G20

DATA GAPS INITIATIVE 3

Challenges of tagging climate-change related subsidies on existing databases

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What Are The Targets For Recommendation 6?

- Target For Recommendation 6: Develop and disseminate **general government and central government climate-impacting subsidies (climate-sustaining and climate-damaging).**

- Climate-related expenditure identification in Brazil:
  - Growing interest in this data.
  - Information not yet available.

IADB partnership

- Project that offers support on the classification of climate related and biodiversity government expenditure.
- Scope: total general government direct expenditure
- Reliance on COFOG for providing consistent data on climate change expenditure with international comparability.
- Use of detailed budget data.

		Transfer (Project or program)	Double-entry classification: secondary purpose or impact of activity associated with the expenditure					Data attributes				
N.º	Government functions and activities	$	Mitigation (secondary purpose)	Adaptation (secondary purpose)	Mixed (secondary)	Recovery	Emergency	Type of expenditure	Institution	Source of funding	Attribute 1	Attribute 2
1 to 3	General public services, defense, security	125										
	Example: organization of the COP (Conference of the Parties)	-										
4	Economic development	128										
4.1.1	Agriculture	98	x									
	Example: genetically-modified seeds	-										
4.3.5	Electricity	100										
	Example: Energy from oil and gas	50										
	Example: Solar energy	-	x									
	Example: Coal-based energy	60										
5.1	Environment	15										
5.2	Climate change	17										
	Mitigation (primary purpose)	15										
	Adaptation (primary purpose)	2										
6 to 10	Housing, health, recreation, education, social protection	390				x	x					
	TOTAL	1.000										

Source: [A Conceptual Framework for the Classification of Government Spending on Climate Change (iadb.org)]

COFOG - Brazil

- Brazil has a national classification of functions used by the three levels of government, but it cannot be directly mapped to COFOG.

- The adopted methodology for COFOG is an ex-post classification based on multiple budgetary attributes.

- Therefore, our COFOG classification methodology requires detailed databases with multiple attributes, similar to the requirements for the classification of climate related expenditures.

Example of database

Ano	NDD	NDD Descrição	Função	Subfunção	Ação	Ação Descrição	UO Descrição	Saldo	Código GFS	NDD	Ação	COFOG
2022	44905252	VEICULOS DE TRACAO MECANICA	SAUDE	SANEAMENTO BASICO URBANO	21CC	Implantação e Melhoria de Sistemas Públicos de Manejo de Resíduos Sólidos em Municípios de até 50.000 Habitantes, Exclusive em Regiões Metropolitanas (RM) ou Regiões Integradas de Desenvolvimento Econômico (RIDE)	FUNDACAO NACIONAL DE SAUDE	8.988.000,00	3112		7051	7051
2022	44905191	OBRAS EM ANDAMENTO	GESTAO AMBIENTAL	RECURSOS HIDRICOS	15MZ	Construção e adequação de sistemas públicos de esgotamento sanitário em comunidades ribeirinhas	COMPANHIA DE DESENV. DO VALE DO SAO FRANCISCO	8.486.873,50	3111		7052	7052
2022	44404213	A MUNICIPIOS DO ESTADO DO ESPIRITO SANTO	SANEAMENTO	SANEAMENTO BASICO URBANO	00TM	Apoio a Empreendimentos de Saneamento Integrado em Municípios com População Superior a 50 mil Habitantes ou Municípios Integrantes de Regiões Metropolitanas ou de Regiões Integradas de Desenvolvimento	MIN. DA INTEGR. E DO DESENVOLVIMENTO REGIONAL	5.489.702,78	2632		7052	7052
2022	44504201	INSTITUICOES DE CARATER ASSIST. OU CULTURAL	SAUDE	SANEAMENTO BASICO URBANO	20AM	Implementação de Projetos de Coleta e Reciclagem de Materiais	FUNDACAO NACIONAL DE SAUDE	3.452.507,99	2822		7051	7051

Obstacles

- Large number of budget activities to be classified, mainly for States and Municipalities.
- Lack of databases with the necessary attributes for classification.
- Little clarity in the description of activities and government entities.
- Need for several adjustments to guarantee the quality of the classification (e.g. water and sewage).

AI model

- For States and municipalities, the challenge is even bigger:
  - Approximately 160,000 rows from the annual State base and 1,800,000 rows from Municipalities for manual classification (2015)
  - Bases do not follow a regular standard
  - Small team

- Solution: **artificial intelligence**, with a method that involves the use of a probabilistic text classification model based on machine learning techniques, specially developed to categorize government expenditure according to COFOG.

AI model

- The model is built on an architecture of Convolutional Neural Networks (CNN) and Gated Recurrent Unit (GRU).
- The model was trained using a database that was previously classified manually.
- It extracts characteristics from texts, identifying relevant patterns such as combinations of words or key phrases.
- The model was initially implemented for data from States, reaching an impressive accuracy score of 0.98.
- The introduction of the AI solution drastically reduced the time required for the COFOG classification for State public expenditures, from 1000 hours to just 8 hours, making the process 125 times faster and 12,400% more efficient.

Next steps

- Apply the AI model to the extended matrix of COFOG, with the classification of climate change related expenditures.
- This requires a database with the extended expenditure classification, which will be done with the IADB assistance.
- That will be done on the same database used for COFOG classification, ensuring consistency with other statistics.

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