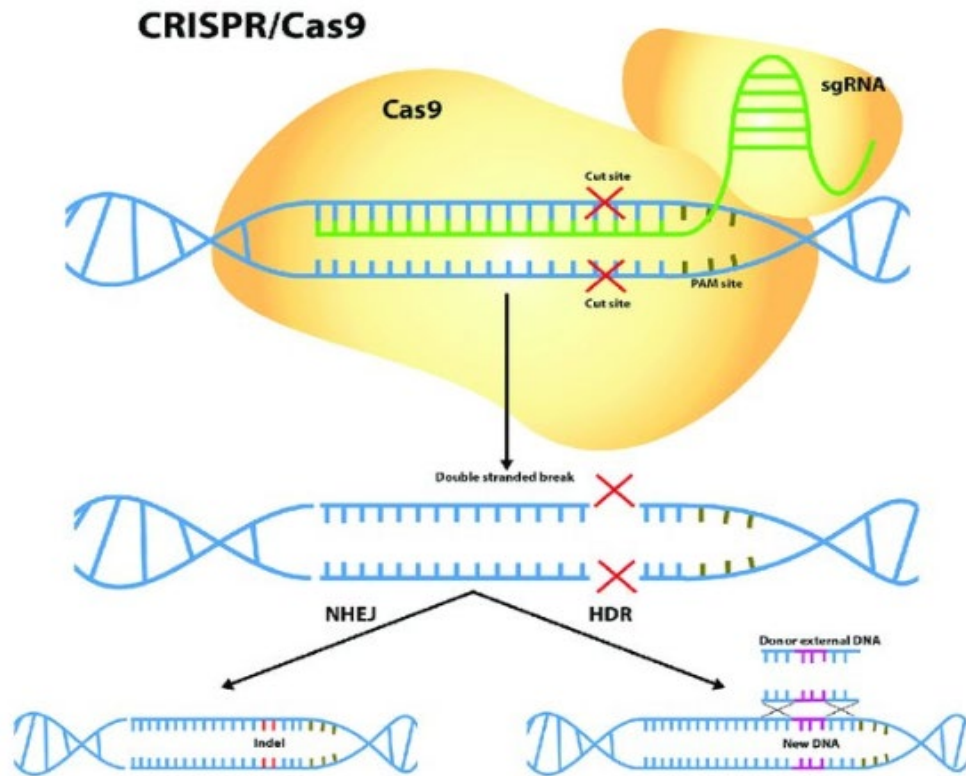




From applied research to commercial development

Polyana K. Martins
Biotechnology Coordinator
GDM

GENE EDITING



New Breeding Technologies – NBTs



GENE EDITING

WORD

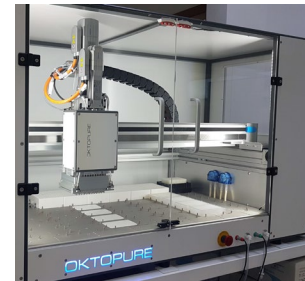
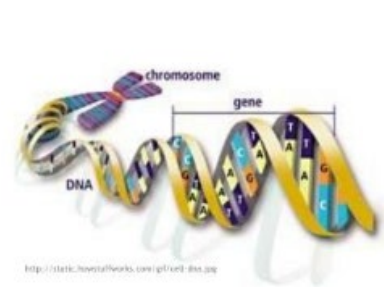
Percebi que tudo que damos importância a vida está ligado ao **nosso** próprio contexto e a forma com que fomos criados. E na história da minha vida, cresci buscando liberdade e me soltar de amarras que não faziam bem. Talvez não acreditasse que poderia ir tão longe. Aprendi a me conectar comigo mesma e descobri a força vital que existe dentro de mim.

GENE

```
CCCAACATCGTCAGACTTCGCGCCTACTACTAC
GCTAAGGAGGAGAAGCTCTTGGTTTACGACTAC
CTTCCAAACGGCAGTTTGCACGCCCTCCTTCA
CGGAAATCGTGGTCCTGGAAGGATTCCATTGG
ACTGGACCACCCGTATCTCCCTTATGCTCGGCG
CCGCTCGCGGACTGGCACGTATTCACGCCGAG
TACAACGCTTCTAAGATCCCACATGGAAACGTG
AGCTCCAACGTTTTGCTTGATAAGAACGGTGTC
GCCCTCATCTCAGACTTTGGCTTGTCGCTTCTA
CTCAATCCCGTGCACGCTATTGCCCCGCTTGGG
AGGGTATCGTGCACCTGAACA
```

Why did GDM decide to invest in Gene Editing?

GDM's **know-how development** in several related areas over 40 years in soybean agriculture



- Gene Discovery projects
- Soybean breeding
- Genotyping and genomics
- Data Science
- Tissue culture and genetic transformation
- Regulatory expertise from transgenic traits and commercialization.

GDM experience in working with soybeans connects well with the current challenges and opportunities

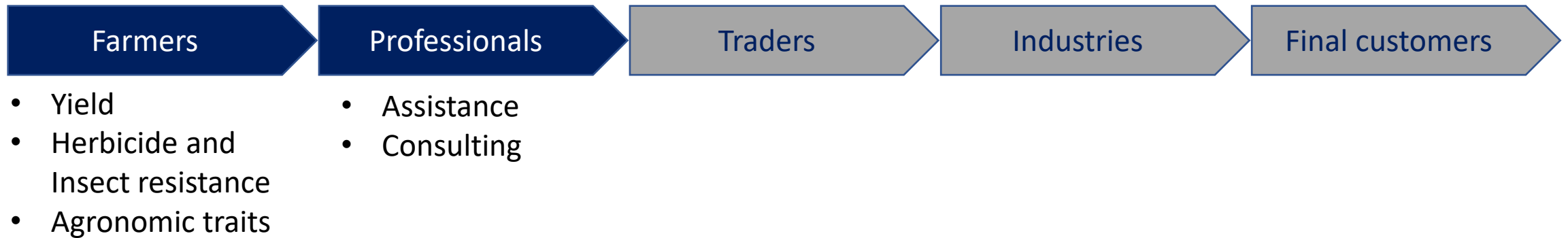
GDM's **market growth** in South America increased our R&D investment.



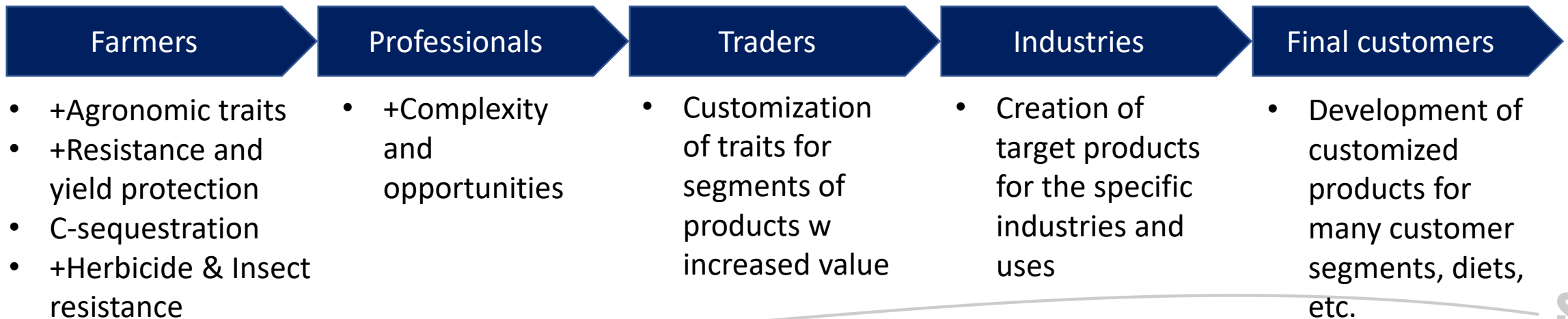
□ More than **25%** of turnover is invested in R&D

NBT may increase bring innovative products to more participants of the soybean chain

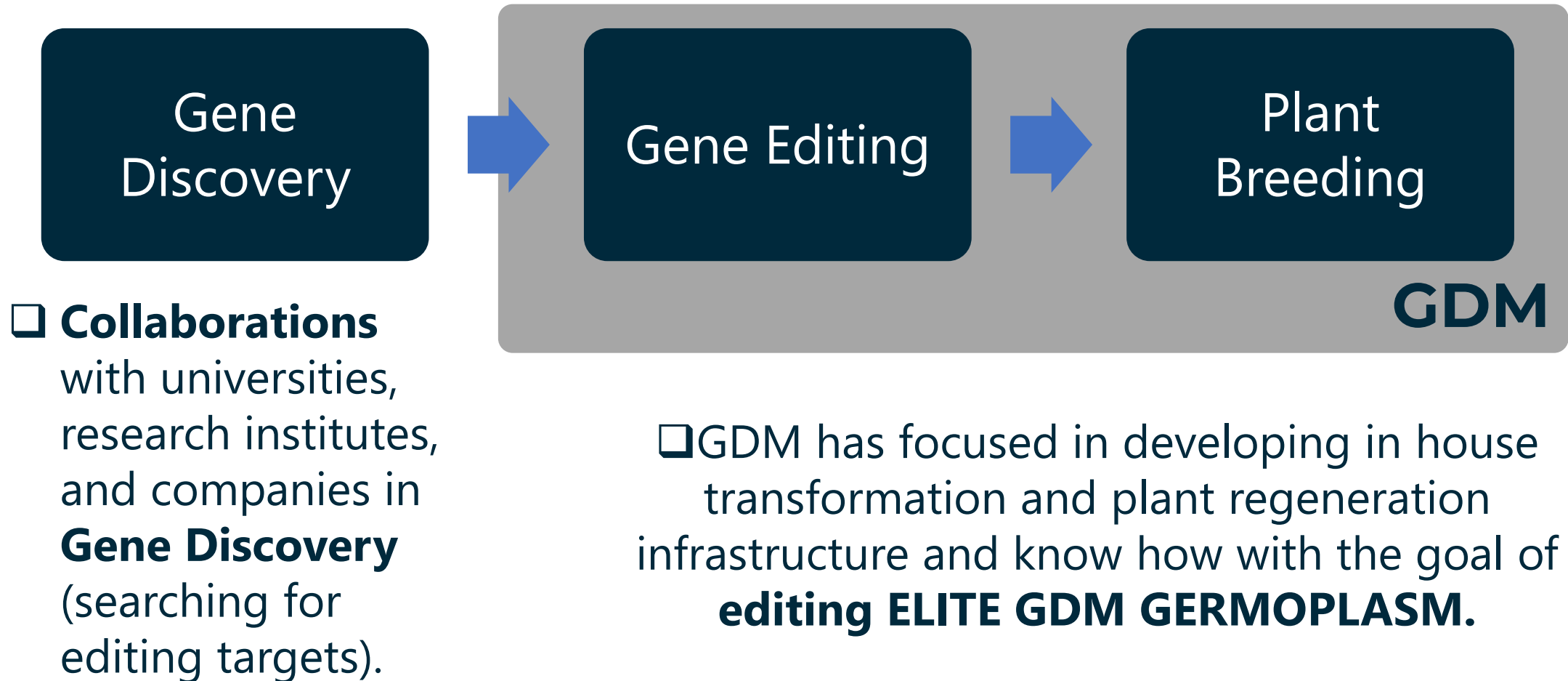
Current commercial model w breeding w/wo transgenesis



Eventual future model w breeding w/wo transgenesis and w NBTs



Gene Editing Program at GDM



GDM's NBTs Lab (Cambé - PR, Brazil)

Started
building lab &
organizing
team

July 2018

Started tissue
culture and
editing of elite
soybean varieties

January 2019

Obtained first
edited elite
soybean
variety at GDM

June 2019

Obtained first
response of non-
GMO edited
soybean by
CONABIA

August 2019

Seed increase
and technology
proof-of-concept

2020-2021



C	T	C	A	A	G	G
C	-	-	-	-	-	G
C	-	-	-	-	-	G
C	-	-	-	-	-	G
C	-	-	-	-	-	G
C	-	-	-	-	-	G
C	-	-	-	-	-	G
C	-	-	-	-	-	G



Creation of portfolio of projects for several concepts
(disease, nutritional components, herbicides, yield, etc.)

Trait: Better digestion

Approval of
FIRST non-GMO
edited GDM
soybean by
CTNBio - BR

March 2022

Approval of
FIRST non-GMO
edited GDM
soybean by
CONABIA - AR

August 2022

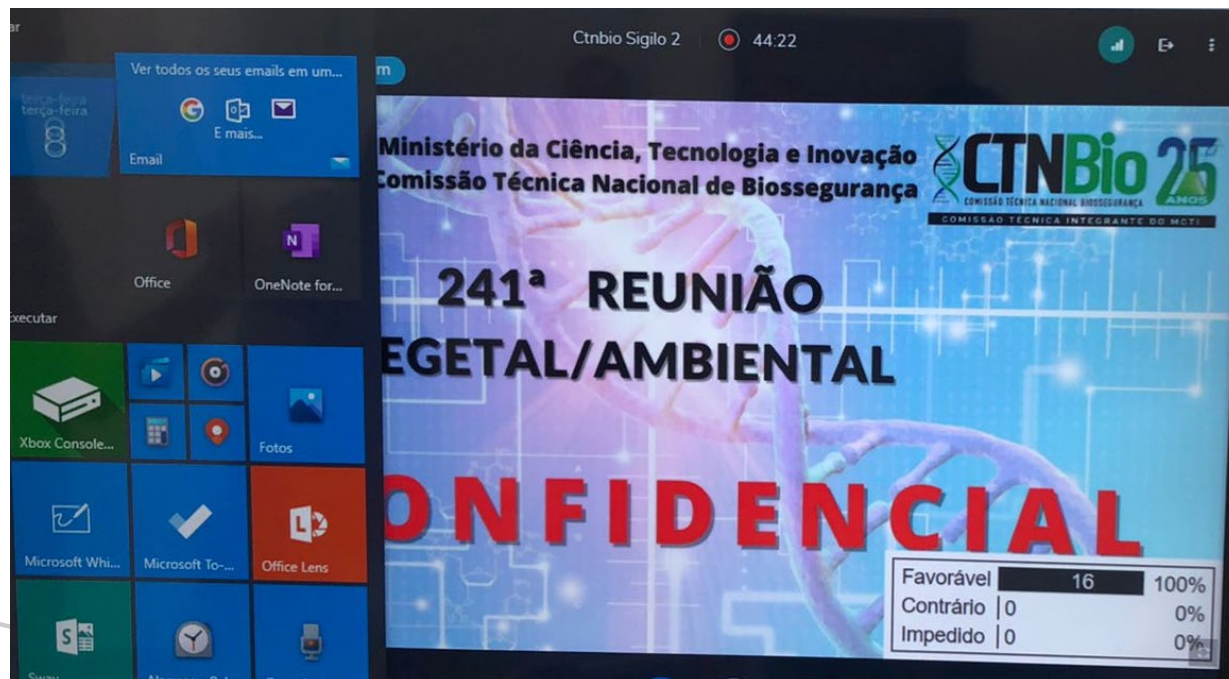
Request
under review
by ICA - CO

September 2022

Trait: Drought tolerant

Approval of
SECOND non-
GMO edited
GDM soybean
from CTNBio

May 2022



Ministério da Ciência, Tecnologia e Inovação
Comissão Técnica Nacional de Biossegurança

**241ª REUNIÃO
VEGETAL/AMBIENTAL**

CONFIDENCIAL

Favorável	16	100%
Contrário	0	0%
Impedido	0	0%



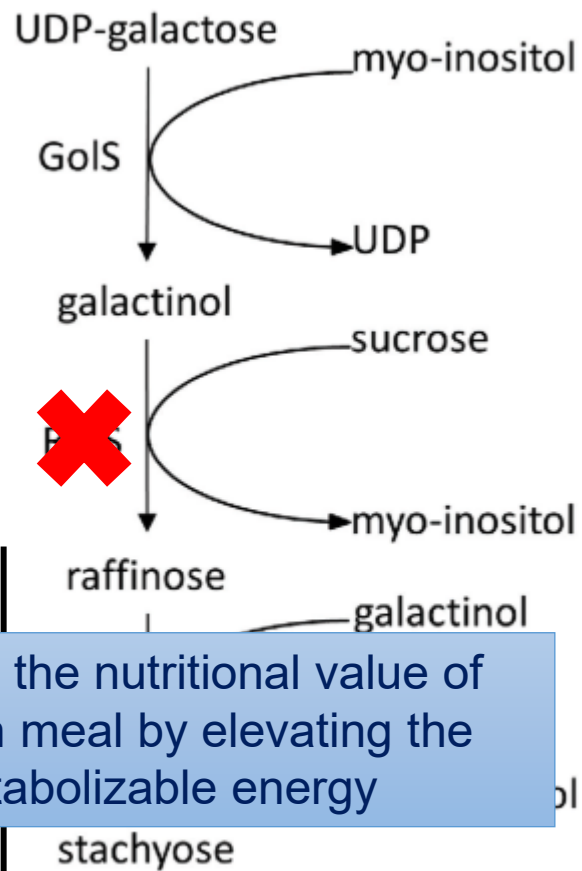
Ministério da Ciência, Tecnologia e Inovação
Comissão Técnica Nacional de Biossegurança

**243ª REUNIÃO
VEGETAL/AMBIENTAL**

CONFIDENCIAL

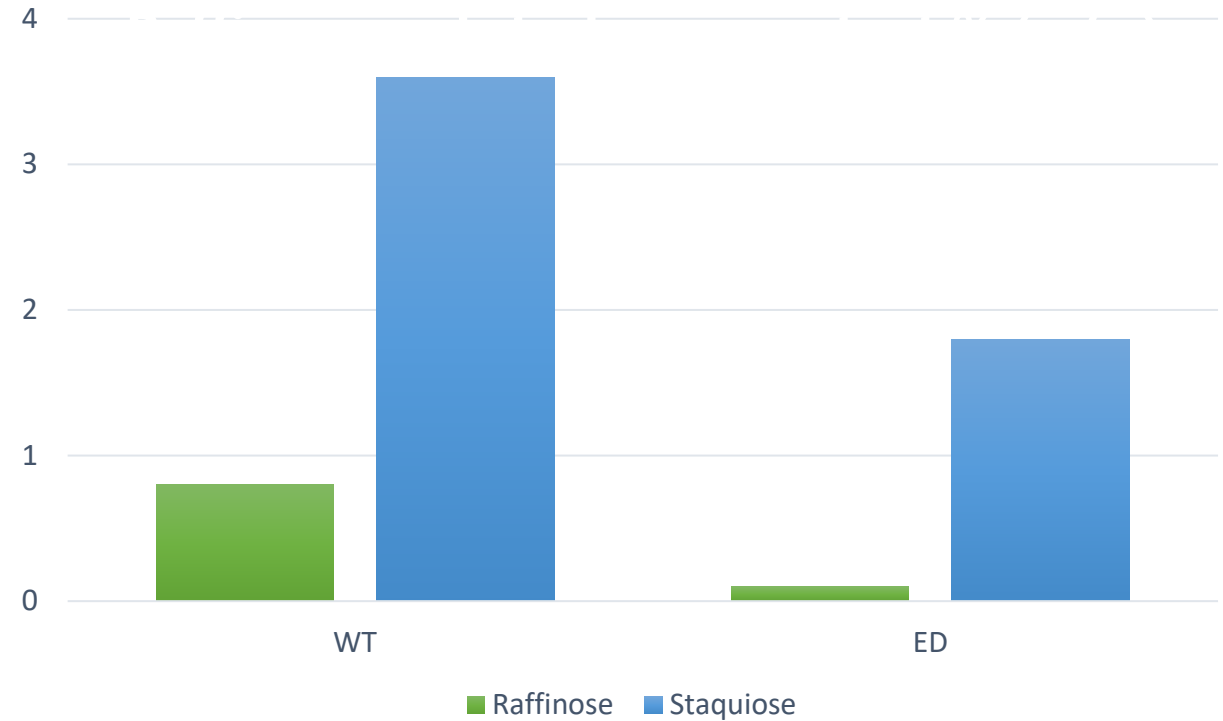
Favorável	12	100%
Contrário	0	0%
Impedimento	0	0%

LOW RAFFINOSE/STACHYOSE PROJECT



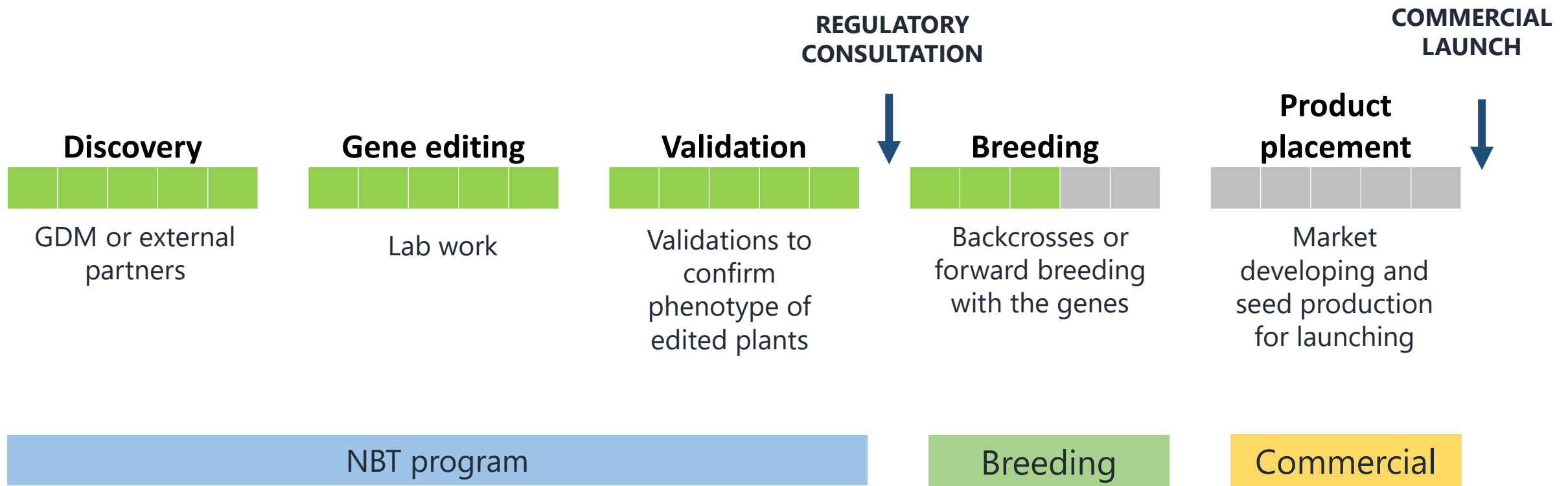
RFOS
human
and m
anima

Increase the nutritional value of soybean meal by elevating the metabolizable energy

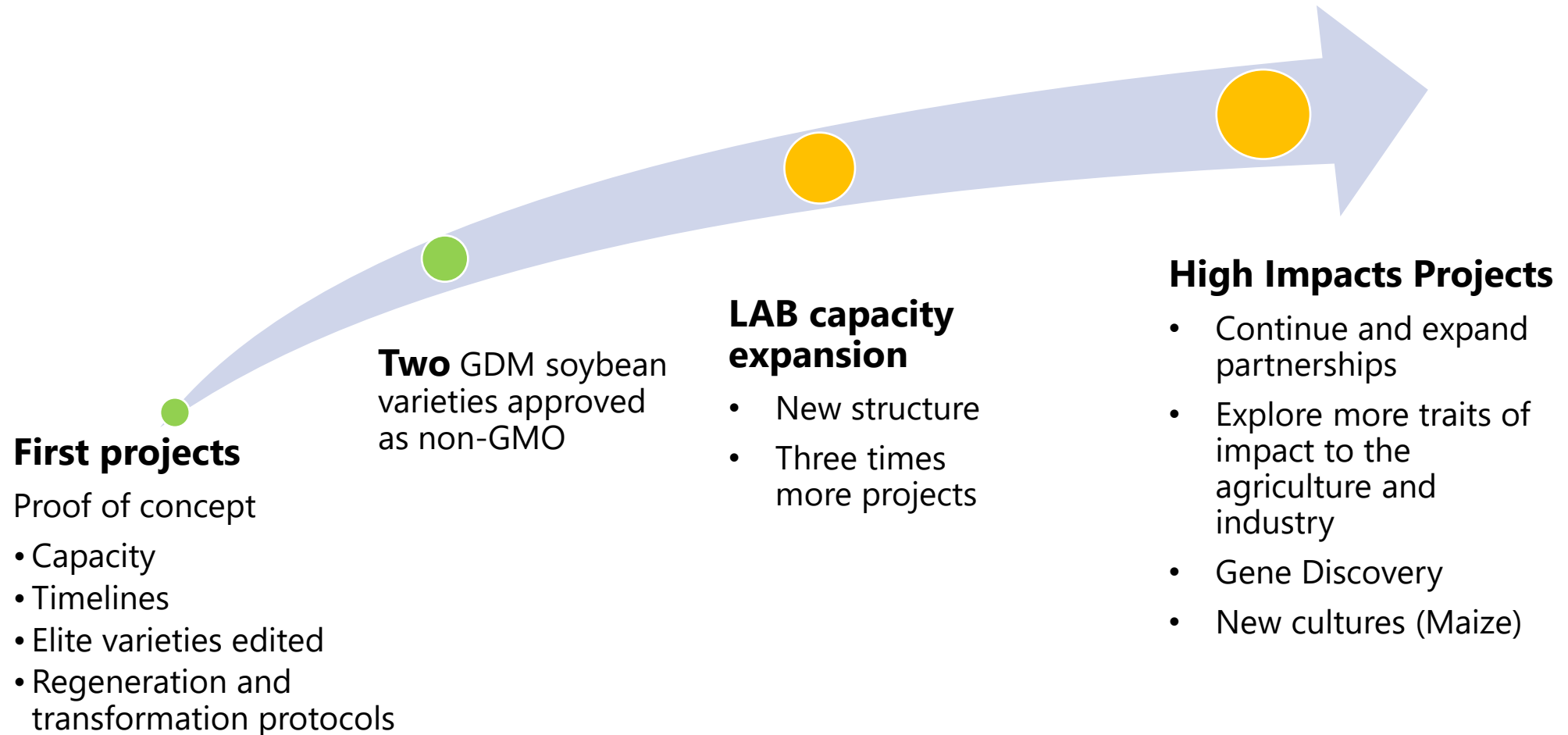


The soybean developed by gene editing has a 85% reduction in raffinose and a 50% reduction in stachyosis. Those features contribute to better digestion and animal weight gain.

Edited varieties will be introduced in GDM breeding programs



FUTURE OF GENE EDITING IN GDM



First field of edited variety of Low Raffinose project



First phenotyping tests with drought stress edited variety in green house and field



Conclusions

- Gene Editing will allow us to expand the genetic diversity available today.
- Regeneration of soybean elite varieties is possible
- GDM has taken the strategic decision to invest in this technology further strengthening its commitment to bring the best genetics to farmers.
- Proud to be the first seed company in Brazil and one of first in the world to develop the first non-GMO edited soybean variety in Brazil.
- Gene Editing will help GDM continue to be present in all relevant markets around the world, contributing to productivity in a sustainable way.



GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAACGGGAGTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAACGGGAGTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAACGGGAGTGGAGCCCCCTCGT
GATTCCAAAC----GTGGAGCCCCCTCGT
GATTCCAAACGGGAGTGGAGCCCCCTCGT
GATTCCAAACGGGAGTGGAGCCCCCTCGT





Thank you!

Contact Information

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GDM

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