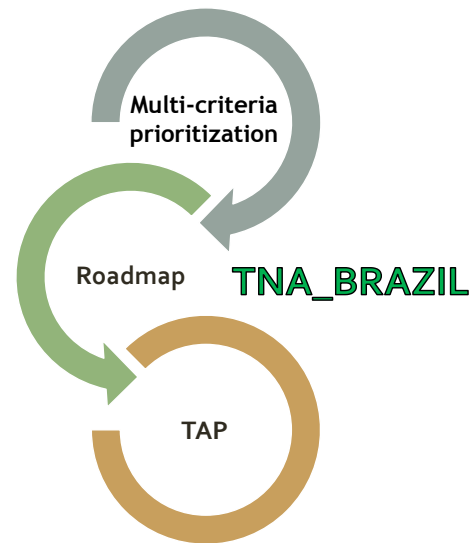


Technology Needs Assessment for the Implementation of Climate Action Plans in Brazil (TNA_BRAZIL)



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This is a preliminary document of the TNA_BRAZIL Project, which aims to establish a national consensus to elaborate a Technology Action Plan (TAP), considering key technologies and priority sectors for compliance with the NDC mitigation targets and the Brazilian strategy for GCF.

Project summary

- ▶ Title: Technology Needs Assessment for the Implementation of Climate Action Plans in Brazil (TNA_BRAZIL)
- ▶ Funding: Green Climate Fund (GCF)
- ▶ National executing entity: CGCL/MCTIC
- ▶ Implementing entity: UNEP
- ▶ Budget: USD 700,000

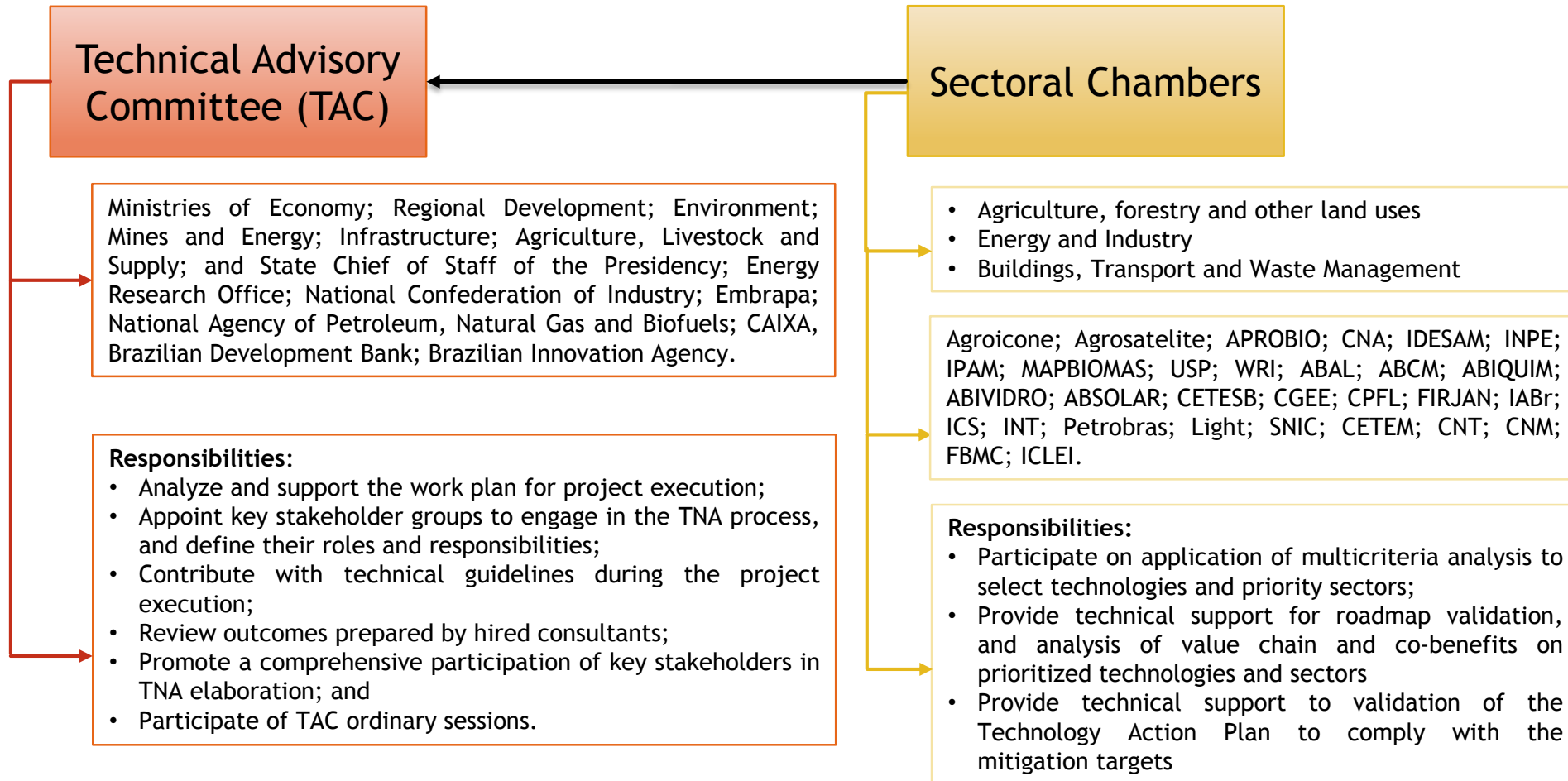
Project activities

- ▶ **Activity 1:** Establish an effective coordination mechanism for elaboration and implementation of the TNA process (until 11/2020)
- ▶ **Activity 2:** Identification and prioritization of sectors and technologies to mitigate GHG emissions, in view of the NDC compliance and the Brazilian strategy for GCF (April to September/2019)
- ▶ **Activity 3:** Elaborate roadmaps, and analysis of value chain and co-benefits, for priority technologies implementation (October to March/2020)
- ▶ **Activity 4:** Development and validation of the Technology Action Plan for building of local content to priority technologies (April a September/2020)

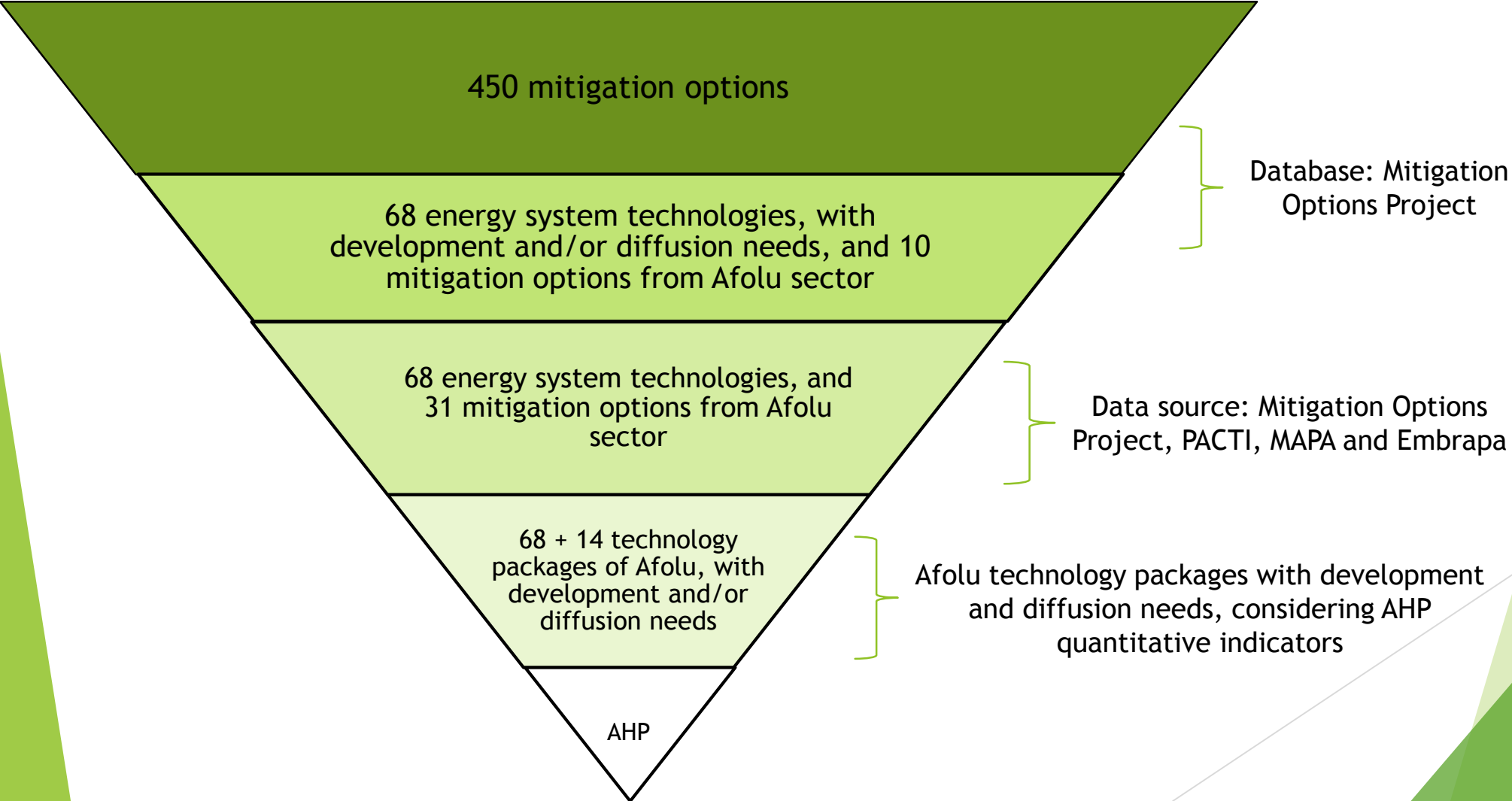


Aiming to elaborate a TAP for increase diffusion and development, preferentially building local content as well as improving capacities to funding access for sectoral priority technologies.

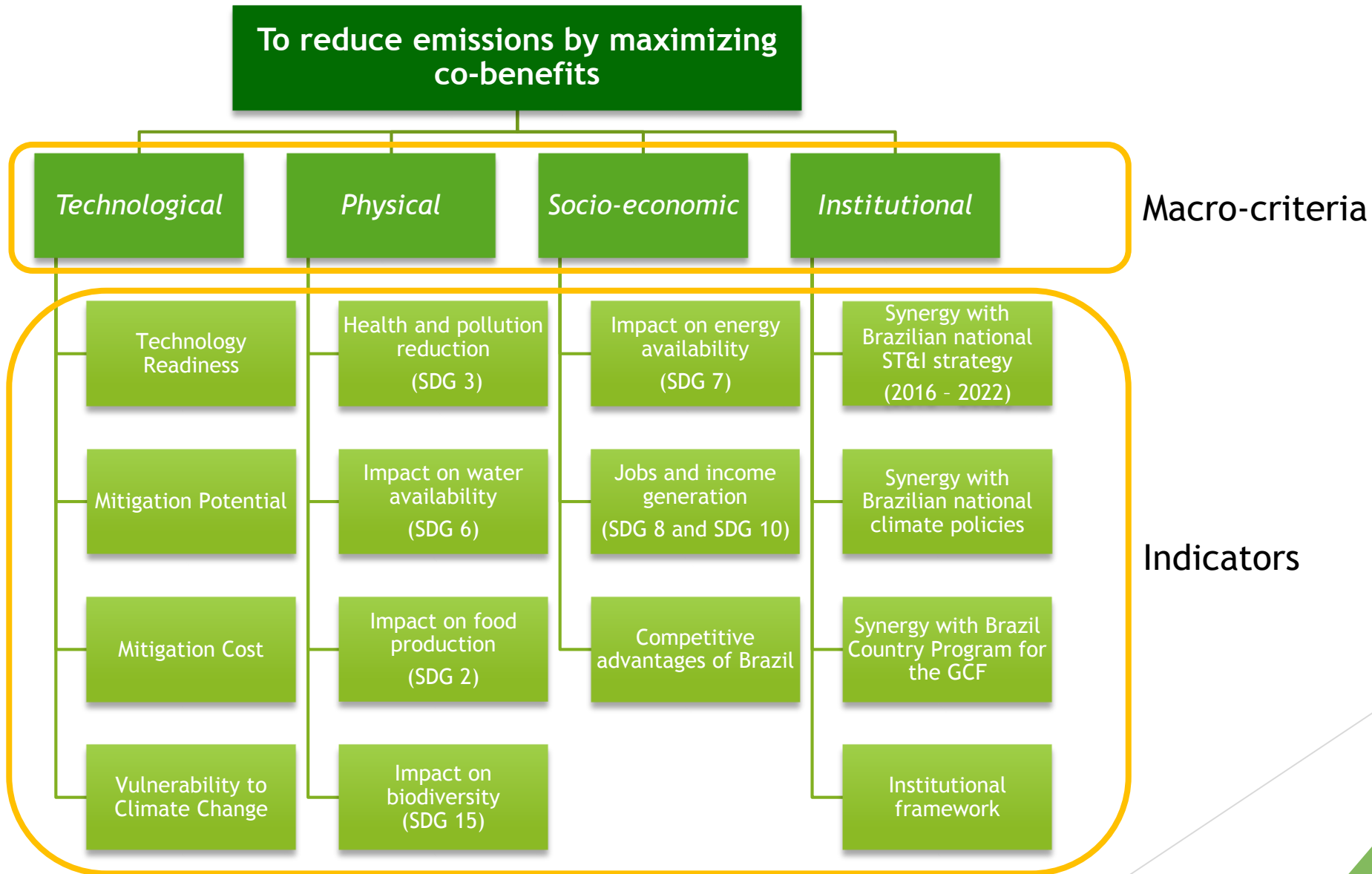
Stakeholder engagement method



Identification and prioritization of sectors and technologies to mitigate GHG emissions



Multi-criteria (AHP) analysis



Technological macro-criterion



Engineering-level characteristics of the technologies

- **Technology readiness (TRL):** represents the maturity status of the technologies globally, i.e. whether its applications are still on lab scale (low) or are already commercial (high)
- **Mitigation potential:** technology's GHG emission reduction potential related to the current practices
- **Mitigation cost:** cost of the technology per unit of CO₂ mitigated (US\$/tCO₂)
- **Vulnerability to climate change:** reflects how the technology is exposed to the expected effects of climate change (e.g. mean temperature increase, sea level rise, variability of renewable resources and increased risk of extreme climate events) compared to the current practices

Physical macro-criterion



Impacts of the technology on the physical environment

- **Health and pollution reduction (SDG 3):** impacts of the technology regarding pollutants generation throughout the production chain
- **Impact on water availability (SDG 6):** impacts of the technology regarding the availability of water resources for society
- **Impact on food production (SDG 2):** impacts of the technology on agriculture, land use and food security
- **Impact on biodiversity (SDG 15):** effects of the technology on the life on land

Socio-economic macro-criterion



Effects of the technology adoption on **social and economic** conditions

- **Impact on energy availability (SDG 7):** impact of the technology on the amount of energy available to society, energy resources use efficiency, renewable energy promotion, energy access and energy infrastructure modernization
- **Jobs and income generation (SDG 10 and SDG 8):** potential impacts of the technology on social inequalities reduction in Brazil, focusing on jobs creation and income generation
- **Competitive advantages of Brazil:** assessment of how the technology can be benefited from being adopted in Brazil, given advantages of production factors in the country (K, L and NR) and the national competence (scientific and technological centers, experience and ongoing R&D)

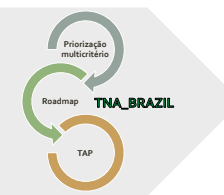
Institutional macro-criterion



Brazilian institutional aspects of the technologies

- **Synergy with Brazilian National Strategy for ST&I (2016 - 2022):** technology's fitting in the scope of the Brazilian National Strategy for Science, Technology and Innovation 2016 - 2022
- **Synergy with Brazilian National Climate Policies:** technology's position within the scope of the national climate policies framework (NDC, RenovaBio, Low-Carbon Agriculture Plan - ABC, National Climate Change Program)
- **Synergy with Brazil Country Program for the GCF:** technology's position within the scope of "Brazil Country Program for the GCF"
- **Institutional framework:** feasibility of the technology implementation beneath the current Brazilian institutional framework, considering the existence of legal instruments, taxes incidence, barriers (economic, market, institutional, cultural) and market and government failures

Electronic Questionnaire and AHP



Em sua opinião, para o objetivo de reduzir emissões com a geração do máximo de cobenefícios, o indicador "PRONTIDÃO TECNOLÓGICA", em relação aos demais indicadores tecnológicos listados, é: *

	Muito menos importante	Menos importante	Igualmente importante	Mais importante	Muito mais importante
Potencial de mitigação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Custo de mitigação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vulnerabilidade a mudanças do clima	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Stakeholders

	TEC PT	TEC PM	TEC CM	TEC VC	FIS SP	FIS AG	FIS AL	FIS BD	SEC EN	SEC ER	SEC VB	INT CT	INT ND	INT GF	INT AI	Line Sum	Weight Indicator	Coefficient Indicator
PT	3,0	3,1	3,0	3,1												12,2	0,25	0,06883
PM	2,9	3,0	3,2	3,4												12,5	0,26	0,07083
CM	3,0	2,8	3,0	3,5												12,3	0,26	0,06954
VC	2,9	2,6	2,5	3,0												11,0	0,23	0,06235
SP					3,0	2,7	2,8	3,1								11,5	0,24	0,06164
AG					3,3	3,0	3,6	3,5								13,5	0,28	0,07198
AL					3,2	2,4	3,0	3,3								11,9	0,25	0,06331
BD					2,9	2,5	2,7	3,0								11,1	0,23	0,05941
EN									3,0	2,9	3,1					9,0	0,33	0,07054
ER									3,1	3,0	3,5					9,7	0,36	0,07576
VB									2,9	2,5	3,0					8,3	0,31	0,06531
CT												3,0	2,8	3,1	2,4	11,3	0,23	0,05922
ND												3,2	3,0	3,5	2,6	12,2	0,25	0,06425
GF												2,9	2,5	3,0	2,2	10,6	0,22	0,05593
AI												3,6	3,4	3,8	3,0	13,9	0,29	0,07279

AHP

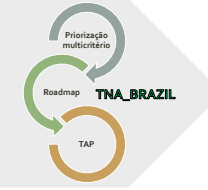
	PT	PM	CM	VC	SP	AG	AL	BD	EN	ER	VB	CT	ND	GF	AI
Silvicultura de nativas aplicadas à restauração	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Veículo Híbrido Flex	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Monitoramento do desmatamento e da restauração florestal	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Aproveitamento da vinhaça e de resíduos agrícolas	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Plantios mistos (exóticas e nativas)	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Veículos Elétricos a Pilha a Combustível a Etanol	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Conservação e melhoramento genético de nativas	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Melhoramento genético florestal	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Sistemas de validação do Cadastro Ambiental Rural	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Silvicultura de precisão	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Sistemas de certificação de cadeias livres de desmatamento	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Solar fotovoltaica em reservatórios	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

Technology Analysts

Ordem	Tecnologia	Código	Nota
1	Silvicultura de nativas aplicadas à restauração	A9	4,444
2	Veículo Híbrido Flex	T6	4,283
3	Monitoramento do desmatamento e da restauração florestal	A11	4,162
4	Aproveitamento da vinhaça e de resíduos agrícolas	R5	4,121
5	Plantios mistos (exóticas e nativas)	A7	4,111
6	Veículos Elétricos a Pilha a Combustível a Etanol	T16	4,000
7	Conservação e melhoramento genético de nativas	A10	3,949
8	Melhoramento genético florestal	A8	3,939
9	Sistemas de validação do Cadastro Ambiental Rural	A12	3,899
10	Silvicultura de precisão	A6	3,859
11	Sistemas de certificação de cadeias livres de desmatamento	A13	3,838
12	Solar fotovoltaica em reservatórios	E13	3,808
13		B1	3,747
14	Melhoramento genético animal	A3	3,737
15		A1	3,657
16	Veículos Elétricos a Pilha a Combustível a Etanol	T13	3,596
17	Biodigestão de resíduos agrícolas	R2	3,586
18		A2	3,576
19	Compostagem de resíduos agrícolas	T1	3,566
20	Indústria de cimento	I20	3,545
21	Trens: Eletrificação parcial ou total	T7	3,535
22	Produção de eletricidade a partir do biogás com microturbinas	R1	3,515
23	Melhoramento genético animal	A4	3,515
24	Cimento geopolimérico	I2	3,515
25	Suplementação nutricional, incluindo creep-feeding	A5	3,475
26	Centrais microgeradoras renováveis: microturbinas eólicas, OPV e células de filmes finos	B2	3,455
27	Materiais inovadores à base de cimento	I3	3,444
28	Diesel biocombustível	E17	3,434
29	Usinas reversíveis	E8	3,404
30	Etanol de segunda geração	E16	3,394

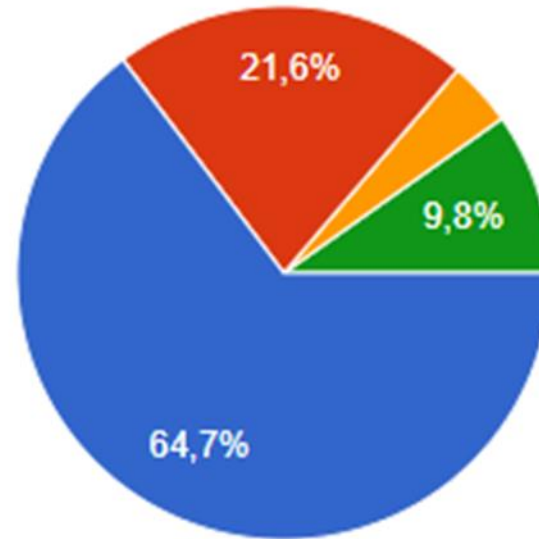
Technology Priorization Ranking

Stakeholders



48
Answers

3
Rounds

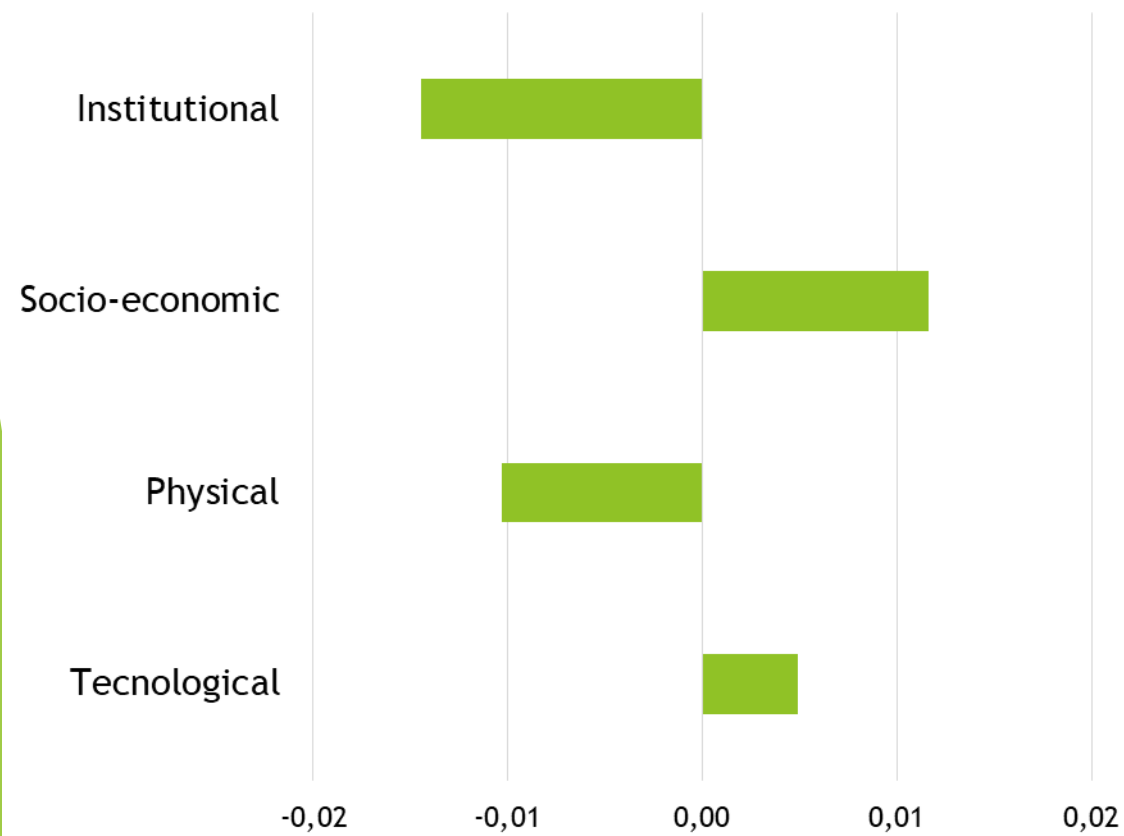


- Public sector
- Private sector
- Third sector
- Academia

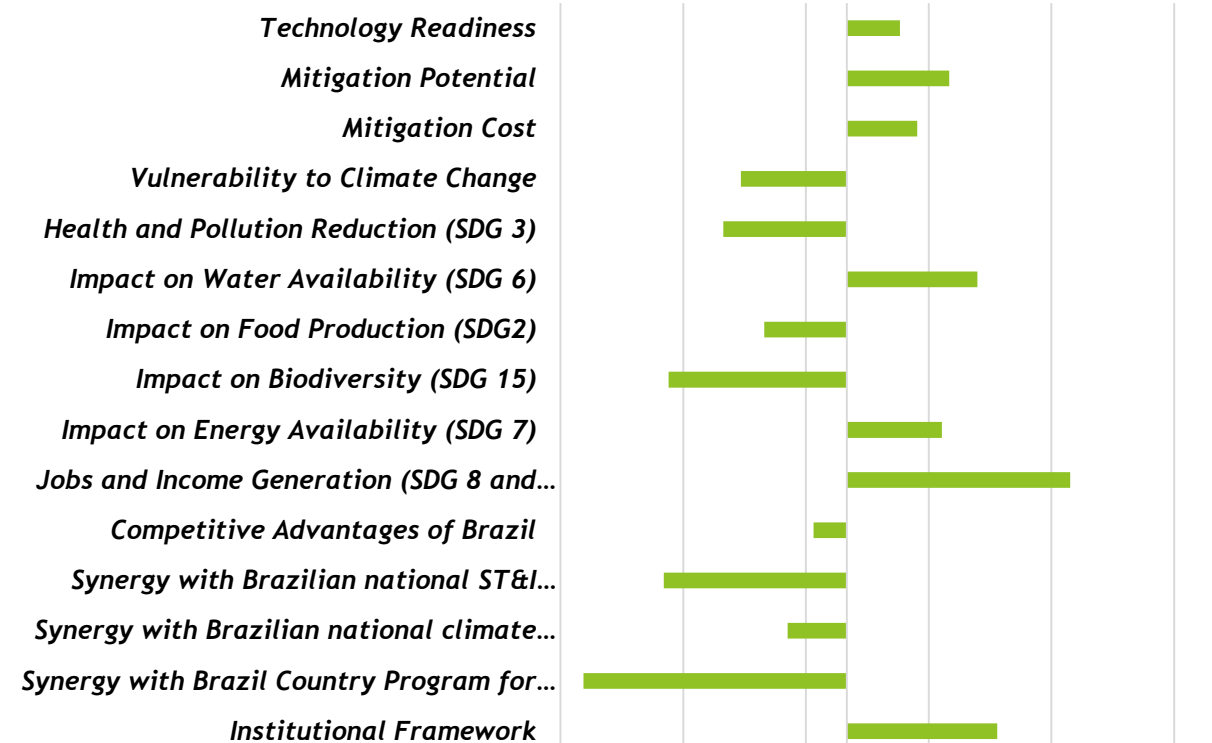
Weighting indicators and Criteria



Macro-criteria

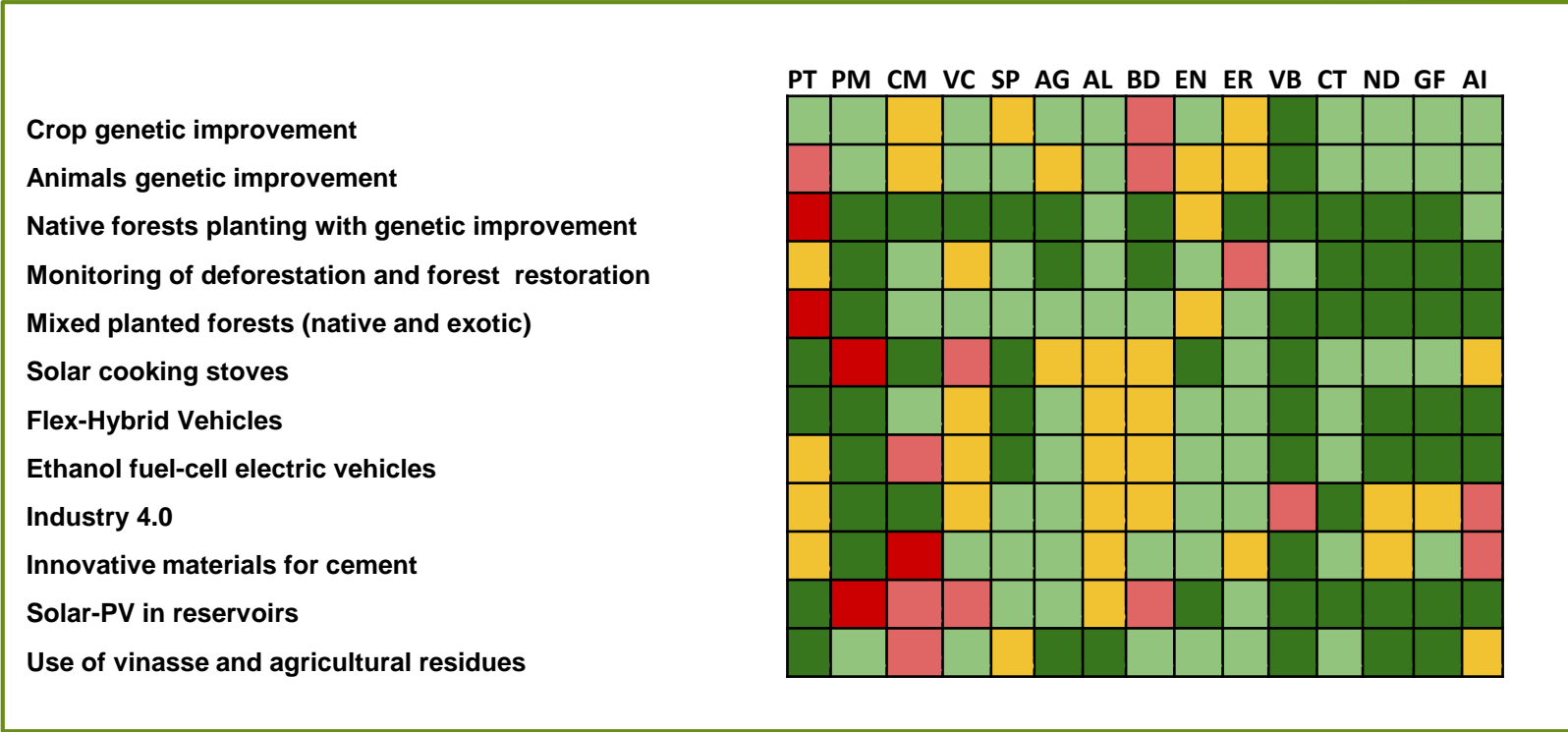


Indicators



Prioritized sectors and technologies

-  **AFOLU: 5**
-  **Industry: 2**
-  **Energy: 1**
-  **Transports: 2**
-  **Residues: 1**
-  **Buildings: 1**



Thanks!

Gracias!

Obrigado!

tna@mctic.gov.br

