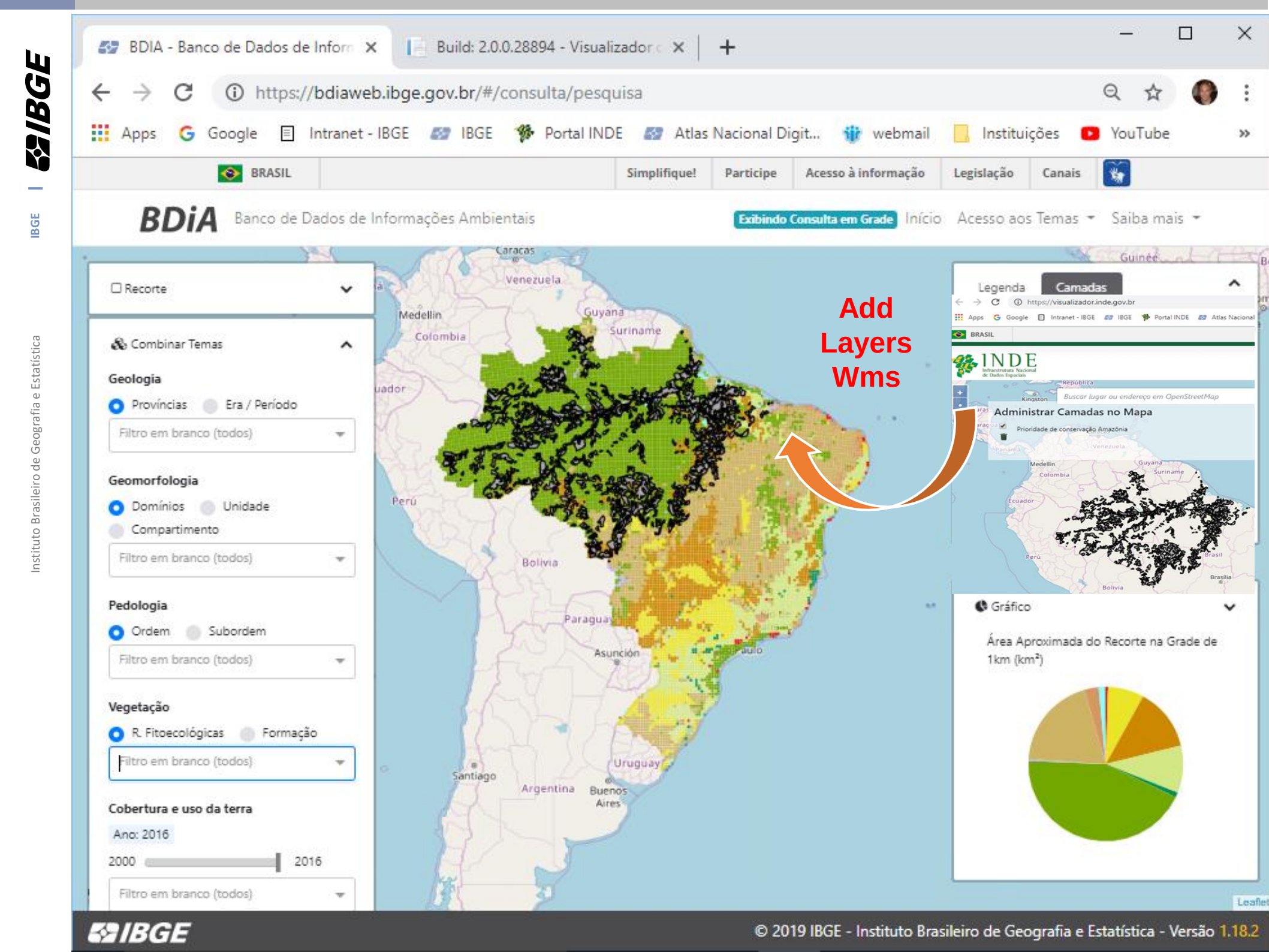
Environmental Information Website (BDIA)
https://bdiaweb.ibge.gov.br

Geology



Statistical grid




BDIA - Banco de Dados de Inform
Build: 2.0.0.28894 - Visualizador
https://bdiaweb.ibge.gov.br/#/consulta/pesquisa
Apps
Google
Intranet - IBGE
IBGE
Portal INDE
Atlas Nacional Digit...
webmail
Instituições
YouTube
BRASIL
Simplifique!
Participe
Acesso à informação
Legislação
Canais
BDiA
Banco de Dados de Informações Ambientais
Exibindo Consulta em Grade
Início
Acesso aos Temas
Saiba mais
Recorte
Combinar Temas
Geologia
Províncias
Era / Período
Filtro em branco (todos)
Geomorfologia
Domínios
Unidade
Compartimento
Filtro em branco (todos)
Pedologia
Ordem
Subordem
Filtro em branco (todos)
Vegetação
R. Fitoecológicas
Formação
Filtro em branco (todos)
Cobertura e uso da terra
Ano: 2016
2000
2016
Filtro em branco (todos)
Add
Layers
Wms
Legenda
Camadas
Administrar Camadas no Mapa
Gráfico
Área Aproximada do Recorte na Grade de 1km (km²)
Caracas
Venezuela
Medellin
Colombia
Guyana
Suriname
Perú
Bolivia
Paraguay
Asunción
Uruguay
Santiago
Argentina
Buenos Aires
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Knowledge about the **dynamics of natural resource use** has been a key element for the **development of control and preservation policies.**

Knowledge and systematic monitoring of the situation of natural resources, aiming at the recovery, improvement or maintenance of environmental quality.

Environmental quality is related to the control of environmental variables, which change, whether due to anthropic actions or natural changes.

Monitoring the dynamics of the use of ecosystem assets

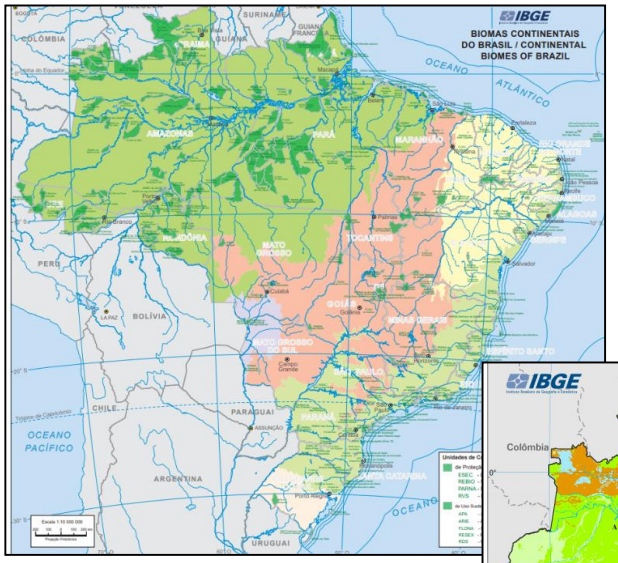
Definition of ecological units

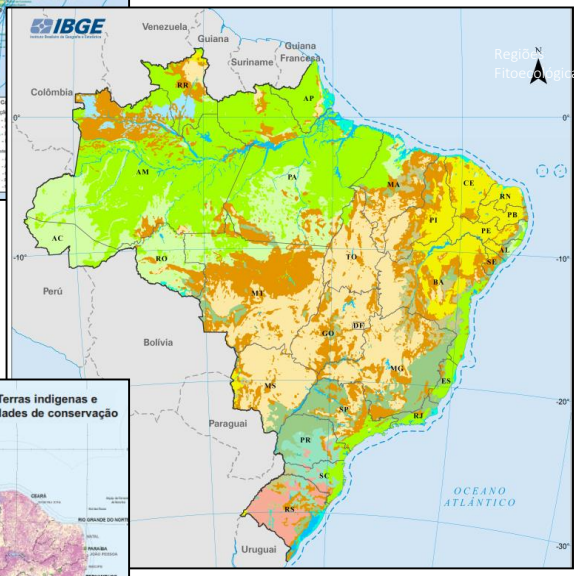
Ecosystem Accounts - Extension

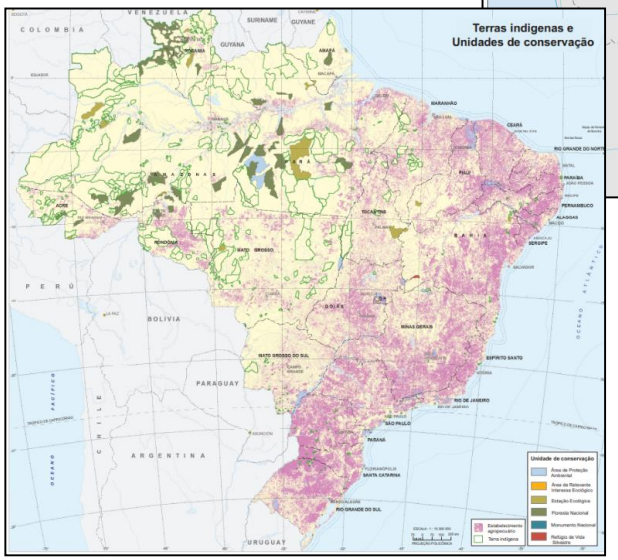
Ecosystem Assets

Ecological Units

Biome
Phytoecological region
Conservation unit
Natural region



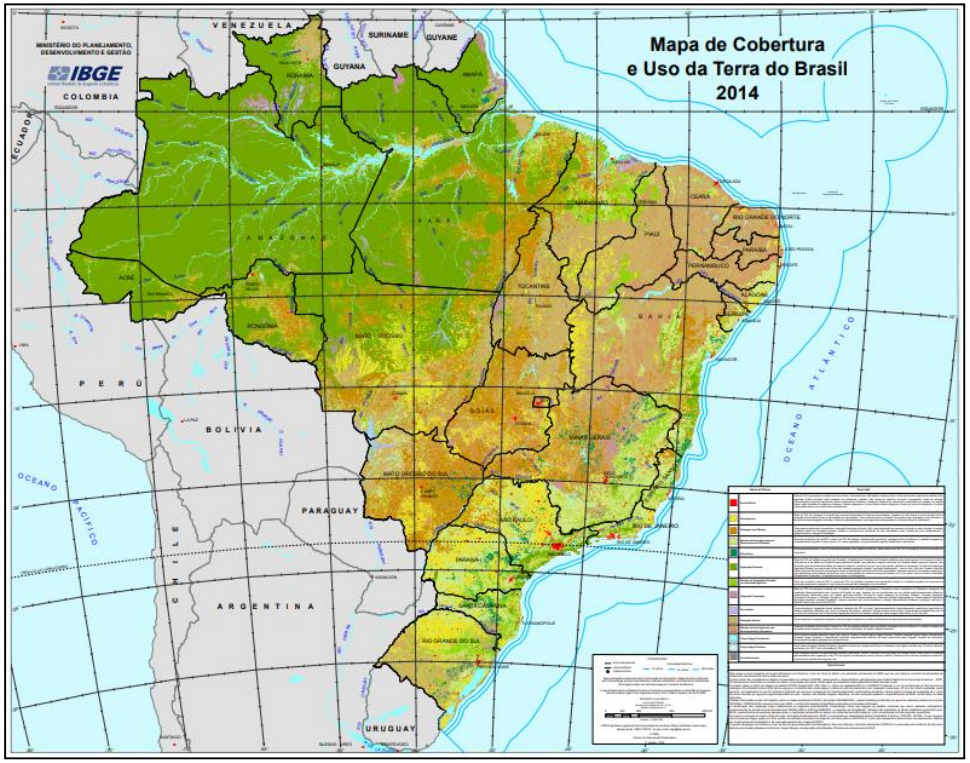


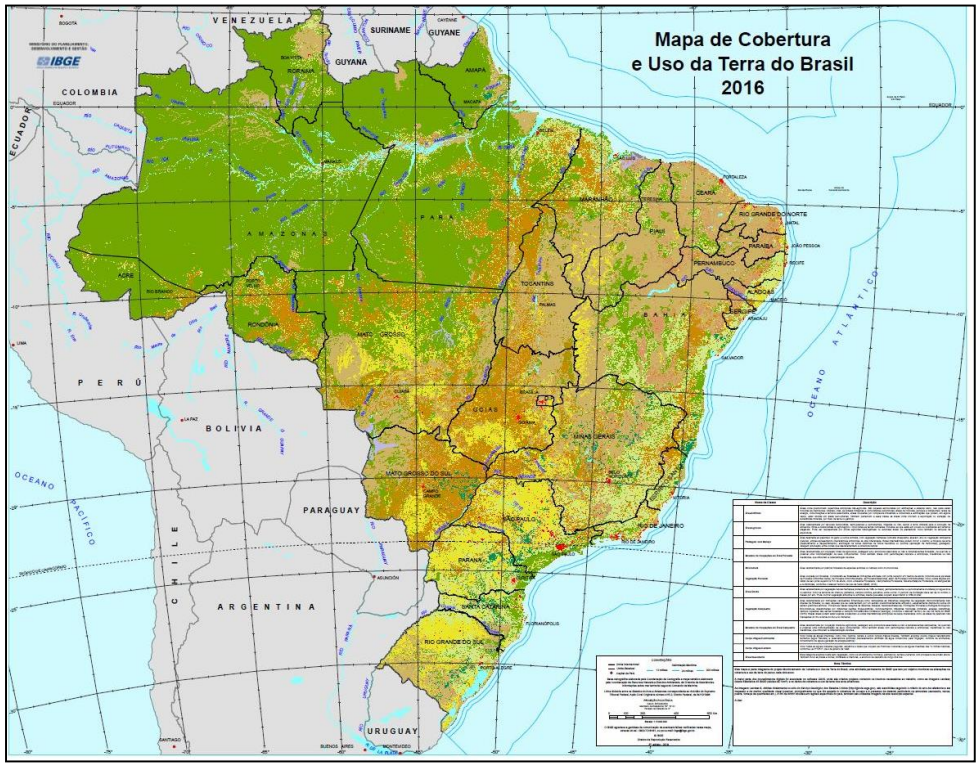


Land Cover and Use Accounts

Change Analysis over time

Land use and Land Cover monitoring
(2 years)





Basic space units = 1km² grid cell

Objectives of Physical Land Cover and Use Accounts

- ✓ Describe land area and changes over an accounting period - two years – 2010-2016
- ✓ Quantify changes between initial and final land stock in physical terms (different land cover and use classes).

LAND COVER/LAND USE CLASSES BRAZIL	
Color	Classes
	ARTIFICIAL SURFACES
	CROPLAND
	MANAGED PASTURE
	CROPLAND AND REMAINING FOREST MOSAICS
	SILVICULTURE
	FOREST TREE COVER
	FOREST AND FARMING ACTIVITIES MOSAICS
	SAVANNAH, SHRUBLAND, GRASSLAND
	WETLAND
	NATURAL PASTURE
	CROPLAND AND REMAINING SAVANNAH/SHRUB/GRASSLAND MOSAICS
	INLAND WATER BODIES
	COASTAL WATER BODIES
	BARREN LAND

Extension Ecosystem Account Calculation Table
Amazon Biome

		Área Artificial (1)	Área Agrícola (2)	Pastagem com manejo (3)	Mosaico de Ocupação em Área Florestal (4)	Silvicultura (5)	Vegetação Florestal (6)	Área Úmida (9)	Vegetação Campestre (10)	Mosaico de Ocupação em Área Campestre (11)	Corpo d'água Continental (12)	Corpo d'água Costeiro (13)
AMAZONIA	**2010**	4.459	33.407	391.395	191.843	3.911	3.248.638	21.332	217.566	6.972	77.799	1.624
		0,11	0,80	9,32	4,57	0,09	77,37	0,51	5,18	0,17	1,85	0,04
	2012	4.565	36.780	407.799	197.817	4.305	3.222.903	21.315	216.920	7.114	77.799	1.624
		0,11	0,88	9,71	4,71	0,10	76,75	0,51	5,17	0,17	1,85	0,04
	2014	4.910	49.217	412.908	198.579	4.857	3.204.514	21.154	216.253	7.126	77.799	1.624
		0,12	1,17	9,83	4,73	0,12	76,31	0,50	5,15	0,17	1,85	0,04
4.199.077	**2016**	5.025	56.455	410.757	215.568	5.266	3.182.158	21.147	215.724	7.418	77.799	1.624
		0,12	1,34	9,78	5,13	0,13	75,78	0,50	5,14	0,18	1,85	0,04
Conta de Ecossistema de extensão (área Km²) 2010/2016		**566**	**23.048**	**19.362**	**23.725**	**1.355**	**- 66.480**	**- 185**	**- 1.842**	**446**	**-**	**-**
Taxa de variação % 2010/2016		12,69	68,99	4,95	12,37	34,65	-2,05	-0,87	-0,85	6,40	0,00	0,00
Conta de Ecossistema de extensão (área Km²) 2010/2012		**106**	**3.373**	**16.404**	**5.974**	**394**	**- 25.735**	**- 17**	**- 646**	**142**	**-**	**-**
Taxa de variação % 2010/2012		2,38	10,10	4,19	3,11	10,07	-0,79	-0,08	-0,30	2,04	0,00	0,00
Conta de Ecossistema de extensão (área km²) 2012/2014		**345**	**12.437**	**5.109**	**762**	**552**	**- 18.389**	**- 161**	**- 667**	**12**	**-**	**-**
Taxa de variação % 2012/2014		7,56	33,81	1,25	0,39	12,82	-0,57	-0,76	-0,31	0,17	0,00	0,00
Conta de Ecossistema de extensão (área Km²) 2014/2016		**115**	**7.238**	**- 2.151**	**16.989**	**409**	**- 22.356**	**- 7**	**- 529**	**292**	**-**	**-**
Taxa de variação % 2014/2016		2,34	14,71	-0,52	8,56	8,42	-0,70	-0,03	-0,24	4,10	0,00	0,00

Extension Ecosystem Account Calculation Table
Dense Ombrophylous Forest

		Área Artificial (1)	Área Agrícola (2)	Pastagem com manejo (3)	Mosaico de Ocupação em Área Florestal (4)	Silvicultura (5)	Vegetação Florestal (6)	Área Úmida (9)	Vegetação Campestre (10)	Ocupação em Área Campestre (11)	Corpo d'água Continental (12)	Corpo d'água Costeiro (13)
Floresta Ombrofila Densa	2010	7.437	8.708	173.413	186.657	11.770	1.820.059	4.154	24.770	2.519	3.588	1.529
		0,33	0,39	7,73	8,32	0,52	81,09	0,19	1,10	0,11	0,16	0,07
	2012	7.514	9.184	182.076	190.570	11.956	1.806.814	4.152	24.653	2.568	3.588	1.529
		0,33	0,41	8,11	8,49	0,53	80,50	0,18	1,10	0,11	0,16	0,07
	2014	7.799	11.484	185.771	190.837	12.267	1.799.990	4.152	24.607	2.580	3.588	1.529
		0,35	0,51	8,28	8,50	0,55	80,19	0,18	1,10	0,11	0,16	0,07
	2016	7.872	13.041	185.258	203.180	12.618	1.786.190	4.146	24.573	2.609	3.588	1.529
2.244.606		0,35	1,34	9,78	5,13	0,13	75,78	0,50	5,14	0,18	1,85	0,04
Conta de Ecossistema de extensão (área Km²) 2010/2016		**435**	**4.333**	**11.845**	**16.523**	**848**	**- 33.869**	**- 8**	**- 197**	**90**	**-**	**-**
Taxa de variação % 2010/2016		5,85	49,76	6,83	8,85	7,20	-1,86	-0,19	-0,80	3,57	0,00	0,00
Conta de Ecossistema de extensão (área Km²) 2010/2012		**77**	**476**	**8.663**	**3.913**	**186**	**- 13.245**	**- 2**	**- 117**	**49**	**-**	**-**
Taxa de variação % 2010/2012		1,04	5,47	5,00	2,10	1,58	-0,73	-0,05	-0,47	1,95	0,00	0,00
Conta de Ecossistema de extensão (área km²) 2012/2014		**285**	**2.300**	**3.695**	**267**	**311**	**- 6.824**	**-**	**- 46**	**12**	**-**	**-**
Taxa de variação % 2012/2014		3,79	25,04	2,03	0,14	2,60	-0,38	0,00	-0,19	0,47	0,00	0,00
Conta de Ecossistema de extensão (área Km²) 2014/2016		**73**	**1.557**	**- 513**	**12.343**	**351**	**- 13.800**	**- 6**	**- 34**	**29**	**-**	**-**
Taxa de variação % 2014/2016		0,94	13,56	-0,28	6,47	2,86	-0,77	-0,14	-0,14	1,12	0,00	0,00

Phytoecological region

Natural capital accounting and valuation of ecosystem services project (NCAVES)

Implementing partners

- United Nations Statistics Division
- United Nations Environment Programme
- (Secretariat of the CBD)

Sponsor

- European Union
- Partnership Instrument

Five partner countries

- Brazil, China, India, Mexico, South Africa

Project duration

- 4 years from 2017-2020

System of Environmental Economic Accounting

United Nations Statistics Division

UN environment

Experimental Ecosystem Accounts

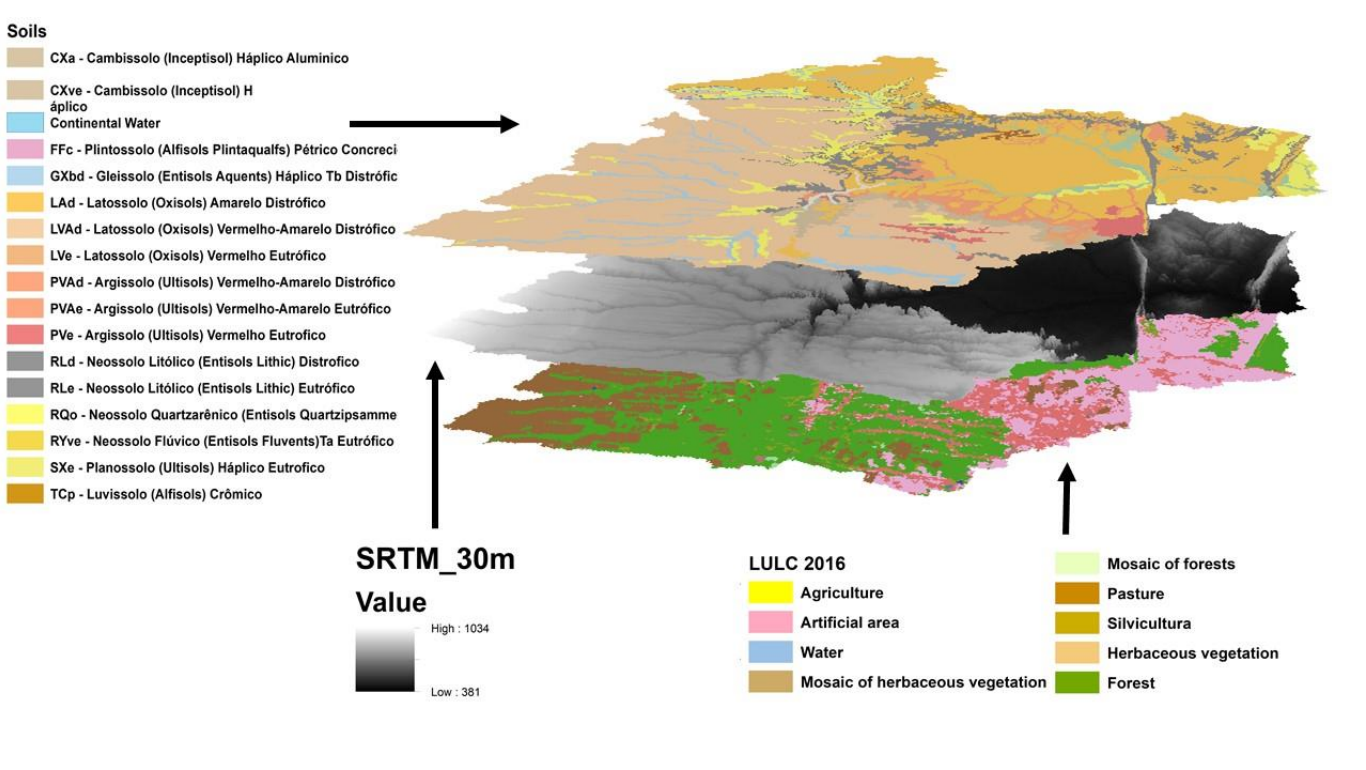
Grande River basin - MATOPIBA region

Ecosystem assets: extension and condition and services

Water flow regulation and soil retention (erosion control)

Ecosystem services such as water provision

Challenge: availability of information by grid cells.



Conclusions

- EEA development requires a joint effort envolving several institutions;
- International aid can help with consultants and budget that governments do not have: the German Cooperation for Sustainable Development through GIZ and United Nations Statistics Division UNSD;
- EEA is a continuous effort that includes improvements through time;
- EEA can provide very important indicators for resources management in a certain region;
- IBGE is uniquely placed because has geospatial + statistics under one roof
- Brazil data rich (as shown by data sources assessment)
- SEEA / NCA important role in underpinning such a framework (e.g. ensures consistency; comprehensiveness etc.)

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