Sustainable Agribusiness and a Strategic Agenda: The Case of Brazil

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1st edition

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“Brazil is ahead as one of the most sustainable suppliers of food, bioenergy, and other agricultural products.
Brazilian agribusiness is part of the solution to environmental issues and a vanguard of decarbonization. The objective of this study is to show some numbers, share ideas and opportunities for the development of the planet **with 10 questions**”

PROF. DR. MARCOS FAVA NEVES

Question 1:

Did Brazil go from a food importer in the seventies to a major world exporter ?

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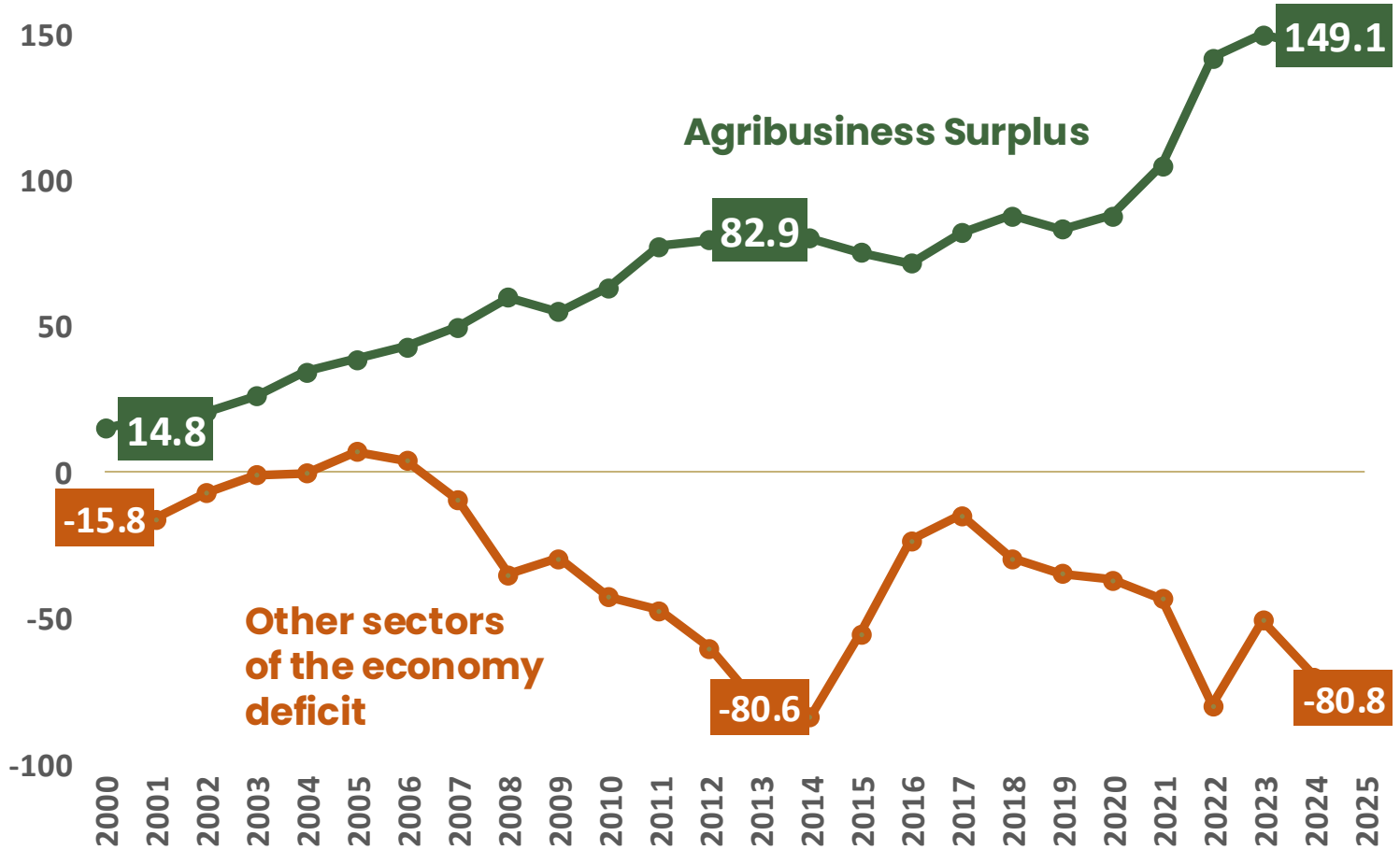
Brazilian trade balance (2025): surplus of US$ 68.3 billion
Without agribusiness: deficit of US$ 80.8 billion

BRAZIL'S TRADE BALANCE: AGRIBUSINESS AND OTHER SECTORS

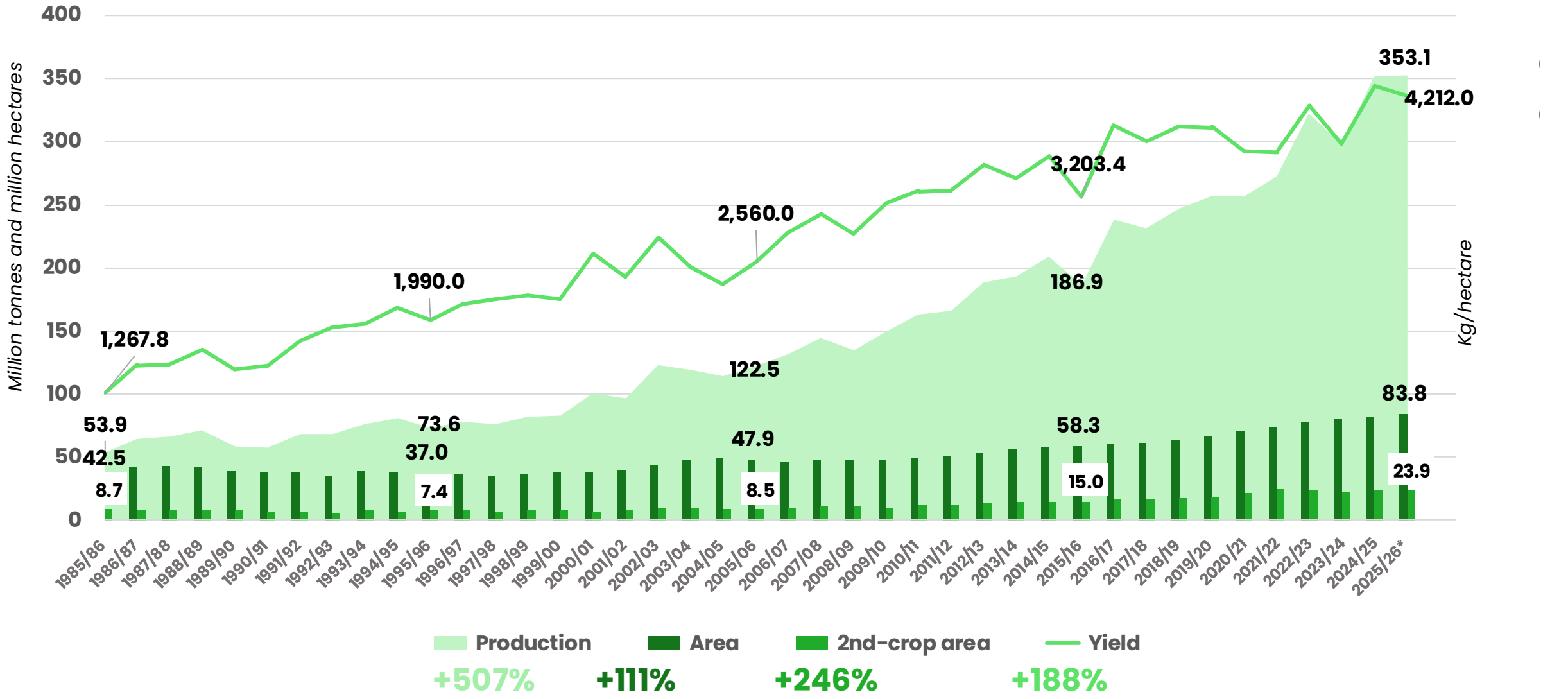
US$ billion



	2005	2015	2025	Total
Agro Exports	43,6	88,2	**169,2**	+ 288%
Agro Imports	5,1	13,1	**20,2**	+ 296%
Balance	**38,5**	**75,1**	**149,0**	**+ 287%**

Source: Prof. Marcos Fava Neves based on Secex/ME and MAPA.

Brazil: Increase in Grain Production, Planted Area and Yield since 1985



Source: Prof. Marcos Fava Neves and Vinícius Cambaúva based on Companhia Nacional de Abastecimento (Conab)
2nd crop (Safrinha): 2nd- and 3rd-crop plantings + winter crops (oats, canola, rye, barley, wheat, and triticale).

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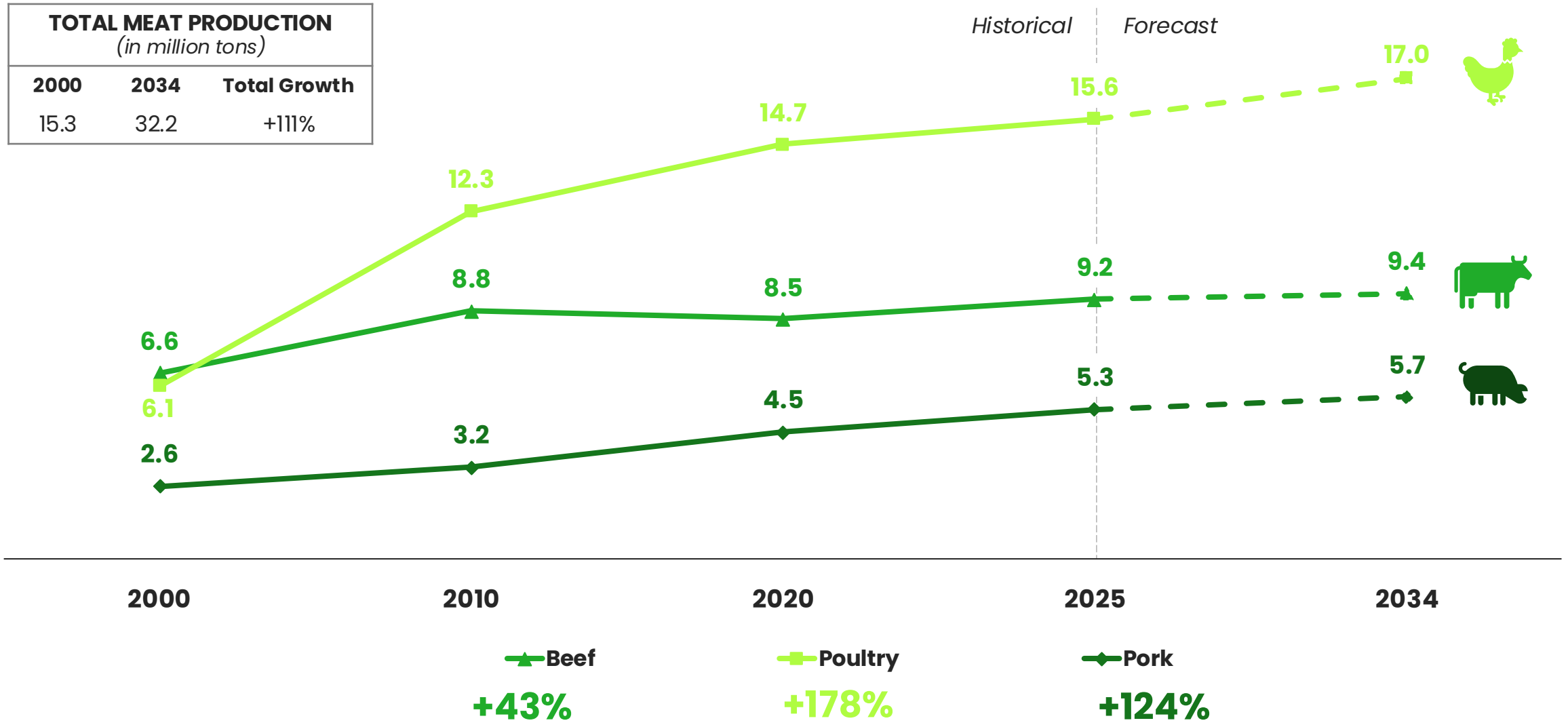
Meat Production in Brazil from 2000 to 2034

TOTAL MEAT PRODUCTION (*in million tons*)		
2000	**2034**	**Total Growth**
15.3	32.2	+111%



Source: Prof. Marcos Fava Neves based on FAO DATA.

Most Relevant Products and Markets for Brazilian Agribusiness

TOP 10 AGRIBUSINESS PRODUCTS EXPORTED BY BRAZIL

US$ billion

°	Products	2005	2015	2025
1	Soybean Complex	9,43	27,96	52,89
2	Meat (Beef, Pork and Poultry)	8,18	14,68	31,80
3	Paper and pulp (forestry products)	7,20	10,33	16,52
4	Coffee	2,93	6,16	16,08
5	Sugar and Alcohol Complex	4,70	8,53	15,06
6	Cereals, Meals and Preparations (Corn)	0,30	5,88	10,12
7	Cotton and Textile Products	1,53	1,78	5,32
8	Juices	1,19	2,05	3,50
9	Tobacco	1,71	2,19	3,39
10	Other Animal Products	0,28	0,63	2,05
11	* Others	6,15	7,99	12,49
	Total	**43,585**	**88,168**	**169,229**

TOP 15 IMPORTERS OF BRAZILIAN AGRIBUSINESS PRODUCTS

US$ billion

°	Countries	2005	2015	2025
1	China	3,08	21,263	55,30
2	European Union	13,29	16,890	25,21
3	USA	5,97	6,464	11,40
4	Vietnam	0,04	2,016	3,59
5	Japan	1,72	2,525	3,26
6	Egypt	0,51	1,772	3,24
7	Turkey	0,21	558	3,23
8	Indonesia	0,28	1,513	3,22
9	India	0,59	1,260	3,21
10	Mexico	0,27	641	3,14
11	Iran	0,78	1,661	2,92
12	Saudi Arabia	0,80	2,256	2,88
13	United Arab Emirates	0,49	1,317	2,67
14	Bangladesh	0,16	1,089	2,67
15	Thailand	0,42	1,443	2,57

Source: Prof. Marcos Fava Neves and Vinícius Cambaúva based on Secex/ME and MAPA.

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Brazil's Market Positions and Shares in Global Agribusiness Trade

Agribusiness Product	World Production			World Exports			Brazil's Market Share (%) in World Exports
	1º	2º	3º	1º	2º	3º	
Orange Juice	Brazil	Mexico	USA	Brazil	Mexico	EU	74%
Soybeans	Brazil	USA	Argentina	Brazil	USA	Paraguay	59%
Sugar	Brazil	India	EU	Brazil	Thailand	India	56%
Chicken Meat	USA	China	Brazil	Brazil	USA	EU	36%
Beef	Brazil	USA	China	Brazil	Australia	India	31%
Coffee	Brazil	Vietnam	Colombia	Brazil	Vietnam	Colombia	31%
Tobacco	China	Mexico	Brazil	Brazil	Zimbabwe	China	31%
Cellulose	USA	Brazil	China	Brazil	USA	Canada	29%
Cotton	China	India	Brazil	Brazil	USA	Australia	28%
Corn	USA	China	Brazil	USA	Brazil	Argentina	24%
Ethanol	USA	Brazil	China	USA	Brazil	Pakistan	23%
Pork Meat	China	EU	USA	USA	EU	Brazil	15%

Source: Prof. Marcos Fava Neves based on USDA, FAO, MAPA, Citrus BR and IBA. Data from 2024 and 2025

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Question 2:

In which aspects do Brazilian agribusiness stand out in sustainability ?

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The Hand of Sustainability in Brazilian Agribusiness

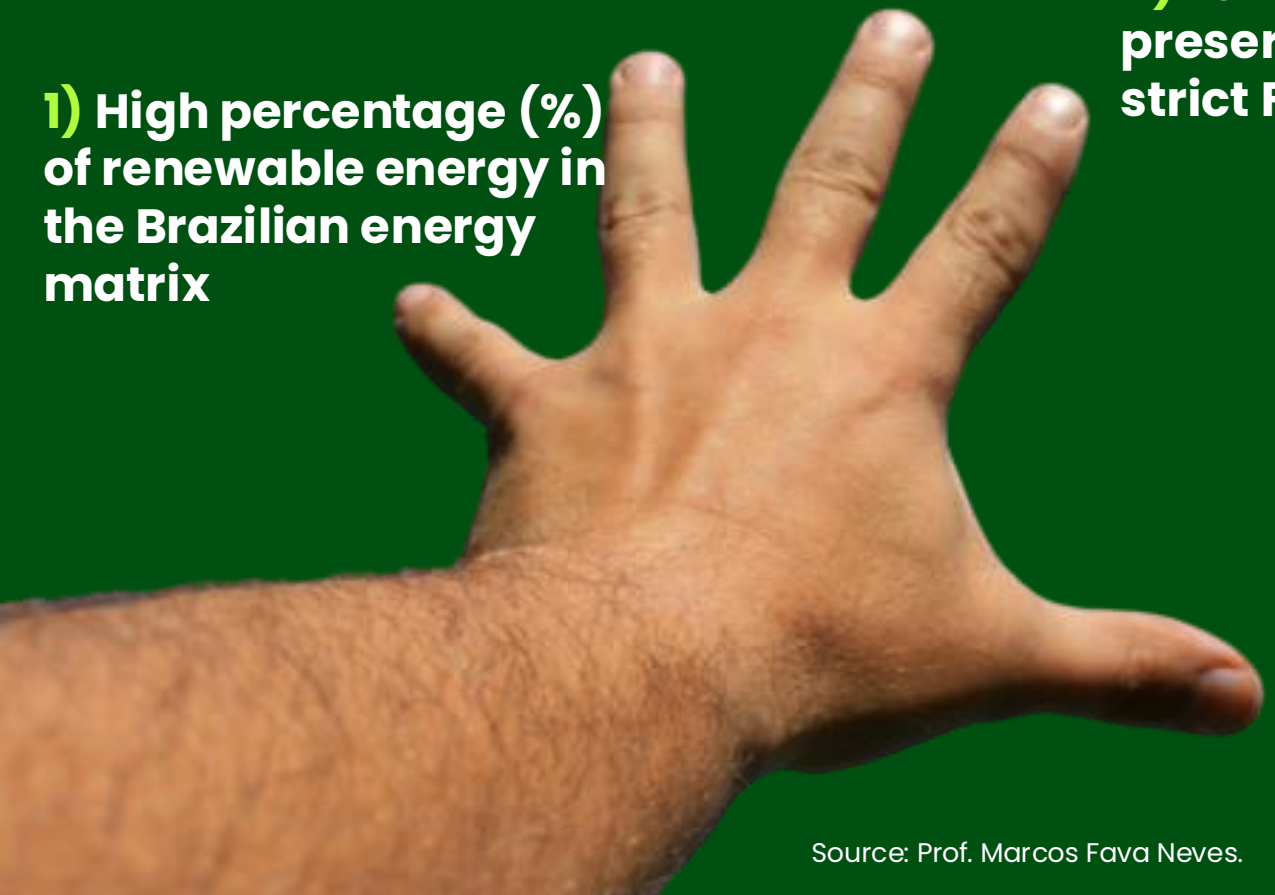
5 topics that demonstrate the strength of sustainability in agriculture and livestock in Brazil

2) High percentage (%) of biofuel use in the fuel matrix

3) Low relative CO_2 emissions per capita

4) Low percentage (%) of land use, high number of preserved areas, reforestation and the presence of a strict Forestry Code

1) High percentage (%) of renewable energy in the Brazilian energy matrix



Source: Prof. Marcos Fava Neves.

5) Innovations and Clean Technologies

- Integrated crop-livestock-forestry (ICLFS);
- Integrated cultivation systems;
- No-tillage system with straw coverage (NTS);
- Planted forests and reforestation;
- Successive cultivation and rotation; up to 3 harvests in the same area;
- Recovery of degraded pastures;
- Regenerative agriculture and circular agriculture;
- Garbage treatment and recycling;
- Bioinputs and biological control;
- Precision agriculture (management per m2);
- Artificial intelligence (AI) in crops;
- Animal waste management;
- Irrigation and controlled systems;
- Intensive termination of animals.
- Solar panels and biogas/biomethane;
- Others...

Adoption Level of Sustainable Practices in Agricultural Countries
(McKinsey)

% of respondents currently adopting the technology[1]

0 <10% 10-39% 40-59% 60-80% >80%

Crop Rotation	68	87	93	71	65	77	23	48
No-Till Farming	56	78	84	56	97	78	42	6
Precision Agriculture	40	56	56	53	68	38	7	3
Use of Bioinputs	38	23	14	41	67	21	35	11
Cover Crops	33	49	24	58	58	37	16	7

Source: McKinsey Global Farmer Insights and "Fórum Brasileiro da Agricultura Tropical", [1]Survey question: "What is your level of adoption of the following practices?"(Adoption implies using a given sustainable practice in any part of the operation and does not necessarily mean it is used on 100% of the farm area.)

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Question 3:

Which are Brazil's indicators in relation to land use and preservation ?

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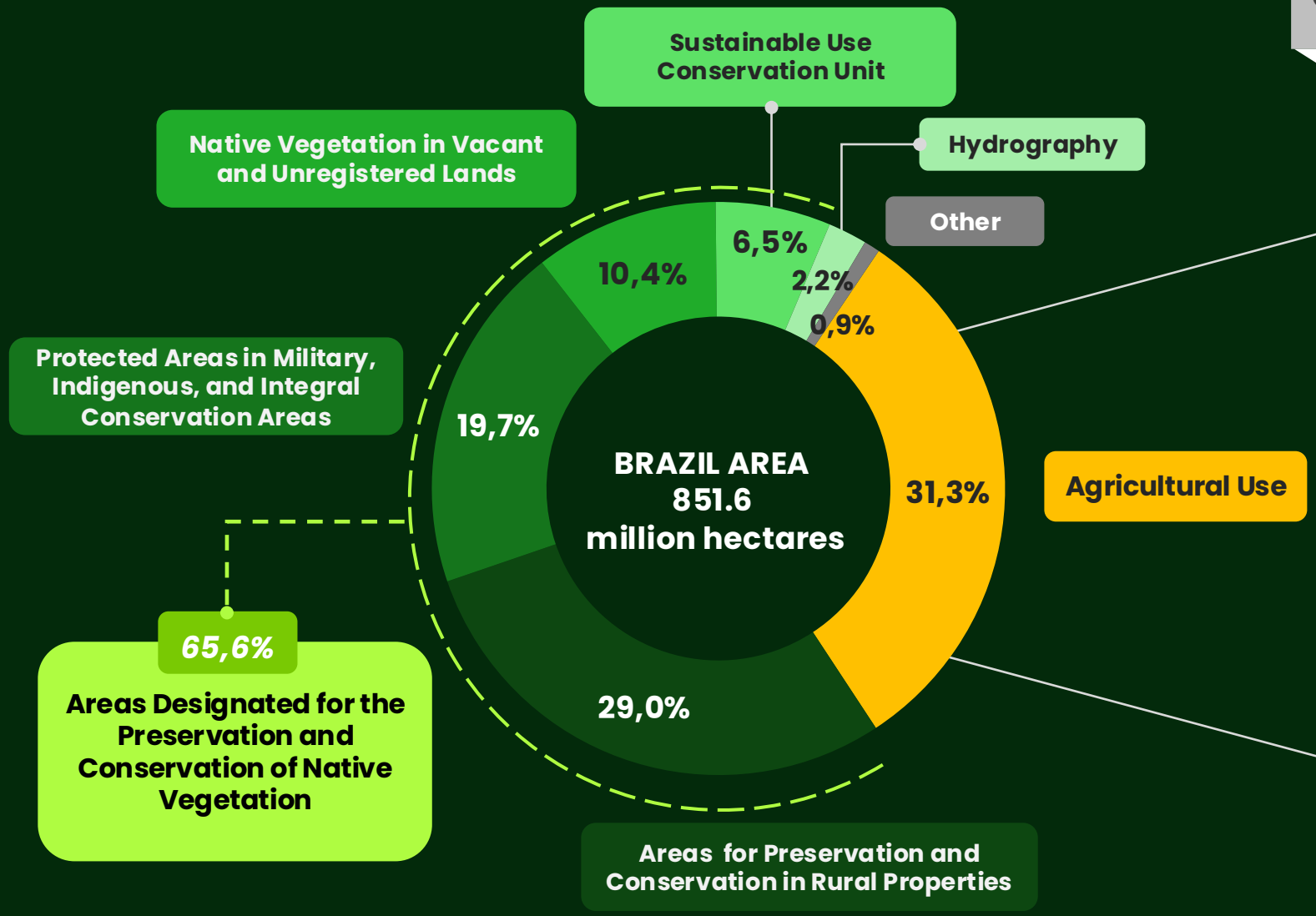
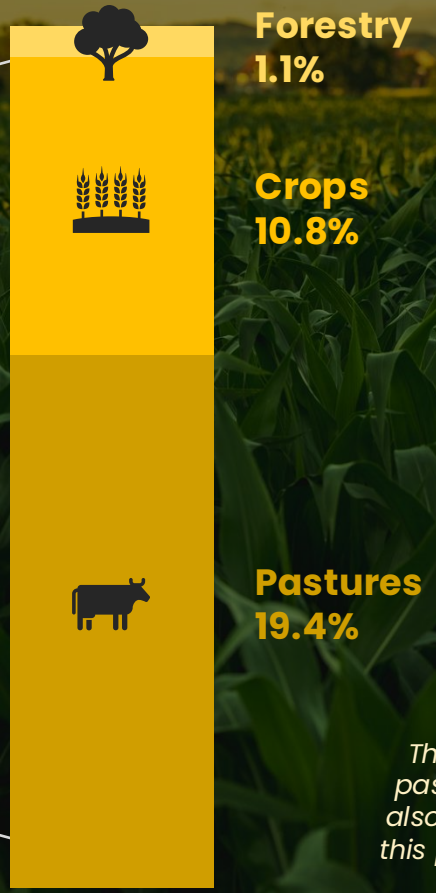
LAND USE IN BRAZIL WITH DATA FROM EMBRAPA TERRITORIAL



CROP AND LIVESTOCK AREA IN BRAZIL



The degraded pasture area is also included in this percentage.

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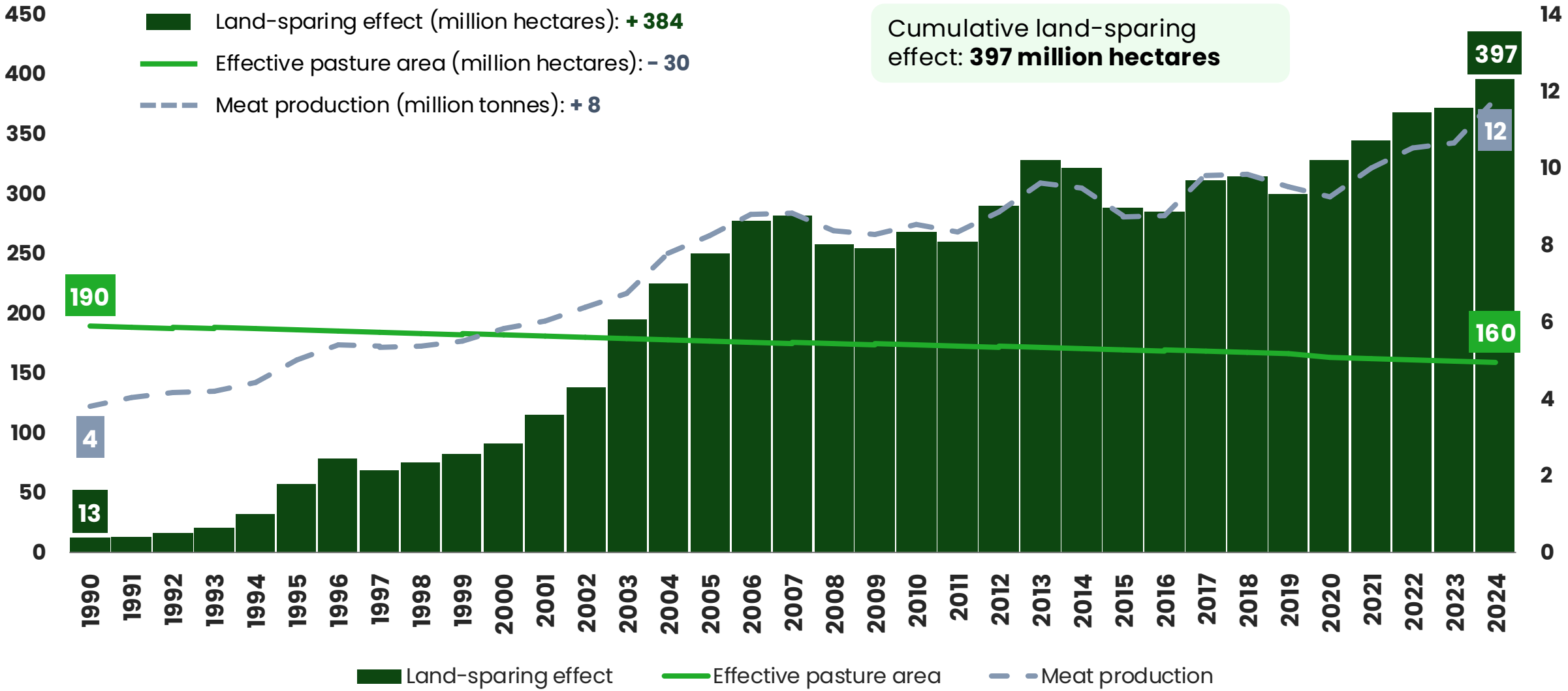
Source: elaborated based on Embrapa Territorial.

Pastures and Meat Production in Brazil from 1990 to 2024



Source: prepared based on Athenagro, IBGE, Lapig, Embrapa Territorial, INPE, Rally da Pecuária and "Fórum Brasileiro da Agricultura Tropical".

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Question 4:

How Circular Agriculture Can Shape the Future of Production

?

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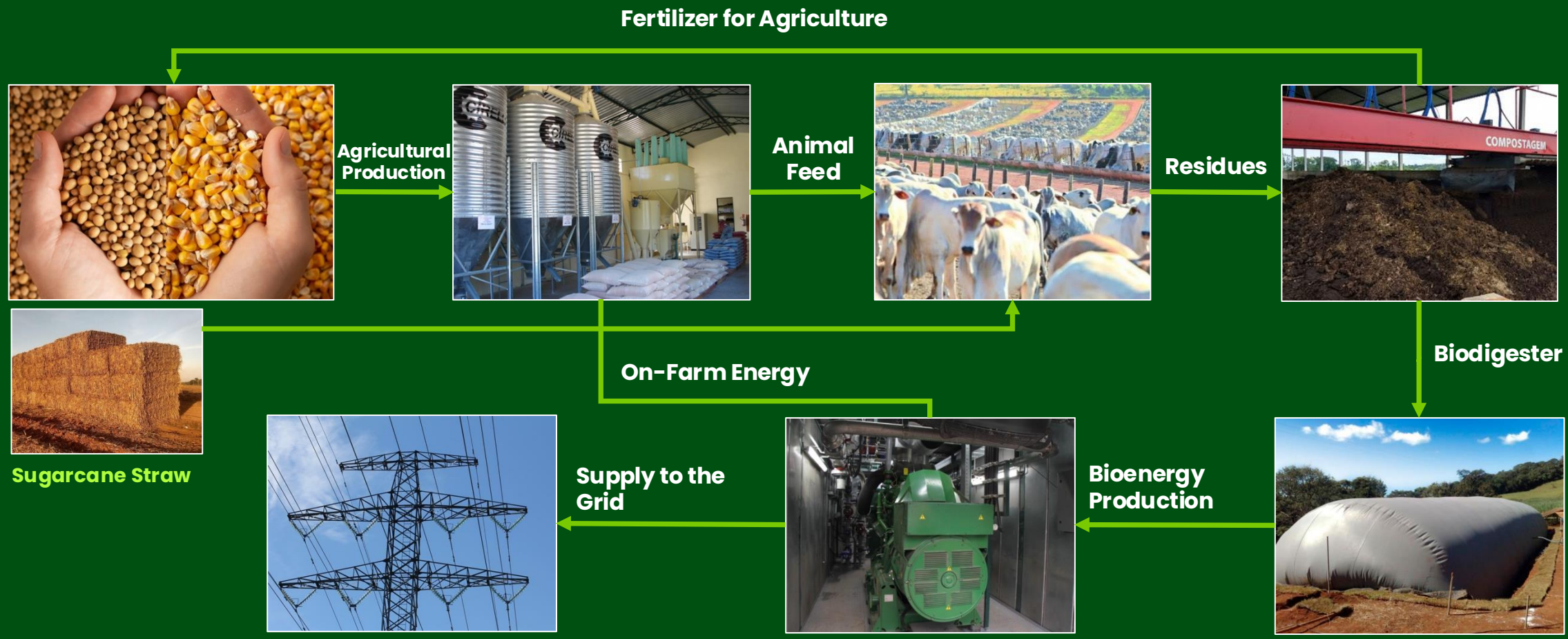
Circular Agribusiness Driving Sustainability

Integration example: grain production, animal feed, feedlots, biofertilizers, bioelectricity generation, and regenerative agriculture



Source: Prof, Marcos Fava Neves and Vinícius Cambaúva.

Question 5:

How is Brazil doing in terms of renewable energy use?

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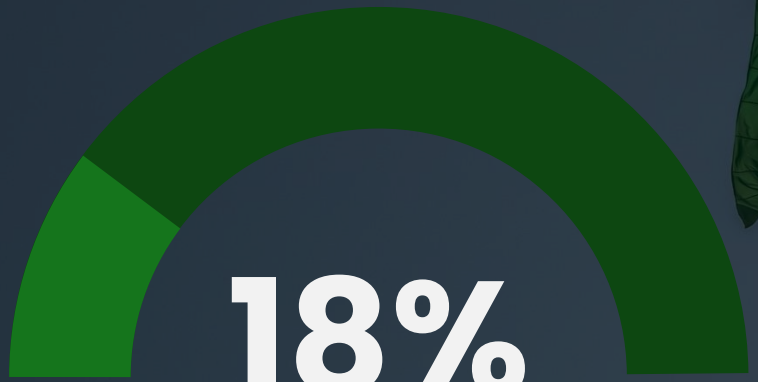
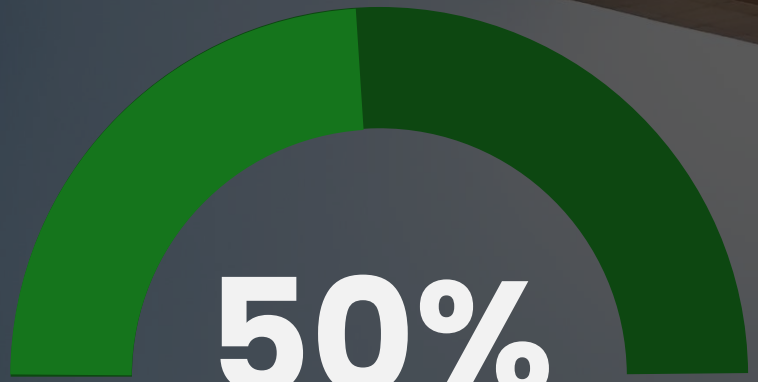
GLOBAL AND BRAZILIAN ENERGY MIX



18%

*Share of renewables in the **global** energy mix...*

X



50%

*...while **Brazil** gets half of its energy mix from renewable sources.*

Of this total, renewable energy sources originating from agriculture account for 33.3%, including sugarcane biomass, firewood and charcoal, black liquor, and other sources.

Source: Prof Marcos Fava Neves and Vinícius Cambaúva based on Irena, and Empresa de Pesquisa Energética (EPE).

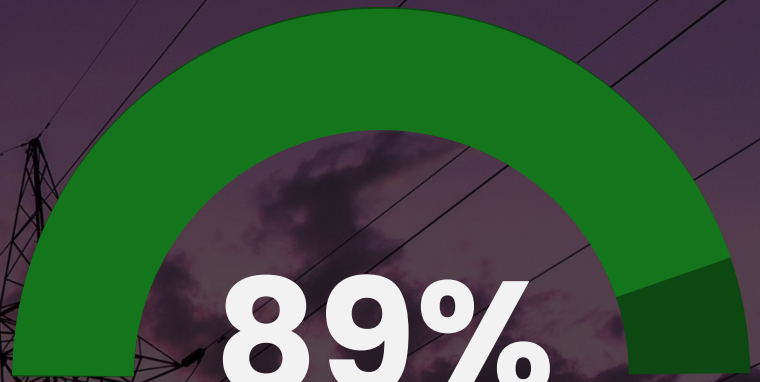
GLOBAL AND BRAZILIAN ELECTRICITY MIX
(ELECTRICITY PART IN TOTAL ENERGY)

Brazil has the highest share of renewable sources in electricity generation among G20 countries

30%

*Share of renewables in the **global** electricity mix...*

X



89%

*...while **Brazil** gets nearly 90% of its electricity from renewable sources.*

Source: Prof, Marcos Fava Neves and Vinícius Cambaúva based on Irena and Empresa de Pesquisa Energética (EPE).

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Question 6:

How Biofuels Are Driving the Energy Transition

?

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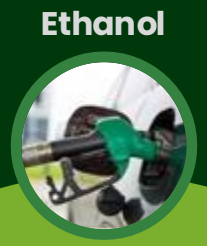
Possibilities of Energy Transition

ENERGY TRANSITION MATRIX

Hydropower


Ethanol

Biodiesel

Biomethane

Sustainable Aviation Fuel (SAF)

Green Hydrogen

Biogas

Biomass Electricity

Solar Energy

Wind Energy

BIOENERGY TYPES

- Biofuels
- Bioelectricity

BIOENERGY SOURCE

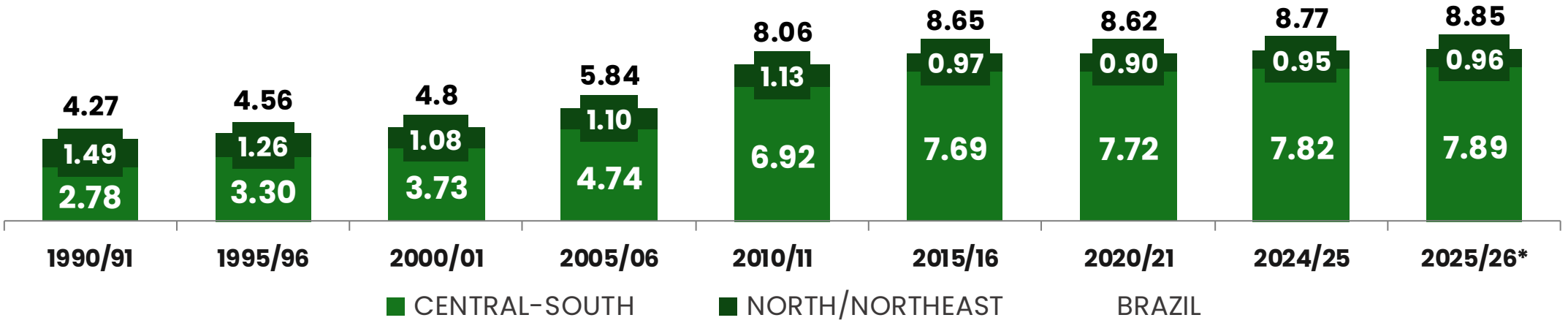
- Biomass
- Solar
- Wind
- Hydro

Source: Prof. Marcos Fava Neves and Vinícius Cambaúva.

The Historical Contribution of Sugarcane to Decarbonization in Brazil

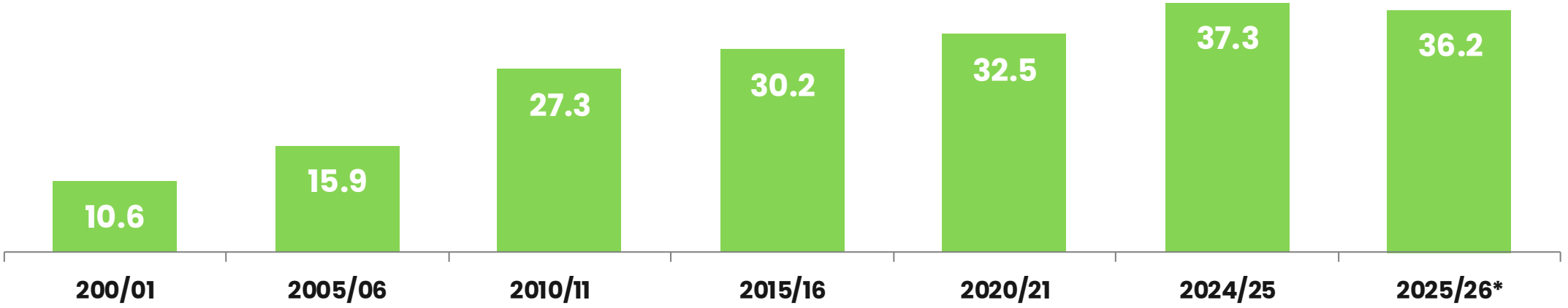
EVOLUTION OF THE AREA HARVESTED WITH SUGARCANE IN BRAZIL

In million hectares



EVOLUTION OF ETHANOL PRODUCTION IN BRAZIL

In billion liters

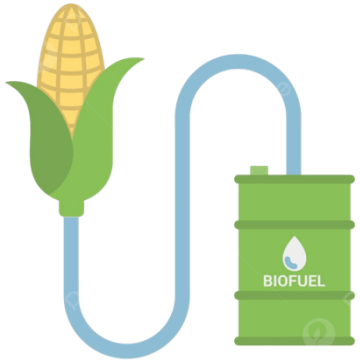


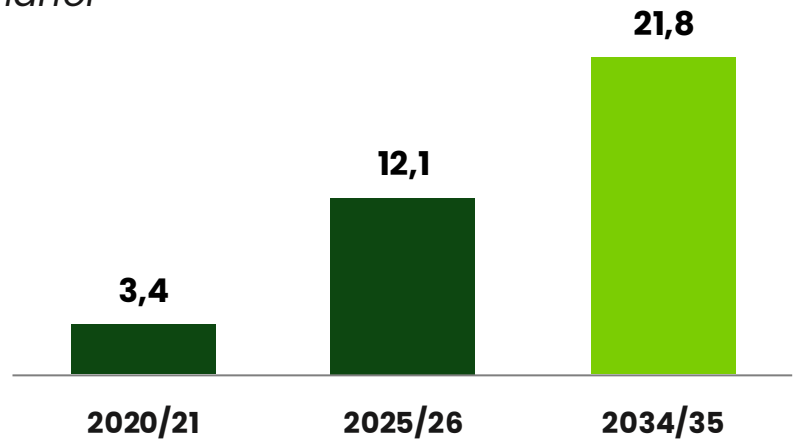
Source: Prof, Marcos Fava Neves e Vinícius Cambaúva based on CONAB andUnião da Indústria da Cana-de-açúcar (UNICA),
*Estimate for the harvest in progress (not yet completed),

Corn Ethanol Development in Brazil

HISTORY AND PROJECTION OF CORN ETHANOL PRODUCTION IN BRAZIL

In billions of liters of ethanol

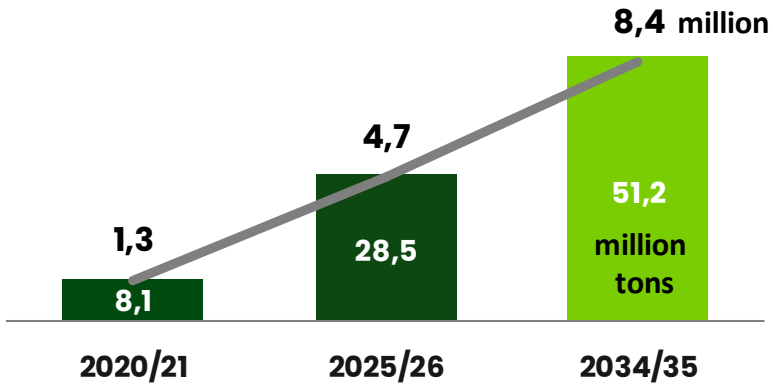




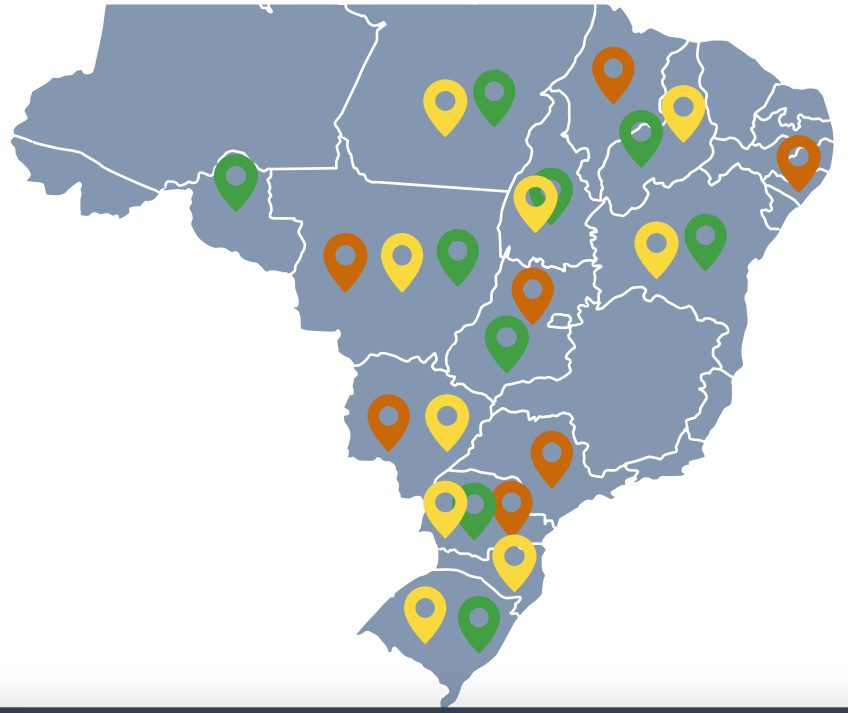
CORN DEMAND FOR ETHANOL PRODUCTION IN BRAZIL

In million hectares and million of tons

ADDITIONAL DEMAND 2025 to 2035:
+ 22,7 million tons of corn
+ 3,7 million hectares



CORN ETHANOL BIOREFINERIES IN BRAZIL



27 Operating	**13** Mato Grosso **05** Goiás **03** Mato Grosso do Sul	**01** São Paulo **01** Paraná **01** Alagoas	**01** Maranhão **01** Rio Grande do Sul
16 Authorized	**07** Mato Grosso **03** Rio Grande do Sul **02** Tocantins **01** Piauí	**02** Bahia **01** Paraná **01** Santa Catarina **01** Goiás	
16 Expected	**08** Mato Grosso **02** Bahia **01** São Paulo	**03** Goiás **01** Rondônia **01** Paraná	

Source: Prof, Marcos Fava Neves e Vinícius Cambaúva based on em UNEM
Premisses: 1) 1 ton of corn 425 liters; 2) Corn Yield 6,11 ton/ha.

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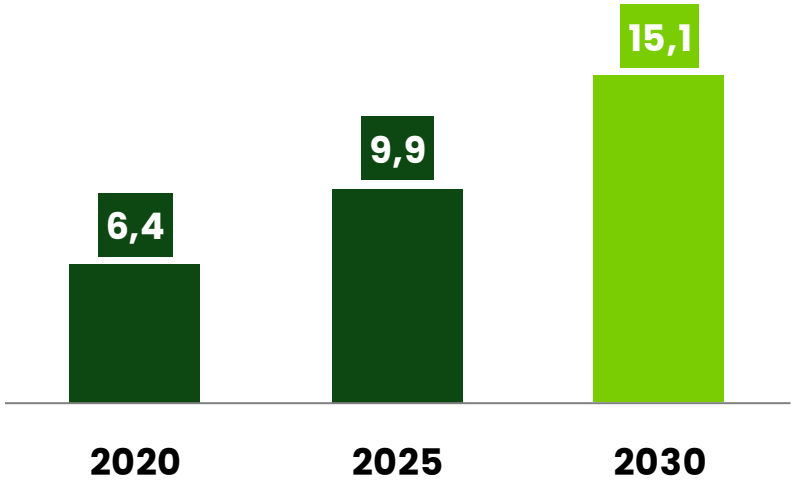
Biodiesel Development in Brazil

HISTORY AND PROJECTION OF BIODIESEL PRODUCTION IN BRAZIL

In billion liters



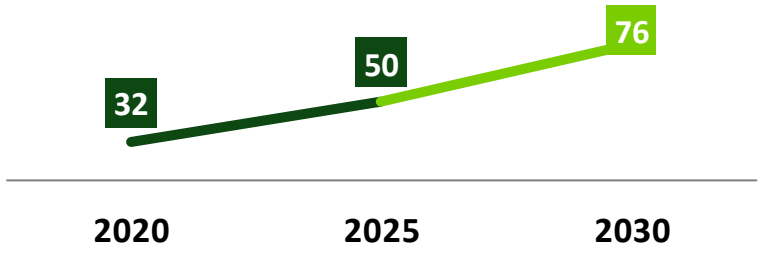
BIODIESEL BLEND IN DIESEL *(%)*	12%	15%	20%

Premise: it considers that 1 ton of soybeans produces 200 liters of biodiesel.

SOYBEAN DEMAND FOR BIODIESEL PRODUCTION IN BRAZIL

In million tons

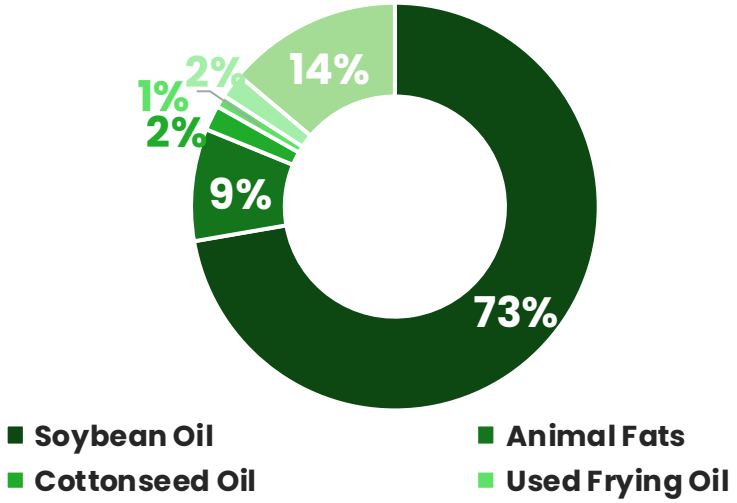
ADDITIONAL DEMAND 2025 to 2030:
+ 26 millions tons



CO-PRODUCTS GENERATED THROUGH BIODIESEL PROCESSING IN BRAZIL

Year	Soybean processing	% of Processing	Feed production
2005	29,9	-	8,62
2015	40,5	36%	15,99
2025	58,5	96%	19,50

BIODIESEL PRODUCTION BY RAW MATERIAL

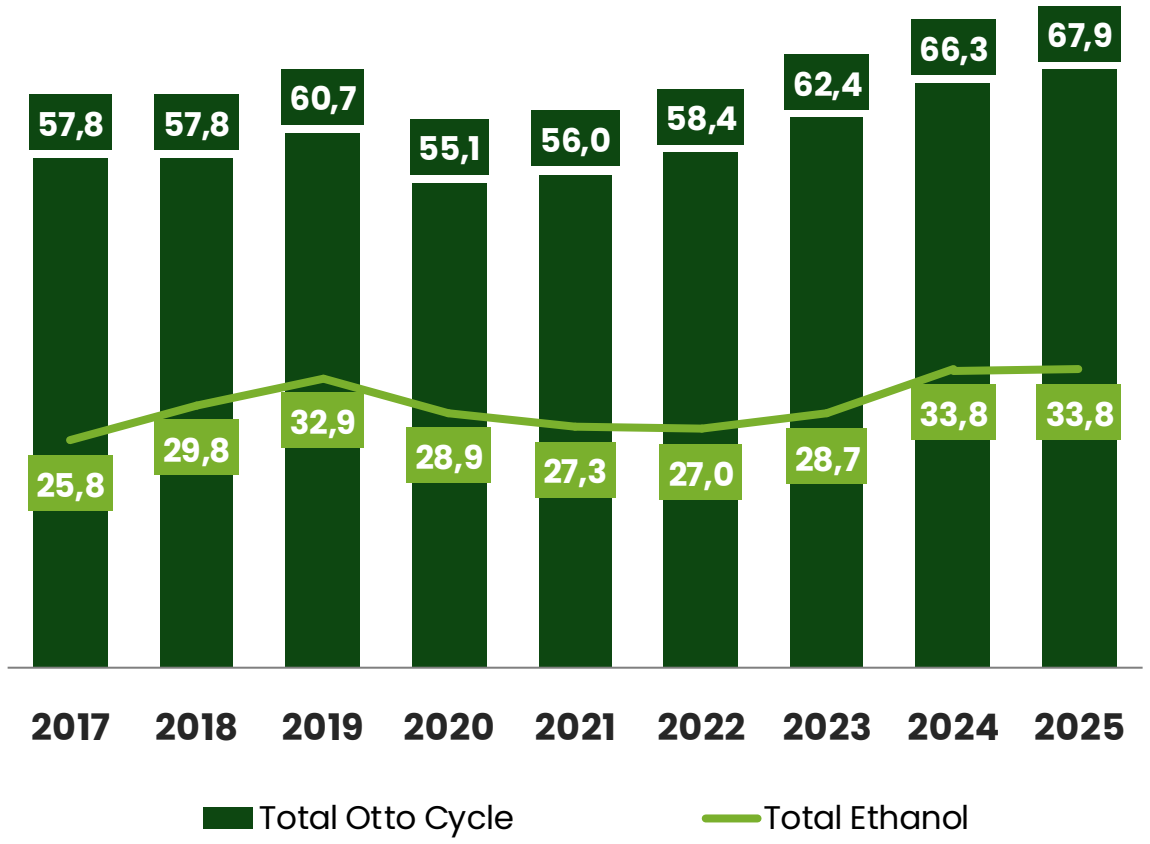


Source: Prof. Marcos Fava Neves and Vinícius Cambaúva based on Abiove.

Ethanol and Biodiesel Role in Brazilian Fuel

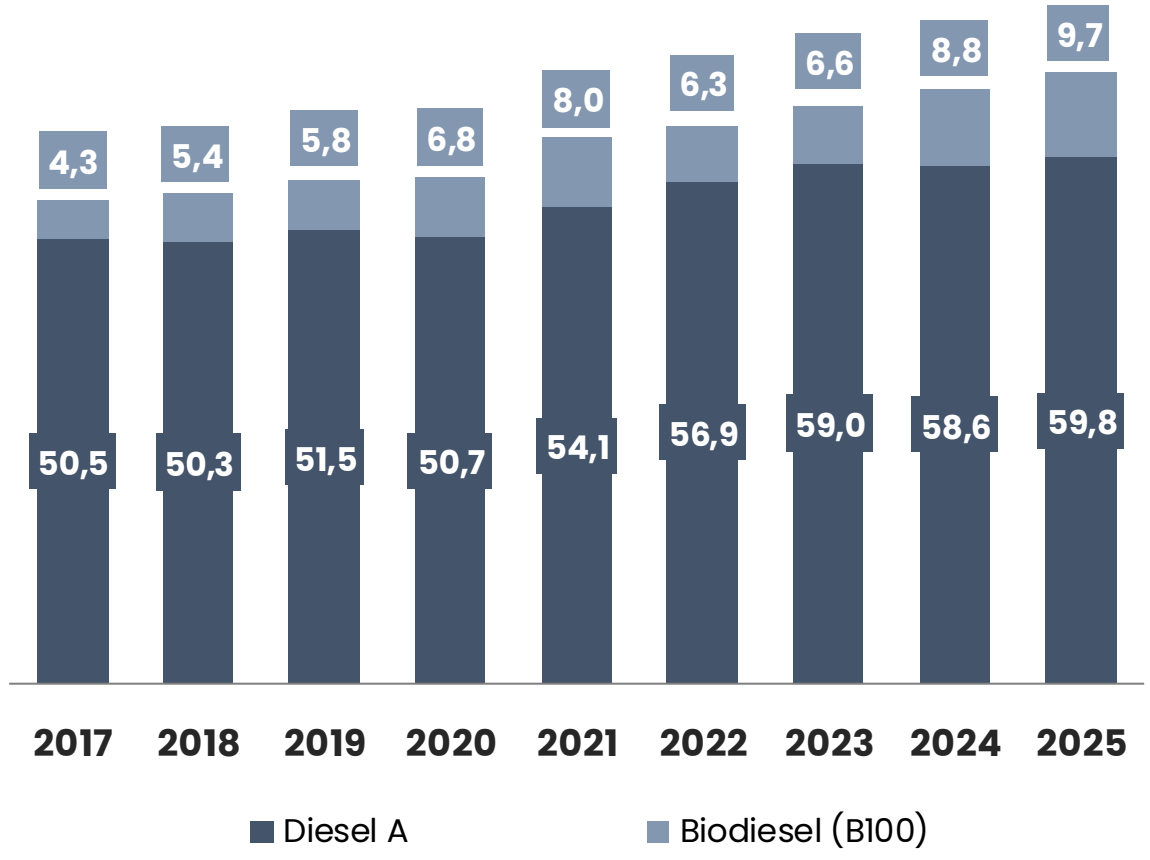
INTERNAL CONSUMPTION OF OTTO CYCLE FUELS (CARS)

In billion liters



INTERNAL CONSUMPTION OF DIESEL CYCLE FUELS (TRUCKS, BUSES, LARGER ENGINES)

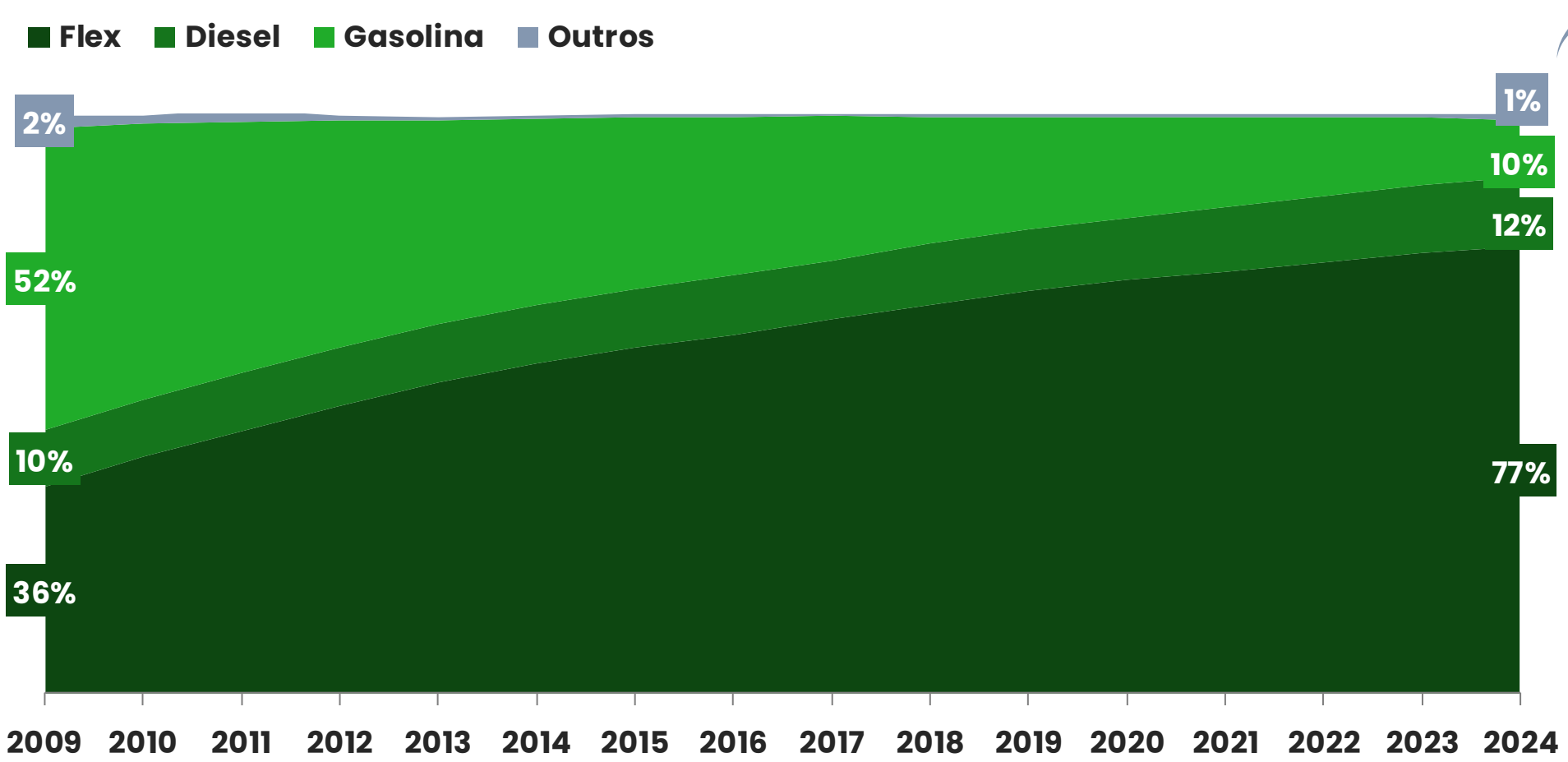
In billion liters



Source: Prof. Marcos Fava Neves andVinícius Cambaúva based on ANP.

Close to 80% of Brazilian Fleet: Flex Fuel Vehicles (Ethanol and Gasoline)

HISTORY OF VEHICLE PARTICIPATION IN THE BRAZILIAN FLEET BY TYPE OF PROPULSION
(Automobiles, Light Commercial Vehicles, Trucks and Buses)



OTHER TYPES PROPULSION

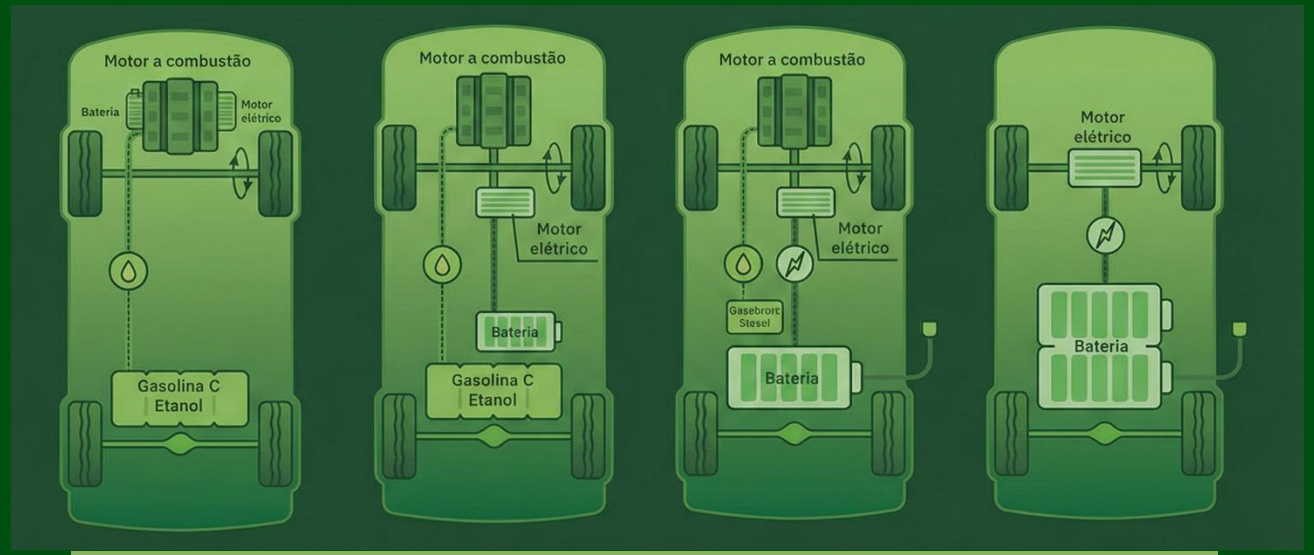
CATEGORIA	SHARE
Hybrid or Electric	0,9%
Natural Gas	0,1%
Alcohol	0,0%

Source: Prof. Marcos Fava Neves and Vinícius Cambaúva based on Abipeças and Sindipeças | Relatório da Frota Circulante, 2025.

Understanding the Vehicle Models of the Future

ELECTRIFIED VEHICLE CATEGORIES

1) MHEV	2) HEV	3) PHEV	4) BEV
Mild Hybrid Eletric Vehicle	*Hybrid Eletric Vehicle*	*Plug-in Hybrid Eletric Vehicle*	*Battery Electric Vehicle*



Fuel			
Gasoline C and Ethanol	Gasoline C and Etanol [1]	Eletricity, Gasolina C e Ethanol	Electricity
Energétic Consumption [2] (MJ/Km)			
1.55	1.1 – 1.9	0..8	0.41 – 0.66

DEFINITIONS:

1. **MHEV (Mild Hybrid):** uses a small electric motor to assist the combustion engine under specific conditions, such as starting and braking, without allowing it to operate solely in electric mode.
2. **HEV (Conventional Hybrid):** It can operate on electric power alone at low speeds or combine both motors for higher output.
3. **PHEV (Plug-in hybrid):** It has larger batteries that can be recharged at an outlet, allowing you to travel longer distances on electricity alone.
4. **BEV (100% electric):** powered exclusively by one or more electric motors, using energy stored in rechargeable batteries. It does not have a combustion engine or an exhaust system, and it does not emit local pollutants during use.

Source: Prof, Marcos Fava Neves based on EPE "DEMANDA DE ENERGIA DOS VEÍCULOS LEVES: 2025-2034",
Notes: [1]HEV Flex and [2]Between subcompact and midsize, according to the Brazilian Vehicle Labeling Program (PBEV),

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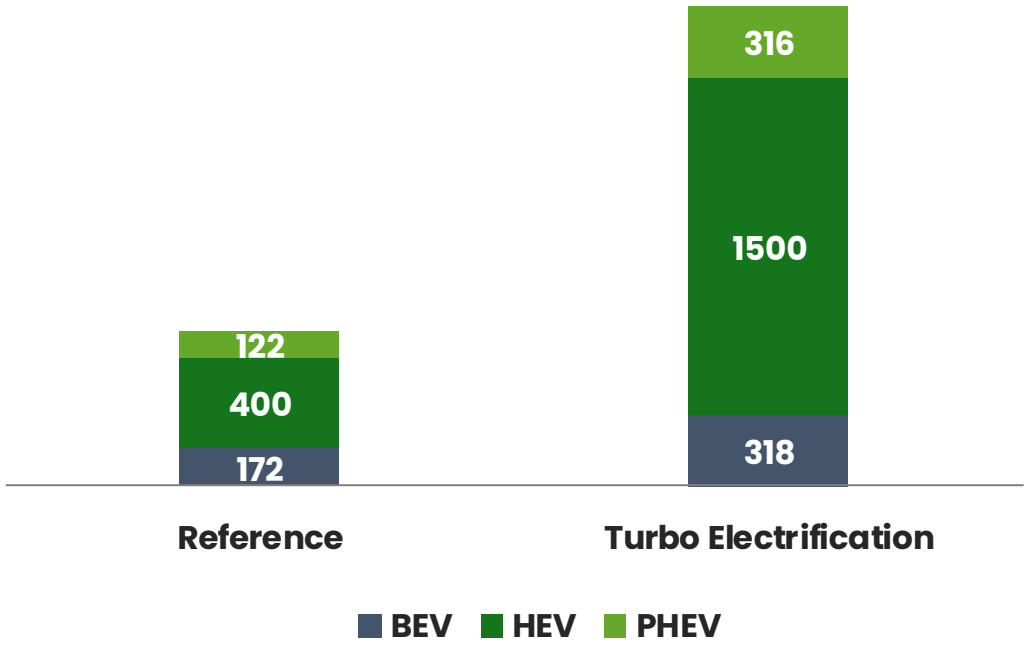
Growth of Hybrid Vehicles in the Brazilian Fleet to 2034

PROJECTION OF LIGHT VEHICLE LICENSING IN BRAZIL IN 2034 ACCORDING TO THE TECHNOLOGY USED

In a thousand units



- ***BEV** = 100% electric;*
- ***HEV** = Conventional hybrid;*
- ***PHEV** = plug-in hybrid.*

5 POINTS THAT SUPPORT THE EXPANSION OF HYBRID VEHICLES IN BRAZIL:

1. **More affordable:** lower cost of ownership compared to 100% electric vehicles.
2. **Recharge independence:** the combustion engine provides autonomy in areas far from large centers where charging points are located.
3. **Powered by ethanol:** flex hybrids have high synergy with the sugarcane sector, driving the Brazilian market.
4. **Lower environmental impact:** lithium and cobalt extraction for batteries has a lower ecological footprint than fossil fuel extraction.
5. **Lower resale value:** the battery reduces the car's value over time. This reduction is greater in 100% electric vehicles.

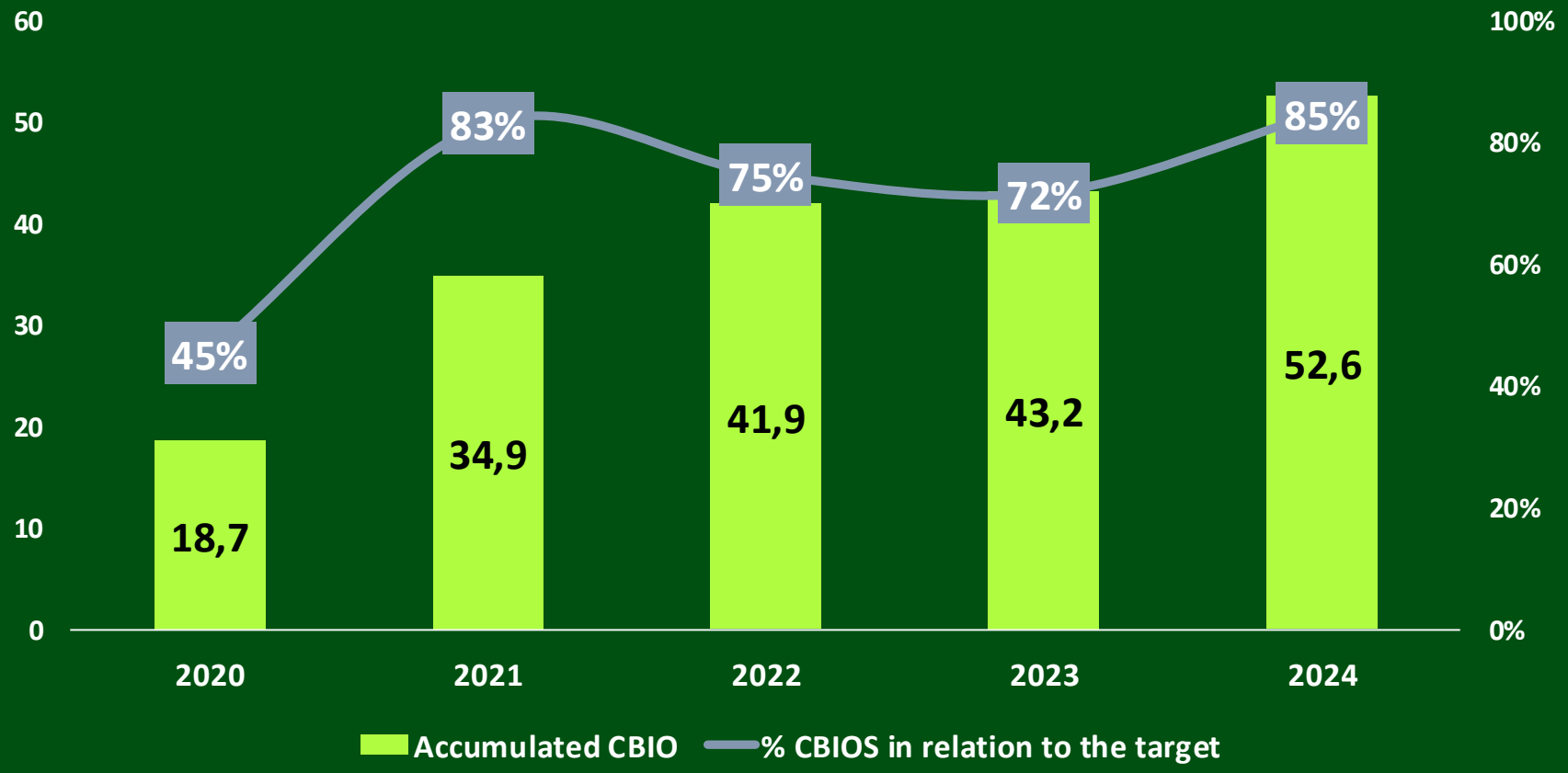
Source: Prof.. Marcos Fava Neves and Vinícius Cambaúva based on EPE: "DEMANDA DE ENERGIA DOS VEÍCULOS LEVES: 2025-2034".

RenovaBio Program avoided 200 million tons of CO^2 emission in 5 years

This amount is equivalent to the emission of **27,3 million popular cars** or those saved by **1,7 billion trees**

EVOLUTION OF CBIOS GENERATION IN THE MARKET

CBIOS accumulated in millions



RELEVANT ASPECTS:

1 CBIO is equivalent to **1 ton of CO^2** that is no longer emitted into the atmosphere.

Therefore, over the 5-year program period through 2024 (partial 2025 data were not released), **191.3 million tons of CO_2** were no longer emitted from the production and use of biofuels.

- **1 CBIO** equivalent to **R$ 67.40** (2025 average) in **B3**.
- Considering this average ticket (without inflation adjustment), we can say that R$ **12.9 billion** in CBIOS were traded in the last 5 years on B3.

Source: Prof. Marcos Fava Neves and Vinícius Cambaúva based on Plataforma CBIO (ANP),

Energy Transition from Biogas and Biomethane Sourced in Agribusiness

BY SOURCE OF BIOGAS

57,6 MM m³/day
Sugar-energy

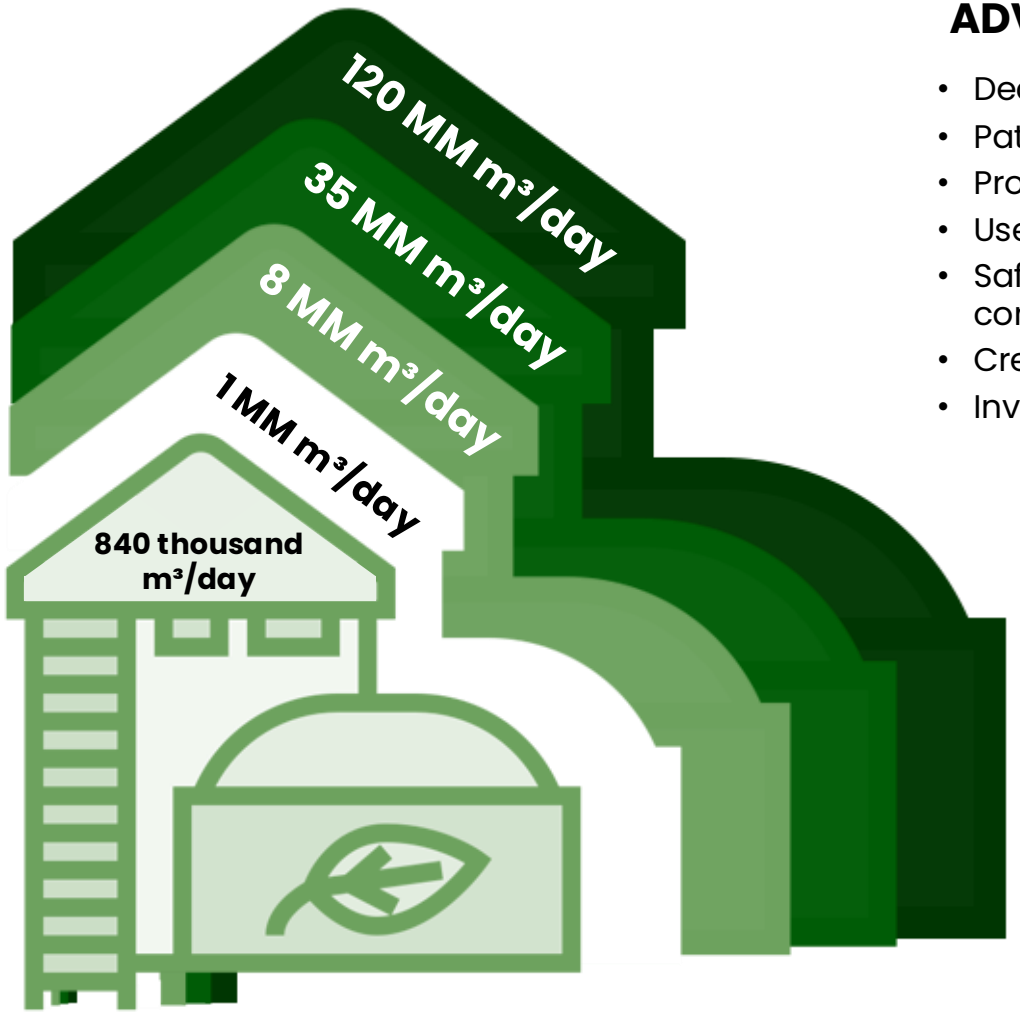
38,9 MM m³/day
Animal Protein

18,2 MM m³/day
Crop Production

6,1 MM m³/day
Sanitation

WHAT DOES IT MEAN TO REACH THE FULL POTENTIAL OF BIOMETHANE FOR BRAZIL?

32% of total electricity consumption.
62% of diesel demand.
100% of the import of fossil fuels.
30x demand for fertilizers.



ADVANTAGES OF BIOGAS

- Decarbonization of key sectors.
- Path to energy independence.
- Promotion of the Circular Economy.
- Use of environmental liabilities.
- Safe, flexible, and close to the point of consumption, electric energy.
- Creation of up to 800,000 jobs.
- Investments of up to R$ 348 billion.

Source: Prof. Marcos Fava Neves , Vinícius Cambaúva and Leticia Martinez based onAbiogás

New Possibilities with Large Ethanol, Biodiesel and Biogas Engines

Source: Prof. Marcos Fava Neves and Vinícius Cambaúva,

Projections for the Brazilian Bioenergy and Biofuels Market

Indicator and Description	Current	2055
Participation of conventional biofuels in the transport sector (Ethanol, biodiesel, biomethane and others)	23%	**43%**
Participation of advanced biofuels in the transport sector (Sustainable Aviation Fuel, Sustainable Marine Fuel, green diesel and others)	% not relevant	**22%**
The role of electrification (electric vehicles) in the transport sector	3%	**13%**
Renewability of the Brazilian transport matrix	30%	**85%**

Indicator and Description	Current	2035	% Growth
Ethanol consumption	35 billion of litters	46 billion litters	**+ 31%**
Biodiesel consumption	9 billion of litters	12 billion litters	**+ 36%**
Sustainable Aviation Fuel consumption	% not relevant	7 billion litters*	**-**

**Demand can vary between 2.5 and 7 billion liters, depending on carbon intensity*

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Source: Prof. Marcos Fava Neves based on EIXOS and Brazilian Ministry of Energy, data from EPE

Question 7:

And how does these indicators compare Brazil with other food producers in the world

?

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Key Sustainability Indicators for Top Agricultural Countries

Top 10 agricultural countries by gross production value	GHG emissions		Land use						Forest area						Renewables					
	GHG emissions per capita[1] (t CO_2eq/cap/yr)		Agricultural land use[2] (million ha)		Share of land used for permanent meadows and pastures[3]		Share of land area used for arable agriculture[4]		Forest area[5] (million ha)		Share of land covered by forest[6]		Share of land area that is protected[7]		Share of electricity production from renewables[8]		Share of primary energy consumption from renewable sources[9]		Biofuel energy production[10] (TWh)	
China	3º	11	1º	520	1º	42%	5º	12%	4º	220	9º	23%	4º	16%	3º	34%	3º	18%	4º	66
India	9º	3	5º	179	9º	4%	1º	52%	6º	72	10º	22%	9º	8%	8º	20%	8º	9%	5º	43
USA	2º	18	2º	412	3º	28%	4º	17%	3º	310	6º	32%	6º	13%	5º	24%	6º	12%	1º	532
Brazil	**6º**	**6**	**3º**	**223**	**4º**	**19%**	**10º**	**7%**	**2º**	**497**	**2º**	**58%**	**1º**	**31%**	**1º**	**88%**	**1º**	**50%**	**2º**	**318**
Indonesia	8º	5	7º	56	7º	6%	8º	10%	5º	92	3º	48%	7º	12%	9º	19%	7º	11%	3º	127
Russia	1º	18	4º	216	8º	6%	9º	7%	1º	816	4º	48%	8º	12%	10º	18%	10º	6%		-
Turkey		-	8º	38	5º	19%	3º	26%	9º	22	8º	28%	10º	7%	2º	46%	2º	20%		-
France	5º	6	9º	28	6º	16%	2º	34%	10º	17	7º	31%	3º	30%	4º	26%	4º	16%	6º	18
Japan	4º	9	10º	5	10º	1%	6º	11%	8º	25	1º	66%	2º	30%	6º	23%	5º	13%		-
Mexico	7º	6	6º	96	2º	38%	7º	10%	7º	66	5º	33%	5º	15%	7º	22%	9º	8%	7º	1

[1]Including emissions from: power industry, industrial combustion and processes, buildings, transport, fuel exploitation, agriculture, and waste (2023); [2]The sum of croplands and pasture (2022);
[3]Land used permanently to grow herbaceous forage crops, either cultivated or growing wild (2022), [4]Land under temporary crops, meadows for mowing or pasture, land under market or kitchen gardens, and land temporarily fallow(2022).
[5]Land under natural or planted stands of trees of at least 5 meters in situ (2020), [6]Land with natural or planted groups of trees at least 5m tall (2020), [7]Geographical space, recognized and managed to achieve long-term conservation of nature (2020).
[8]Renewables include solar, wind, hydropower, bioenergy, geothermal, wave, and tidal sources (2024), [9]Traditional biofuels not included (2024), [10]Biofuel production includes both bioethanol and biodiesel (2024).

Source: Prof. Marcos Fava Neves, Vinícius Cambaúva, Letícia Martinez, and Beatriz Papa Casagrande based on Joint Research Centre (JRC), FAO, Energy Institute, and World Database on Protected Areas via Our World in Data. (rounded numbers)

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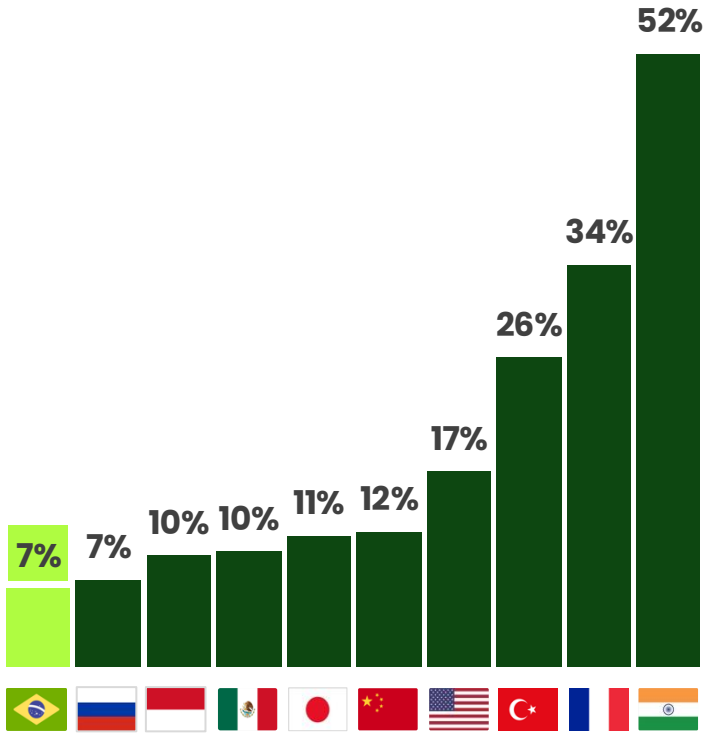
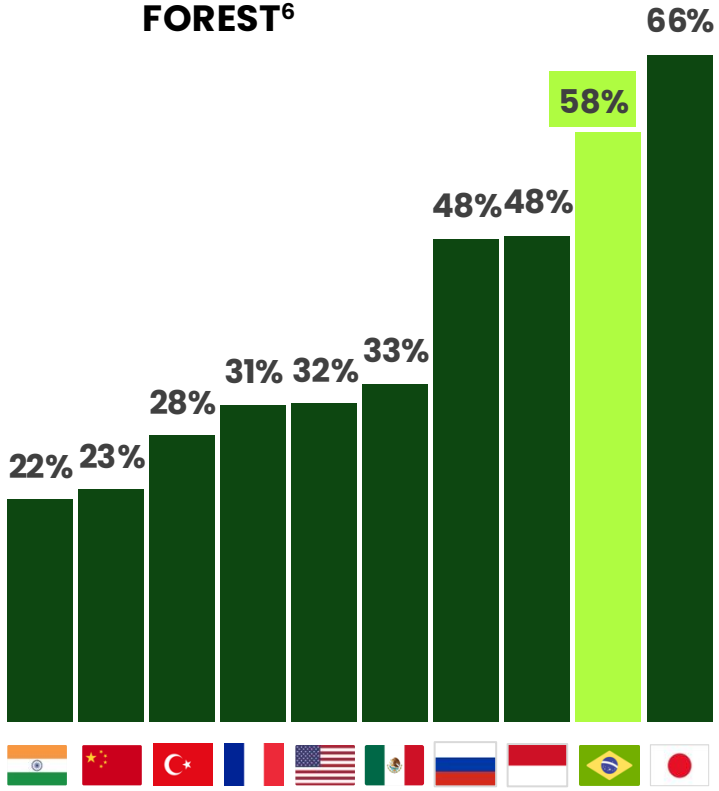
Some Sustainability Indicators for Top Agricultural Countries

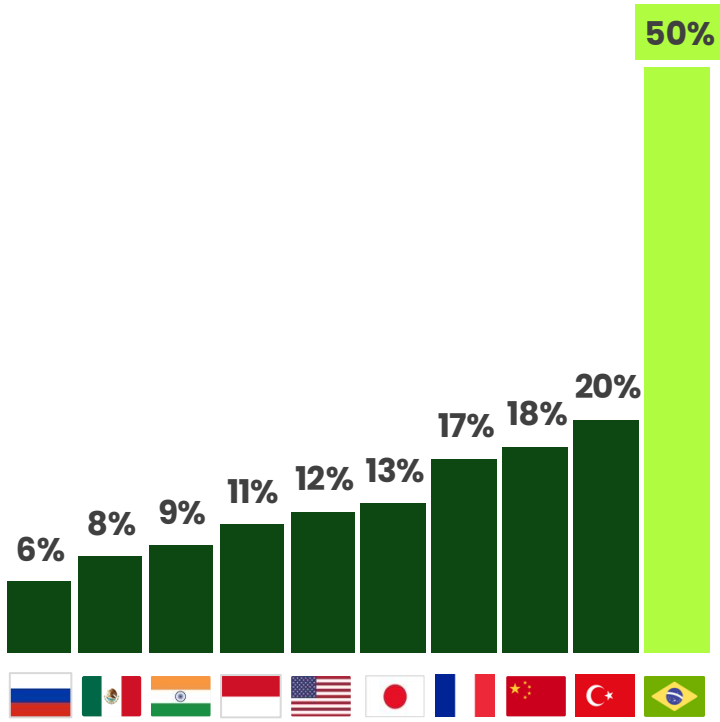
SHARE OF EACH COUNTRY LAND AREA USED FOR AGRICULTURE[4]



SHARE OF EACH COUNTRY LAND AREA COVERED BY FOREST[6]



SHARE OF PRIMARY ENERGY CONSUMPTION FROM RENEWABLE SOURCES[9]



[4]Land under temporary crops, meadows for mowing or pasture, land under market or kitchen gardens, and land temporarily fallow (2022).
[6]Land with natural or planted groups of trees at least 5m tall (2020).
[9]Traditional biofuels not included (2024), [10]Biofuel production includes both bioethanol and biodiesel (2024).

Source: Prof. Marcos Fava Neves, Vinícius Cambaúva, Letícia Martinez, and Beatriz Papa Casagrande, based on data from the Joint Research Centre (JRC), FAO, the Energy Institute, and the World Database on Protected Areas, via Our World in Data.

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Question 8:

What can we expect for Brazil's agricultural area in the future

?

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Grain Production Area in Brazil Can Grow 20 Million Hectares Until 2035 Keeping Current 242 Million Hectares as Total Agribusiness Area Used

(Second Crop Development and Use of Pasture Areas)

Year / Crop		2002/2003	2025/26*	2035/36**
Annual Crops (Grains)	**1st Crop**	**30**	**56**	**68**
	Soybeans	19	49	60
	Corn	10	4	5
	Other	1	2	3
	2nd and 3rd crops	**14**	**28**	**35**
	Total Grains Area	**44**	**84**	**103**
Perennial Crops and Others	**Sugarcane, Coffee, Orange, Forests and Others**	**18**	**26**	**28**
Agricultural Production Area *(hectars)*		**48**	**82**	**96**
Pasture Area *(hectars)*		**182**	**160**	**146**
Total Agricultural Area Use *(hectars)*		**230**	**242**	**242**

Obs.: *Areas of 2nd and 3rd crops were not considered in the sum, since they correspond to the same fields of the 1st crop.*

Obs.: *Between 2021 and 2031, ABIEC estimates that pasture area should decline by 0.75% per year.*

Brazil's Total Area: 851

Source: Prof. Marcos Fava Neves baed on Conab, USDA e ABIEC, *Estimativa Conab (01/2026), **Estimates Prof. Marcos Fava Neves,
1st crop includes: cotton, peanuts 1st crop, beans 1st crop, corn 1st crop and soybeans, 2nd and 3rd crops: other crops (including winter).

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Question 9:

What are some of the major investment opportunities in Brazil from 2026-2050

?

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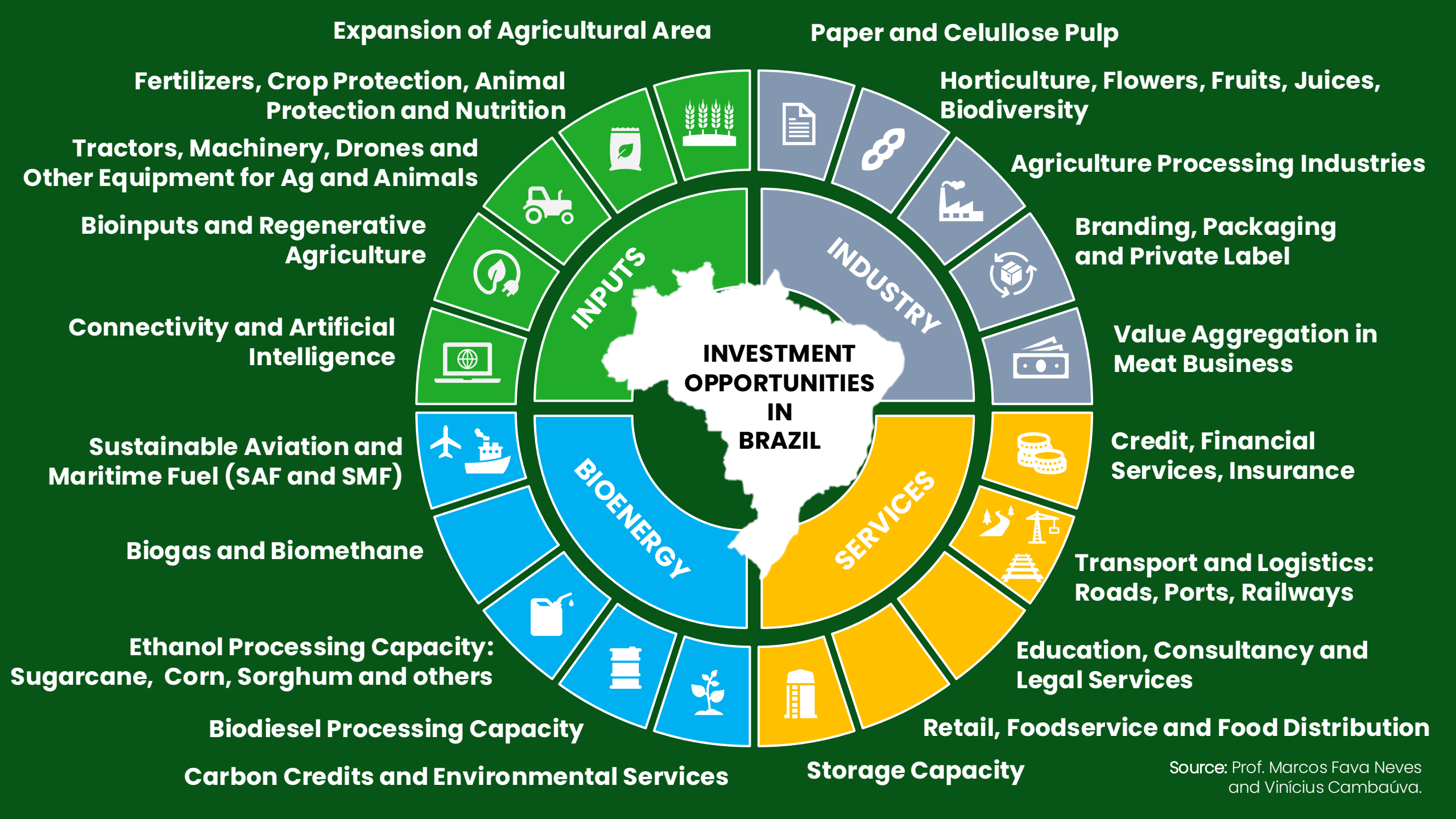

Source: Prof. Marcos Fava Neves and Vinícius Cambaúva.

Question 10:

How to increase production to meet population growth, urbanization, income enhancement, fight hunger and preserve the environment?

?

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AGENDA: AGRIBUSINESS AS A SOLUTION TO CLIMATE ISSUES

THE LETTER SENT TO COP30

In June 2025, during the 5 days of the **35th edition of the IFAMA World Conference**, held for the first time in Brazil, in the city of Ribeirão Preto, topics were discussed and elaborated by about 600 professionals, including scientists, politicians, teachers, researchers, students, and other agents of global agriculture, from 40 different countries, resulting in a letter,

The letter sought to answer the **question**:

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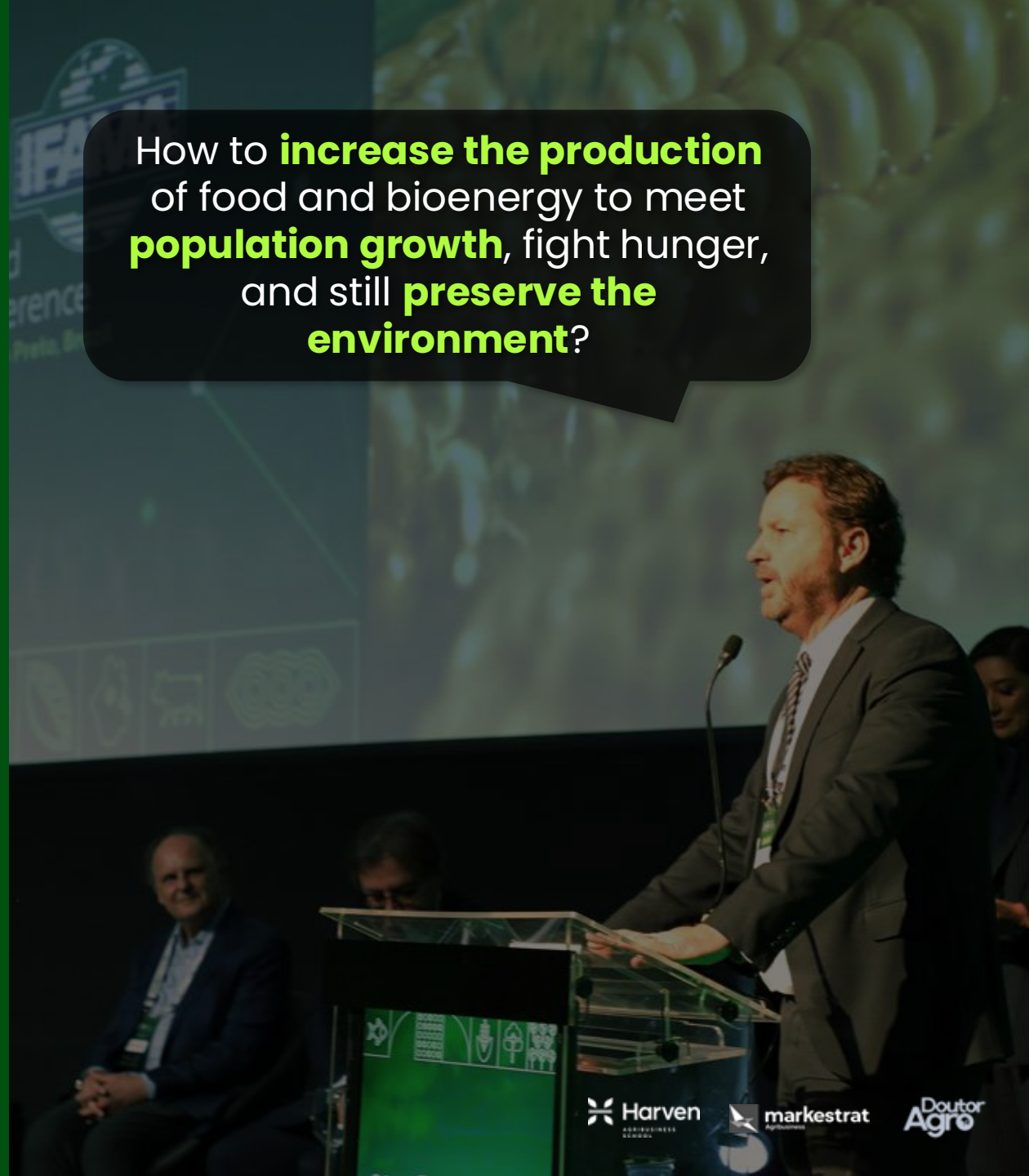

Agenda: 5 Categories for Agribusiness as an Environmental Solution

1 The use of sustainable systems and regenerative agriculture

- Area recovery: Conversion of degraded pastures for agriculture and forestry.
- Crop rotation and green manure: Use of species to improve the physical, chemical, and biological characteristics of the soil.
- No-till farming: Maintenance of soil cover to prevent erosion and promote the microbiota.
- Integrated systems: Adoption of Integrated Crop-Livestock-Forest (ICLF), agroforestry systems, and consortia.
- Planted forests: Carbon capture and pulp and paper production as a substitute for plastic.
- Vertical cultivation: Layered plant production, ideal for large cities and urban logistics.
- Protected cultivation (hydroponics/aeroponics): Growing plants without the need for soil, using protected environments.
- Organic cultivation: Reduction or elimination of the use of chemicals in production.
- Land conversion: Adaptation of arid, desert, or savannah areas for agriculture.
- Circular economy: Integration of by-products to generate new inputs, increase efficiency, and reduce waste.

2 The use of technologies applied to food production chains

- Precision Agriculture and Data (AI, GPS, Big Data): Optimizes irrigation, reduces input use, and improves data-driven decision-making (weather, pests, market).
- Precision irrigation: Increases productivity and reduces waste.
- Weather forecast: Use of stations and software for better climate risk management.
- Automation and Machinery (Robots, Drones): Optimizes operations, reduces costs, enables area mapping, and supports agricultural spraying.
- Blockchain and Traceability: Registration of the production chain to ensure transparency, security, and waste reduction.
- Online Marketplaces: Platforms for selling products and negotiating inputs, reducing transaction costs.
- Communication and Digital Education: Integrates the links of the production chain and improves professional efficiency through technology.
- New Productions and Post-Harvest: Includes laboratory foods (cell culture) and preservation technologies to reduce waste.

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Agenda: 5 Categories for Agribusiness as an Environmental Solution

3 The use of bioinputs and genetic techniques

- Biopesticides: insecticides, fungicides, nematicides, biofertilizers, and biostimulants used to control pests, diseases, nematodes, and other phytosanitary problems, reducing the use of chemicals and mineral and chemical fertilizers.
- Bioinputs in animal health and animal feed: vaccines, medicines, and other biological inputs.
- Phytochemicals and semiochemicals: natural repellent or attractive substances used in agriculture.
- Genetic improvement: improvement of plants to adapt to different soil and climate characteristics (soil, temperature, precipitation, and others), and greater resilience to climate change.
- Biotechnologies: use of living organisms in the genetic modification of plants, to optimize the control of pests, diseases, and weeds, increase productivity, and reduce the need for the use of chemicals in agriculture, synthetic and cellular biology, gene editing, and nanotechnology in plants and animals.

4 The use of technologies for energy generation

- Ethanol: Produced from sugarcane, corn, cereals, and sugar beets; potential to reduce emissions by up to 70% (vs. gasoline).
- Biodiesel: Produced from soybeans, palm, canola, animal fat; potential to reduce emissions by up to 90% (vs. diesel).
- Biogas: Generated by the anaerobic digestion of organic matter, such as vinasse, sugarcane bagasse, and animal production residues.
- Biomethane: Produced from organic waste (manure, agro-industrial); up to 90% reduction in emissions (vs natural gas),
- Sustainable Aviation Fuel (SAF): Produced from organic matter (ethanol as the main input); potential to reduce emissions by up to 80%.
- Green Hydrogen: Produced by water electrolysis, with integration into agroindustries.
- Biomass Electricity: Generated from sugarcane bagasse, black liquor (pulp industry), and other agricultural wastes.
- Solar and Wind Energy: Generation of electricity on rural properties with solar panels or wind turbines.
- Adaptation of car, tractor, truck, and bus engines for the use of biodiesel, biogas, and ethanol.
- Ethanol Electric Car: Generation of bioelectricity from ethanol to power low-emission electric vehicles.

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Agenda: 5 Categories for Agribusiness as an Environmental Solution

5 Public Policies

- Payment for Environmental Services (PES): Incentive to the conservation of preserved areas on rural properties, with the involvement of companies focused on sustainable management.
- Payment for Decarbonization (Agriculture): Remuneration to producers (e.g., cattle ranchers) who adopt low-carbon practices and contribute to climate neutrality (e.g., soil carbon stock).
- Decarbonization Programs (Bioenergy): Trading of carbon credits generated by bioenergy-producing companies to encourage the energy transition.
- International Incentive Programs: Global initiatives (such as the "Vale Fund" and the "Farm Bill Act") demonstrate a global commitment to renewable energy and carbon markets.
- Public Policies and Global Industries: Agendas that encourage the preservation of native areas (e.g., via water resources) and prioritize farms and forestry with a positive carbon balance.

The objective of presenting this inventory to COP 30 was to demonstrate, in a clear and consistent way, that agriculture can be part of the solution to climate change, provided that public policies and private strategies are directed toward expanding the use of resource-saving technologies that drive productivity and environmental conservation.

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Meet Harven

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Report Coordinator Prof. Marcos Fava Neves

Marcos Fava Neves is as a part-time professor of planning and strategy at the School of Business (FEARP), University of São Paulo (Ribeirão Preto). Holds a degree in agronomic engineering from ESALQ/USP - Piracicaba (1991), a master's degree (1995) and a doctorate in management (1999) from FEA School of Business of the University of São Paulo. Studied European Agribusiness at ESSEC-IGIA/France (1995) and in Value Chains and at Wageningen University/Netherlands (1998-1999). He spent 2013 as a visiting professor at Purdue University (Indiana, USA), where he remains a permanent International Adjunct Professor. Since 2006, he has also held an international professorship at the University of Buenos Aires, Argentina. To complement his education, he did one week immersion programs at: Inalde/Colombia (2017), Florida International University/USA (2018), Purdue University/USA (2019), Incae/Costa Rica (2022), Rotterdam School of Management/Netherlands (2023), University of Stellenbosch/South Africa (2024) and University of Central Florida/USA (2025).

His expertise is in strategic planning for companies and food supply chains and currently serves as a board member for six private organizations, having participated on more than ten international boards throughout his career. In 2004 founded Markestrat Consultancy with partners, which now employs about 120 people and undertakes international projects, studies, and research in strategic planning and management for over 300 agri-food business organizations. Marcos has private sector experience, having worked at a citrus juice export company (1992-1993), an animal health/veterinary firm (1994-1995) and CEO of Brazil's second-largest biofuel holding company (2008/2009).

Marcos has supervised over 40 doctoral dissertations and master's theses and contributed to the education of around 2,000 business administration graduates in Brazil. His publications emphasize practical and effective business methods. He has authored over 150 articles in international journals and written or edited 80 books published by ten different publishers across Brazil, Uruguay, Argentina, South Africa, Singapore, the Netherlands, China, the United Kingdom, and the United States. Marcos has also contributed regularly to China Daily Newspaper, CNN TV in Brazil and authored case studies for Harvard Business School (2009/2010), Purdue University (2013/2019/2023), and Pensa/USP in the 1990s. He is one of Brazil's most cited authors in strategy, planning, and agribusiness, with over 6,000 citations on Google Scholar.

As a highly active speaker, Marcos has delivered around 2,000 lectures and presentations in 25 countries. He has received approximately 150 recognitions from Brazilian and international organizations and was named a "Fellow" of the International Food and Agribusiness Management Association (IFAMA) in 2015.

In 2023, Marcos founded Harven Agribusiness School, a university dedicated to food and agribusiness, which currently enrolls 350 undergraduate students in Brazil. Coming from a farming family, Marcos is a passionate advocate for agriculture and the role of farmers in societal development. On the social front, together with his parents, he co-founded and supports Mucapp, an NGO that over the past 30 years, has built more than 600 homes for Brazilian families living in precarious conditions. Marcos is married to Camila and has three daughters: Beatriz, Julia, and Cecilia.

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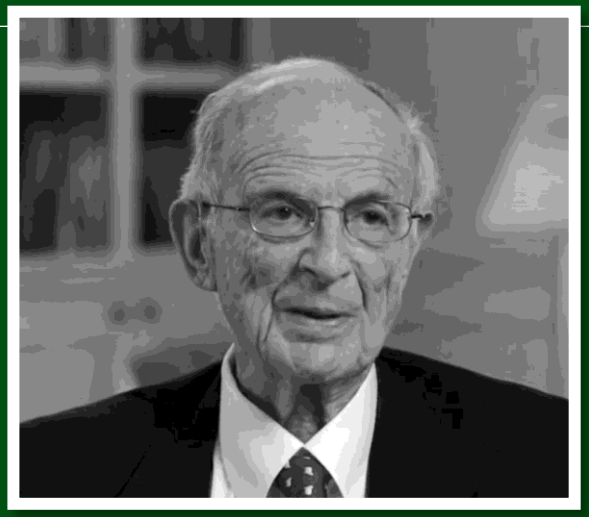

RAY GOLDBERG
(1926 – 2026)

This material is a tribute to Mr. Ray Goldberg, the "father of agribusiness," one of the leading figures in the history of global agribusiness and the creator of the term "Agribusiness," along with John Davis, at Harvard University in 1957, and one of the founders of IFAMA.

Your dedication to transforming the global food system into something more efficient and humane serves as a compass for this work. May we honor his legacy by transforming the complexity of production chains into a sustainable engine for the planet. Thank you, Ray, for teaching and transforming the lives of thousands.

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Thank You!

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