
INPUT
Iniciativa para o Uso da Terra

Influence of Climate Anomalies on Crop Failure (1991-14)

INPUT
Iniciativa para o Uso da Terra

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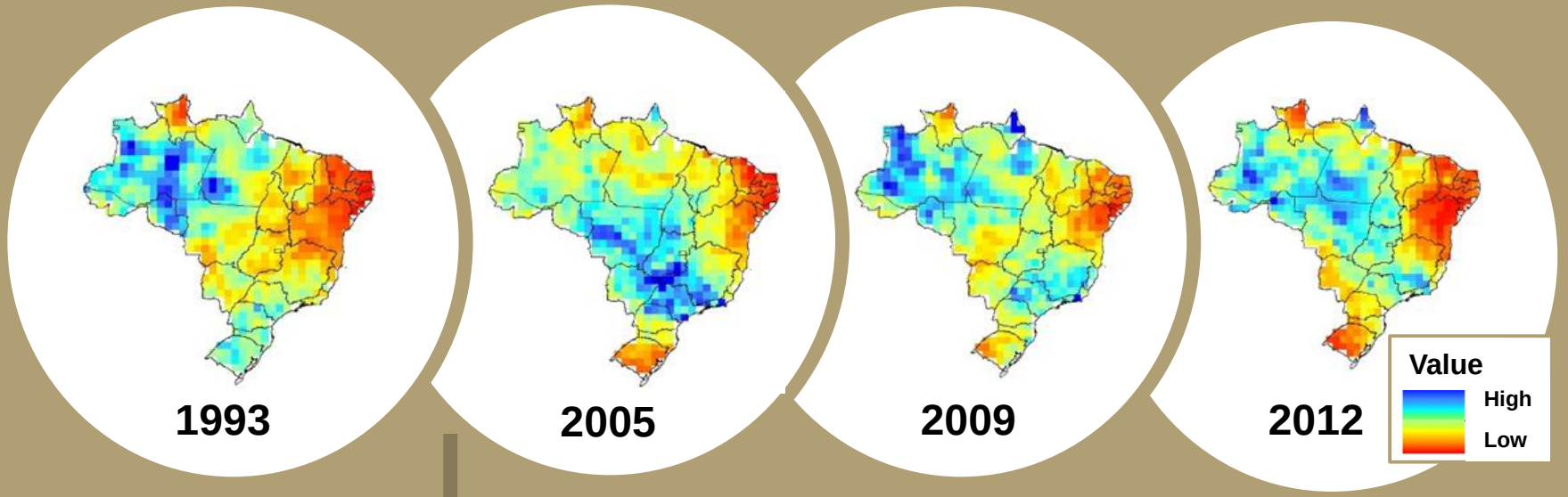
This study has identified extreme climate events of PRECIPITATION and MINIMUM TEMPERATURE in Brazil (1991-2014)

The **determination coefficient (R^2)** indicates the correlation between the climatic anomalies and a SOY, CORN and SUGARCANE crop failure.

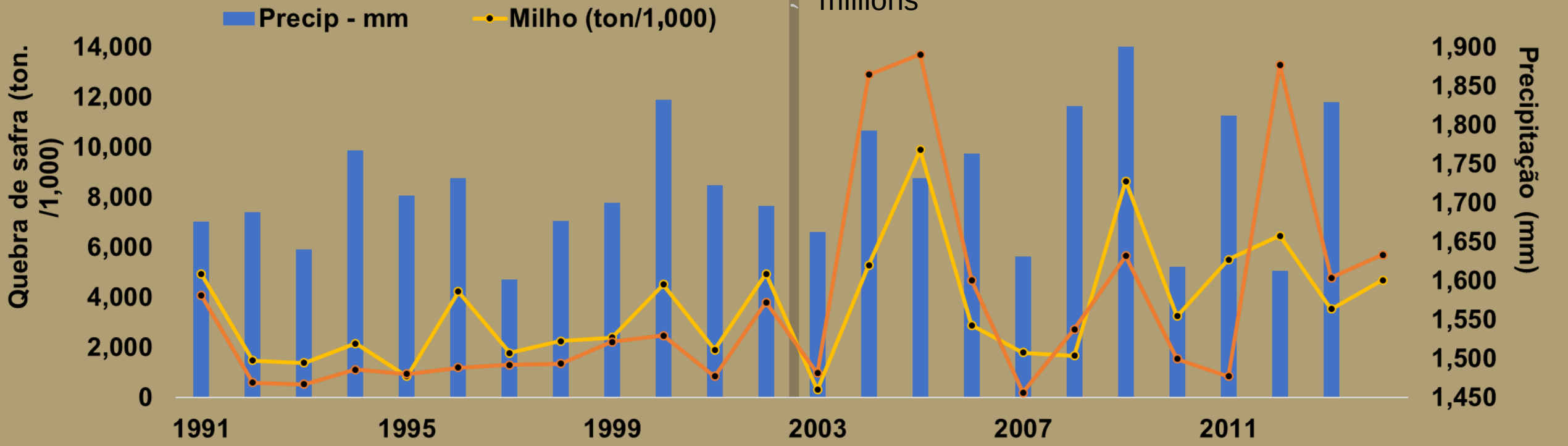
The relations between ANUAL PRECIPITATION and CULTURES crop failure

Total:
Soy - 88 millions tons
Corn - 87 millions tons



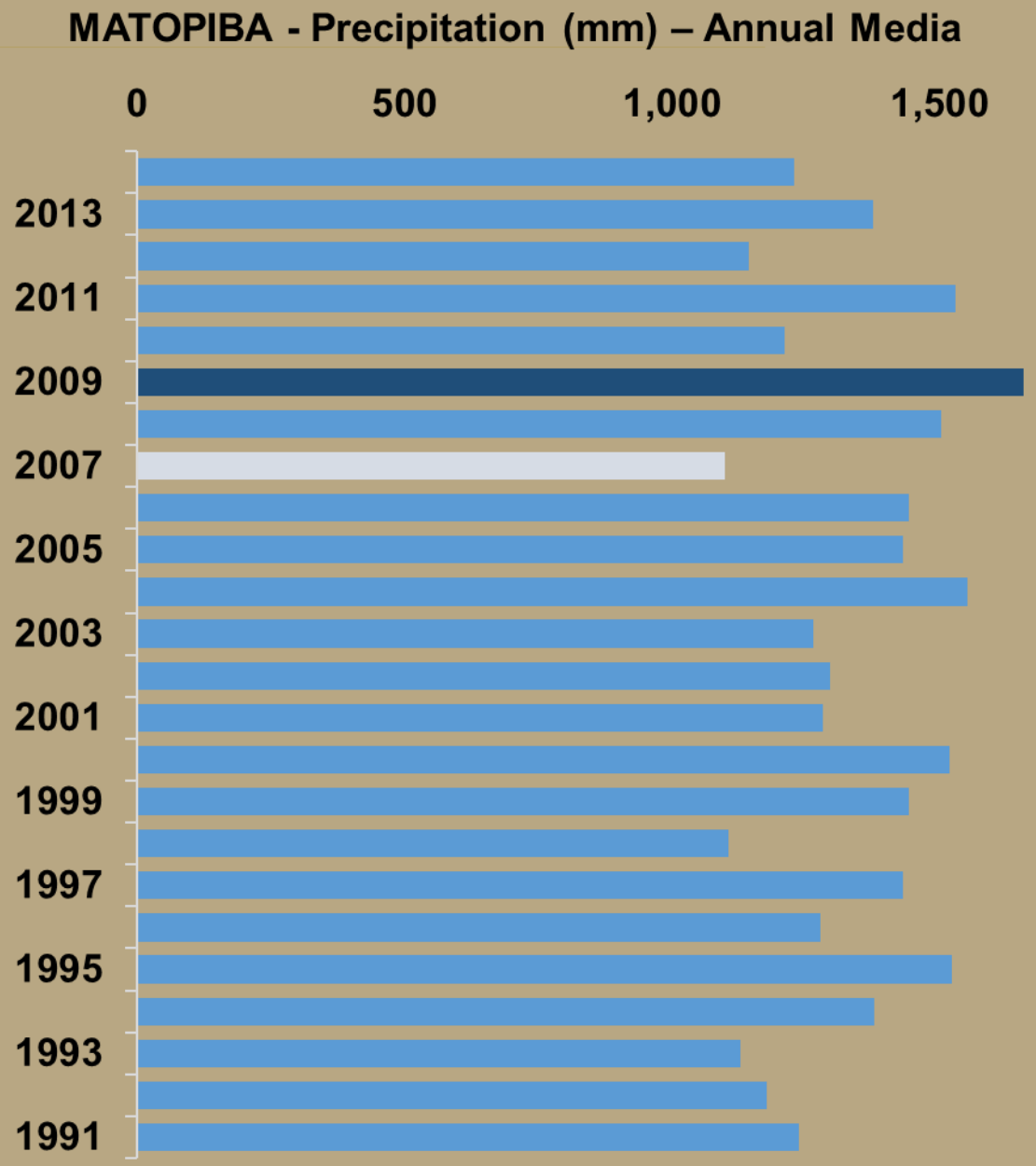
Scenario 1
1991-2002 - Soy: 21 millions / Corn: 33 millions

Scenario 2
2003-2014 - Soy: 67 millions / Corn: 54 millions



MATOPIBA x Precipitation

Precipitation - Annual Media: 1.250 a 1.450 mm



High and lower average precipitation in the period (1991 – 2014):

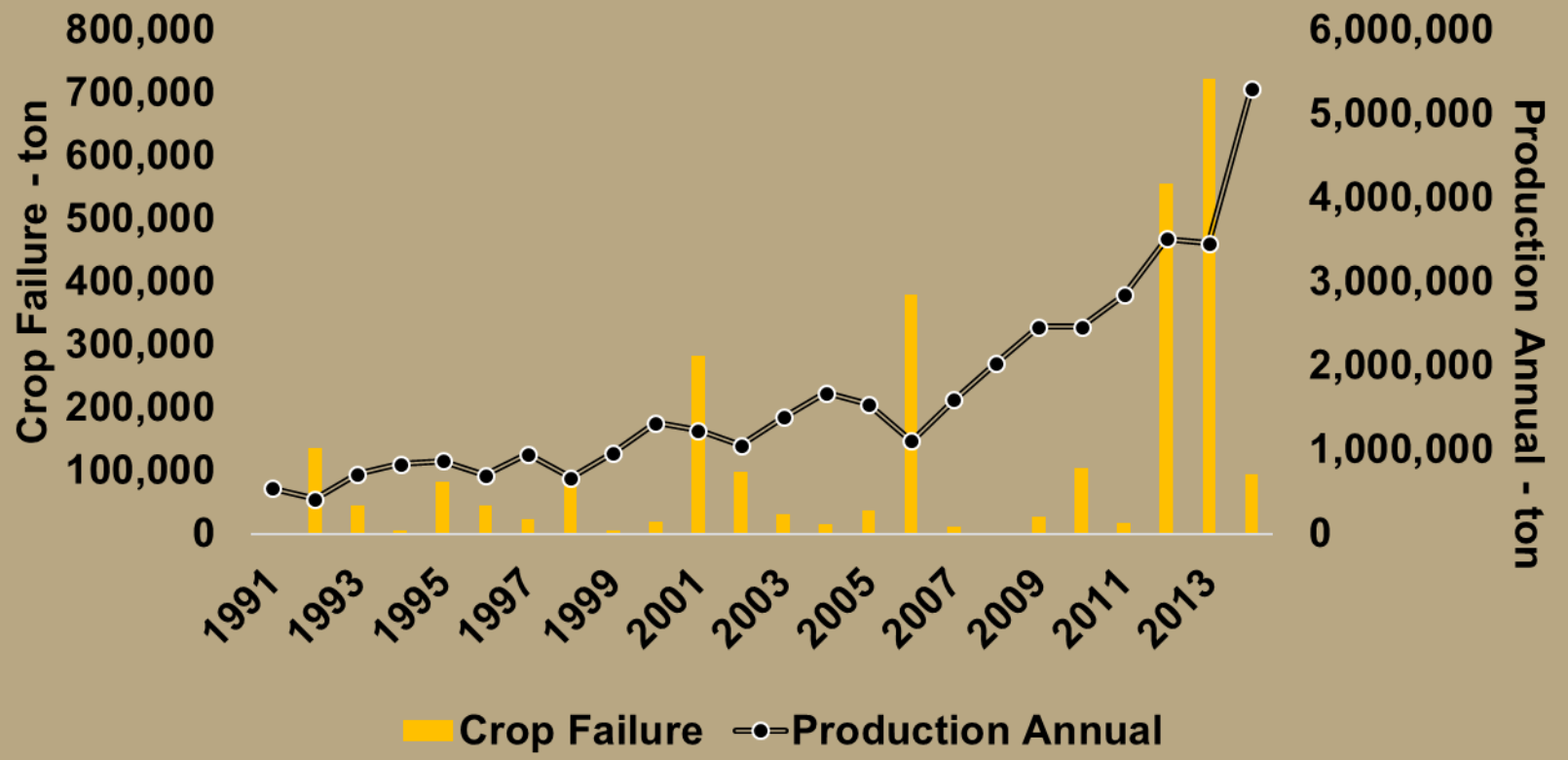
1,657 mm

1,099 mm

MATOPIBA – Corn – Crop Failure x Annual Production

Precipitation - Annual Media: 1.250 a 1.450 mm

- For MATOPIBA, it is an Agricultural Frontier, with production related to the fast growing Agribusiness, corn is increasingly exposed to areas that had previously no cultivation, which in addition to increasing production, increases the chance of crop failure, due to the use of land with less suitable agricultural skills.
- A fact that could be circumvented by the intensification of livestock, and the use of land already exploited.



MATOPIBA – Soy – Crop Failure x Annual Production

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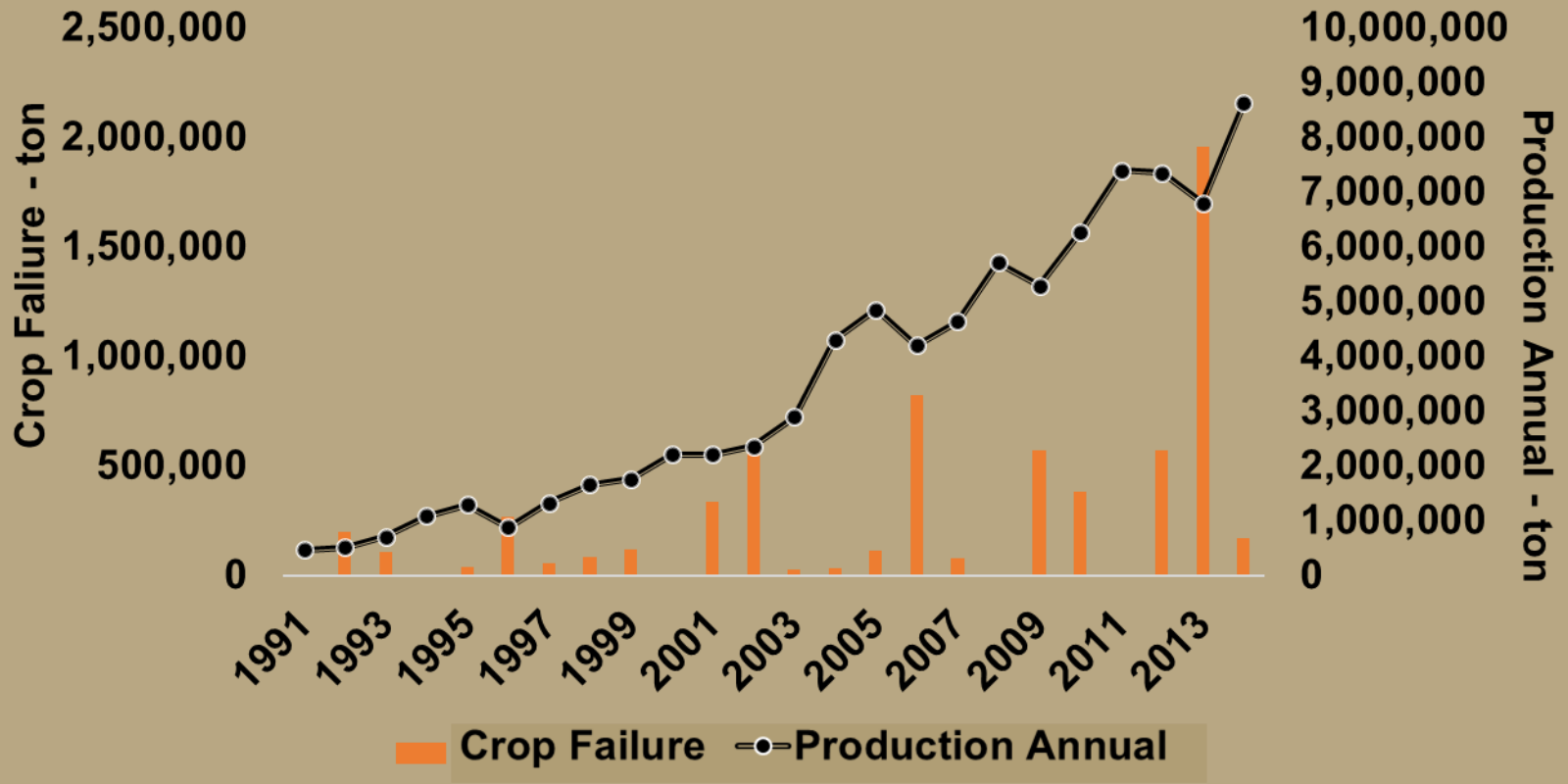

MATOPIBA – Corn and Soy – Crop Failure x Annual Production

- For MATOPIBA, it is an Agricultural Frontier, with production related to the fast growing Agribusiness, corn is increasingly exposed to areas that had previously no cultivation, which in addition to increasing production, increases the chance of crop failure, due to the use of land with less suitable agricultural skills.
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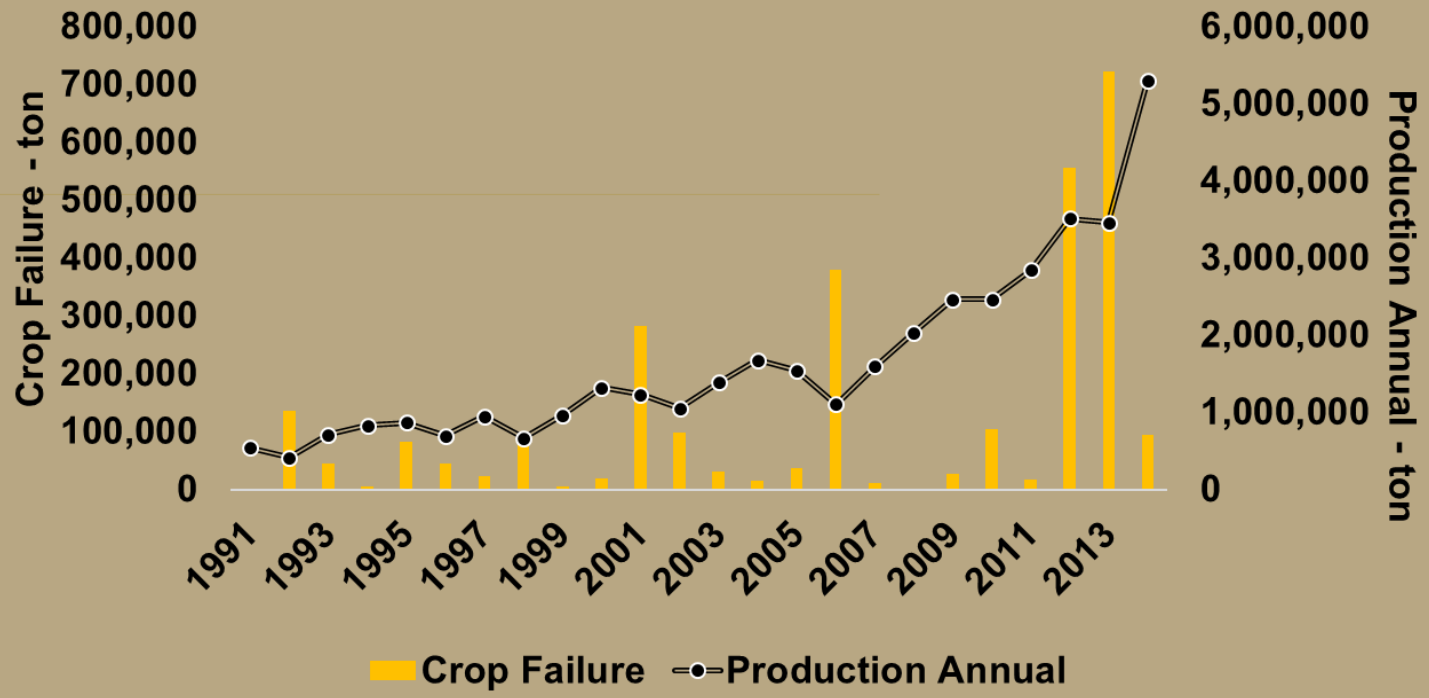
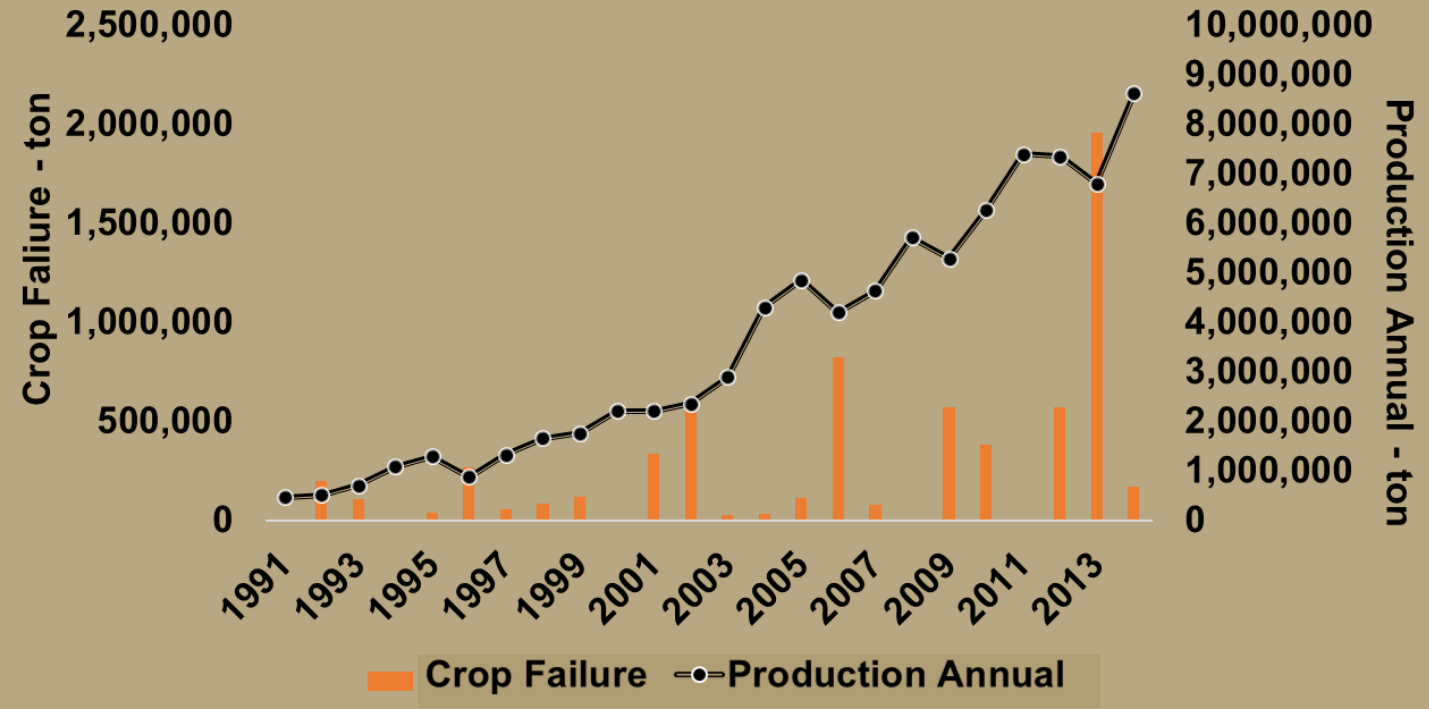
Precipitation - Annual Media: 1.250 a 1.450 mm



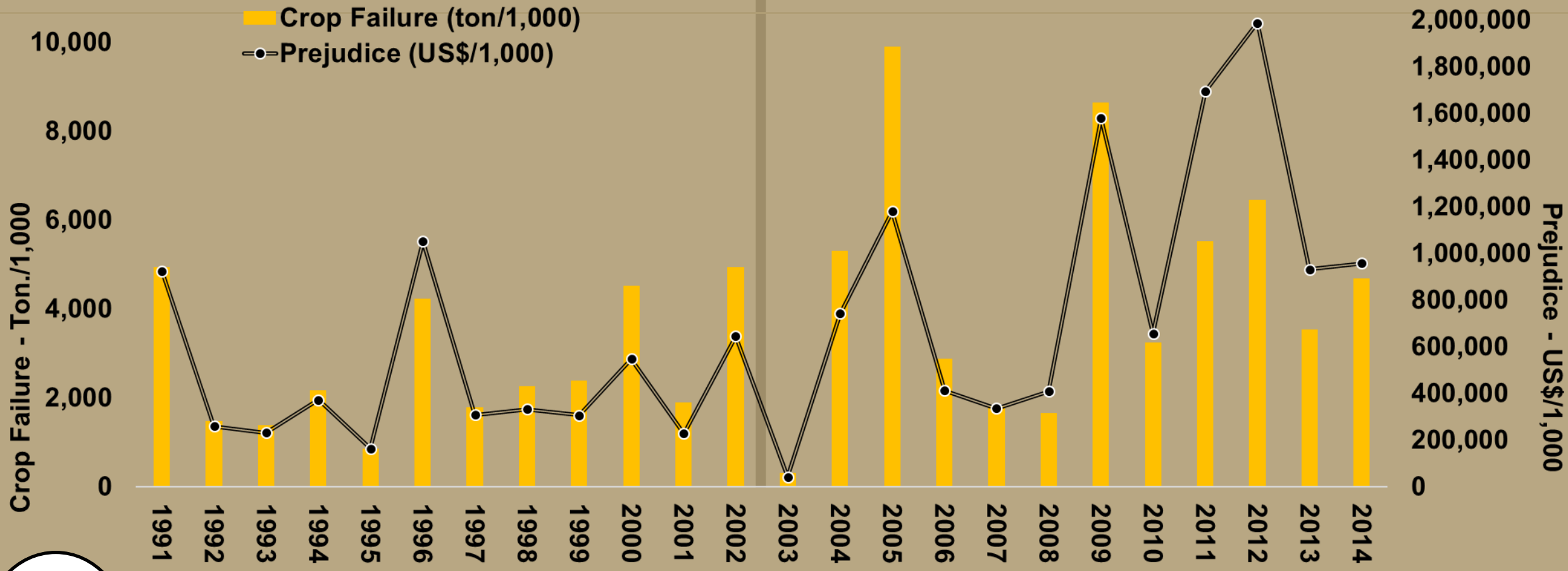


Correlations crop failure X losses in CORN

Total: 87 millions tons

Scenario 1
1991-2002 - 33 millions tons

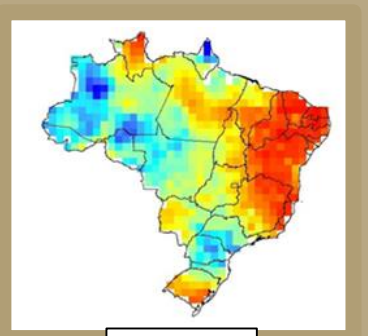
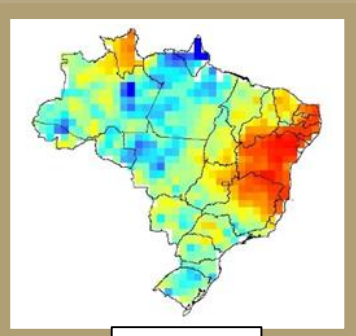
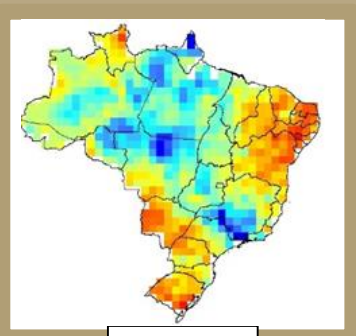
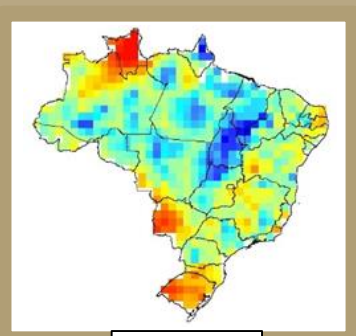
Scenario 2
2003-2014 - 54 millions tons



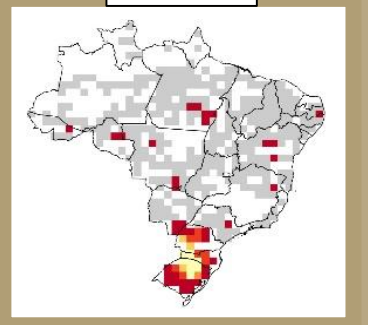
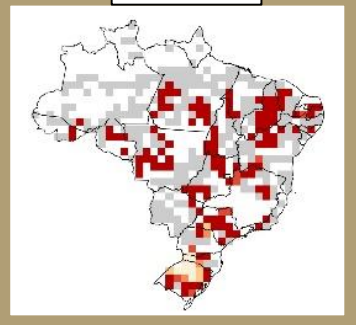
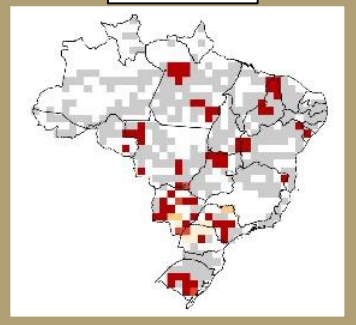
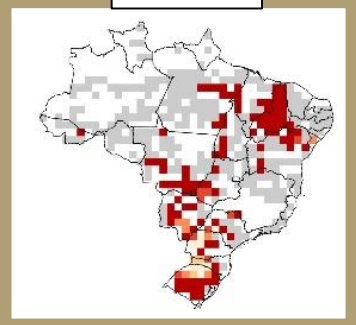
World Bank (US$/ton)	$ 187	$ 176	$ 167	$ 172	$ 192	$ 248	$ 173	$ 148	$ 128	$ 121	$ 120	$ 131	$ 135	$ 140	$ 119	$ 143	$ 186	$ 245	$ 183	$ 202	$ 307	$ 308	$ 263	$ 204

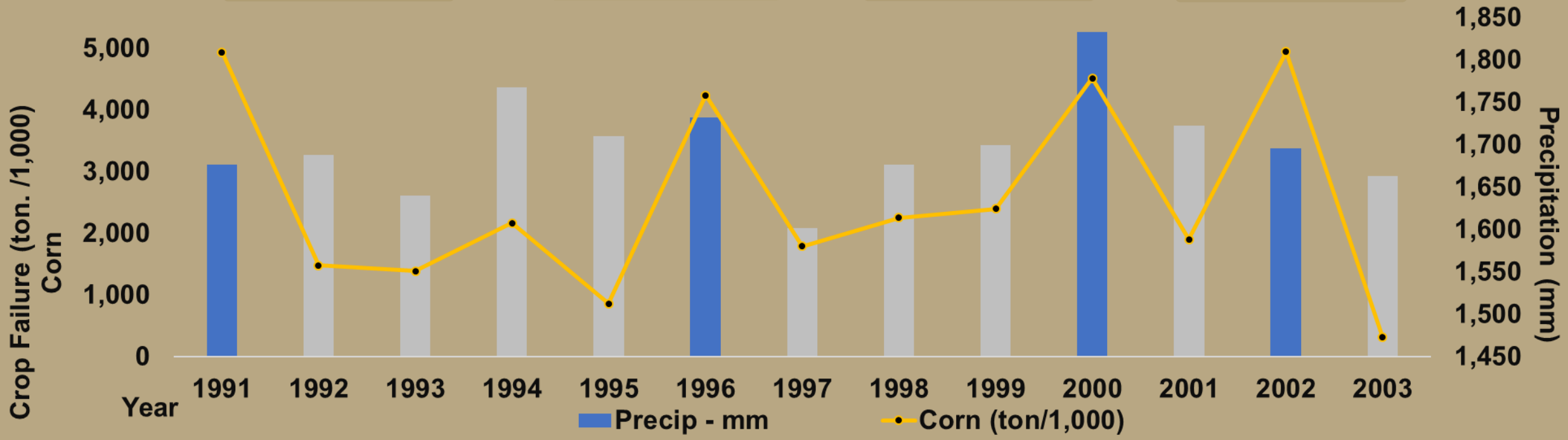
Precipitation

Corn

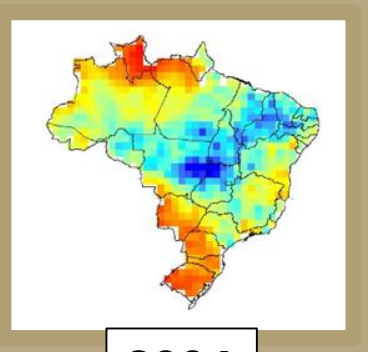
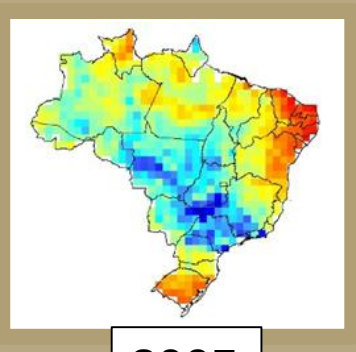
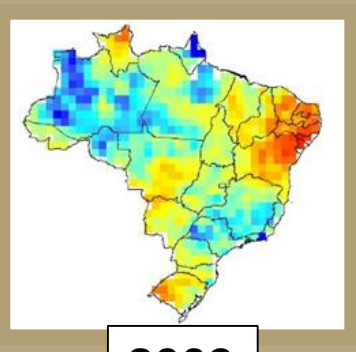
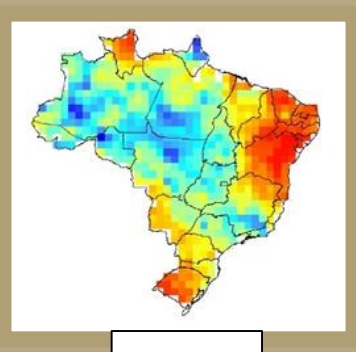
1991 1996 2000 2002

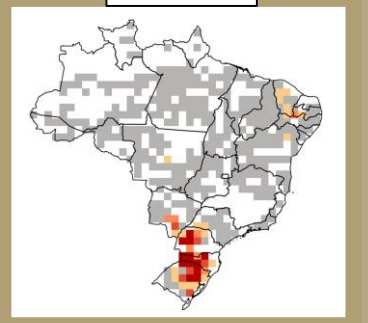
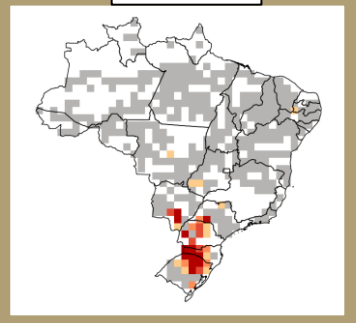
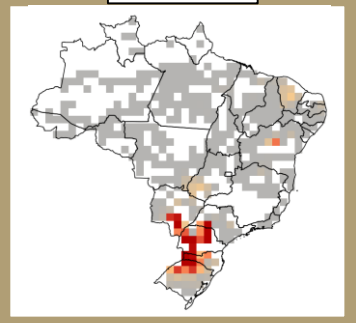
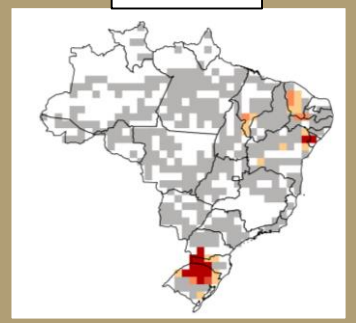


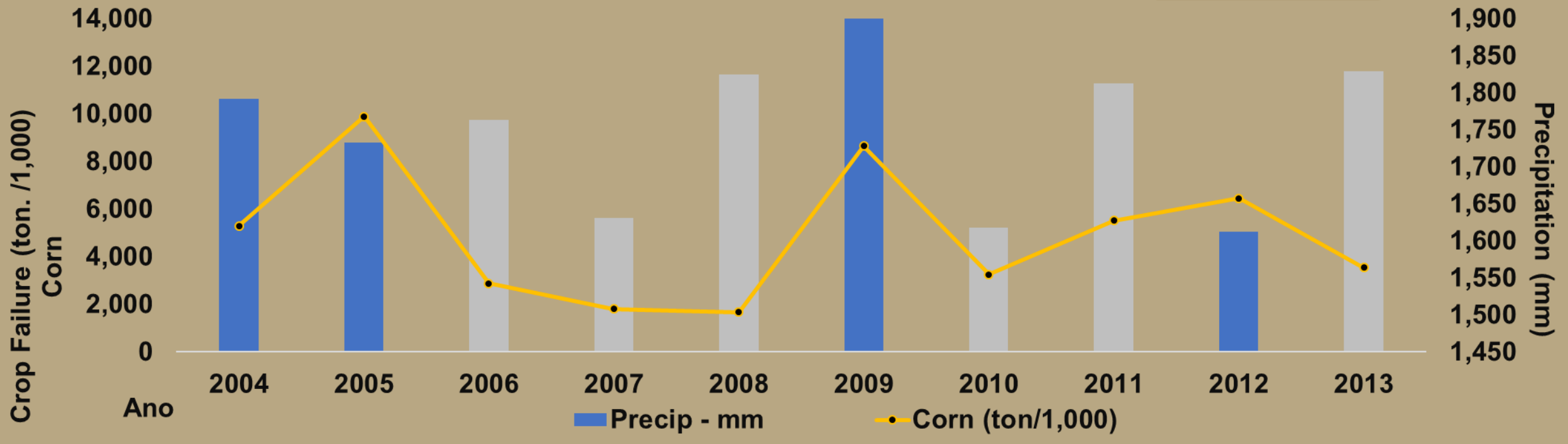
Precipitation

Corn

2004 2005 2009 2012

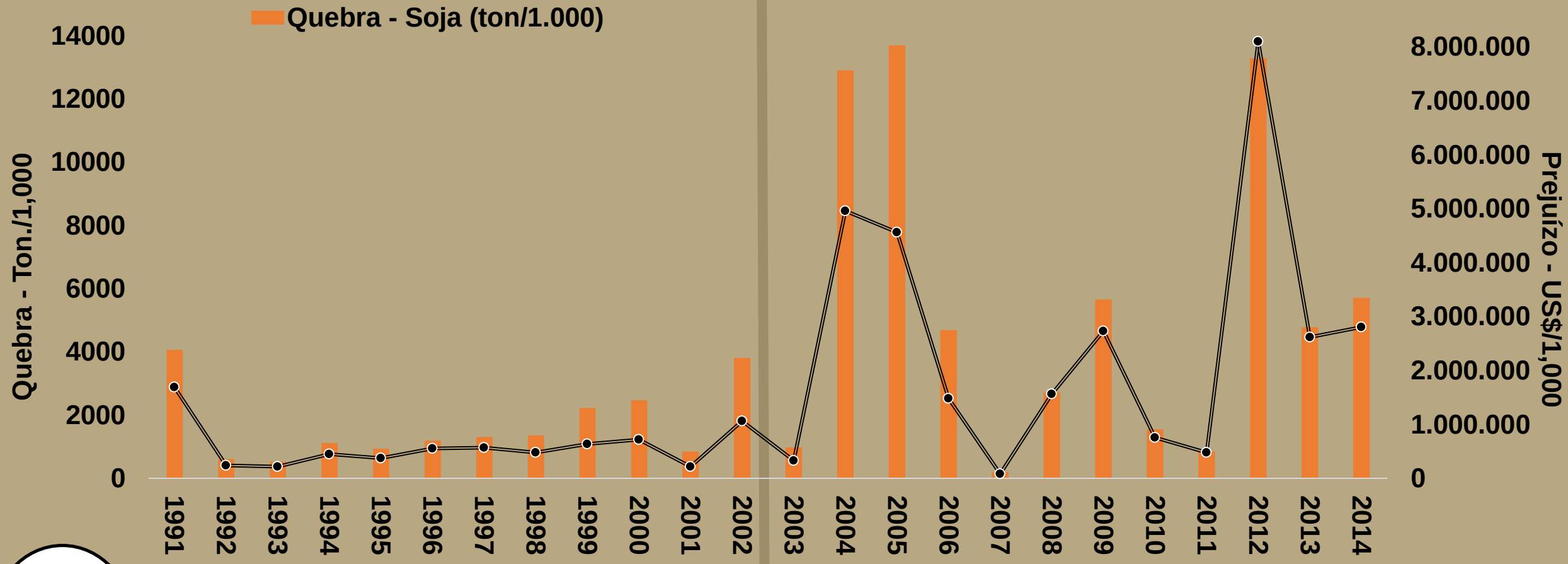


Correlations crop failure X losses in SOY

Total: 88 millions tons

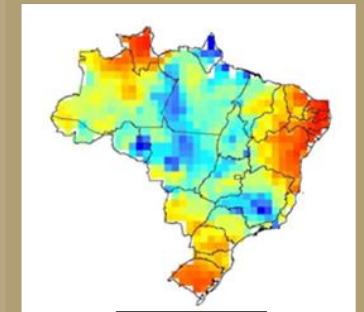
Scenario 1
1991-2002 - 21 millions tons

Scenario 2
2003-2014 – 67 millions tons

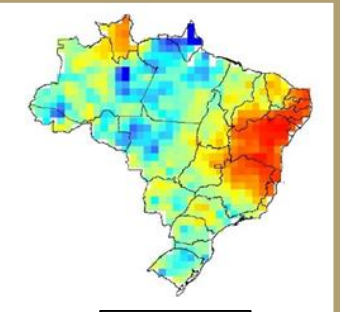


Bolsa de Chicago (US$/ton)	$ 416	$ 397	$ 418	$ 402	$ 403	$ 460	$ 436	$ 353	$ 287	$ 291	$ 262	$ 280	$ 340	$ 384	$ 333	$ 315	$ 439	$ 575	$ 482	$ 488	$ 569	$ 610	$ 547	$ 492

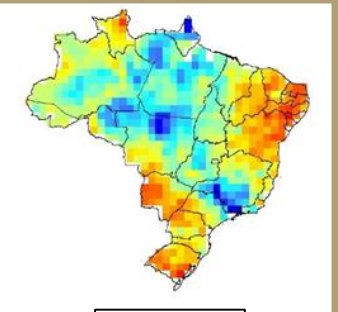
Precipitation



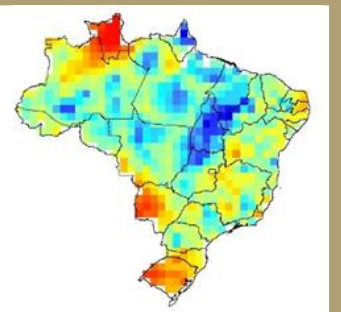
1991



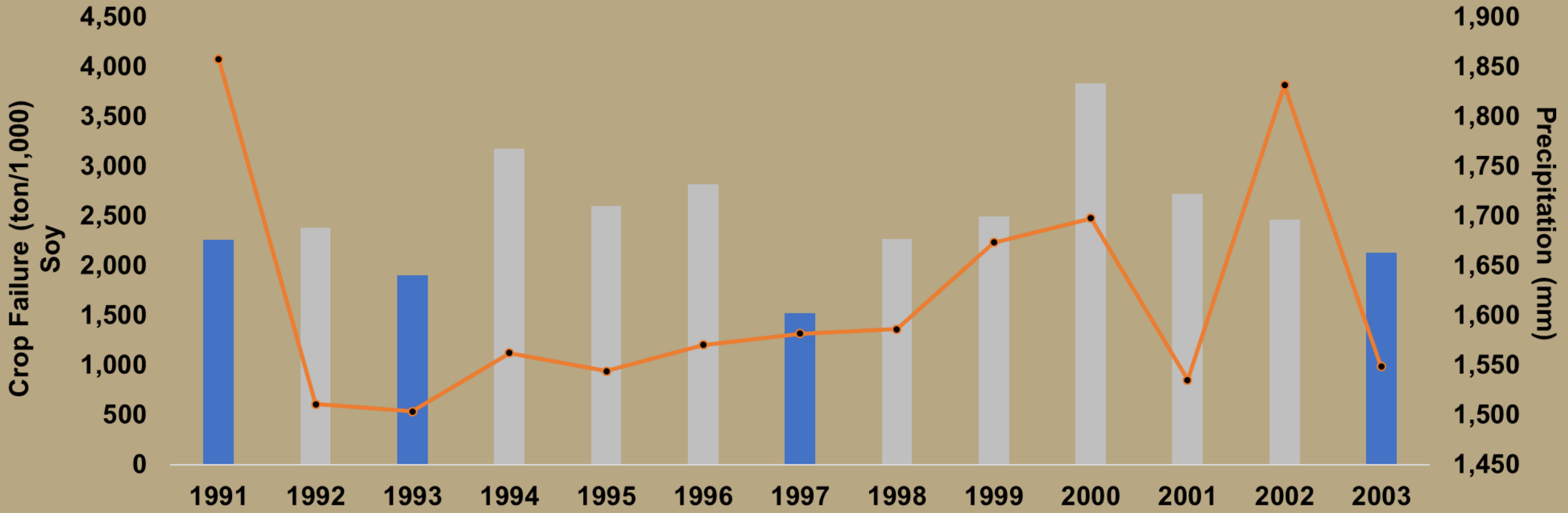
1993

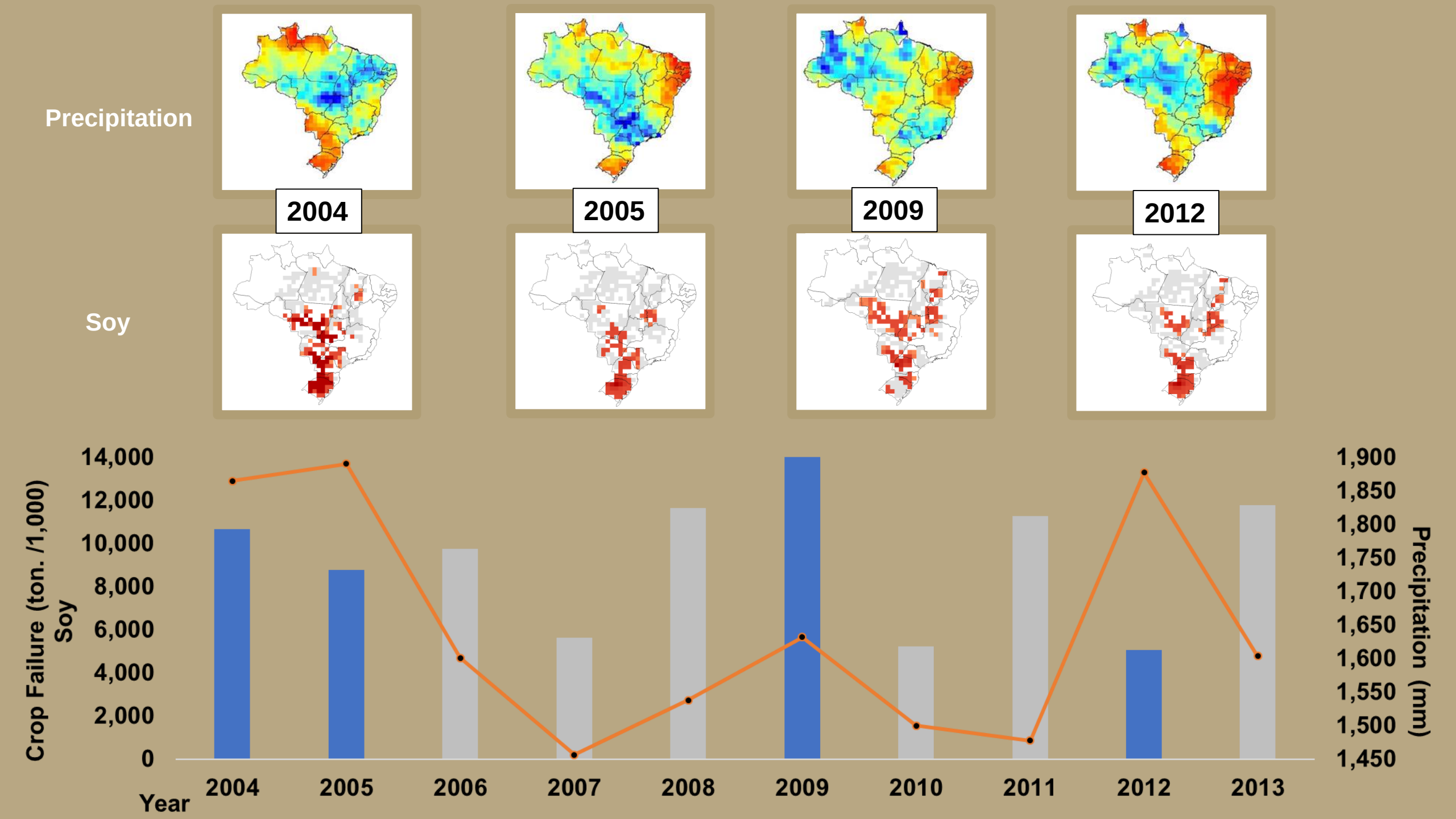


1997



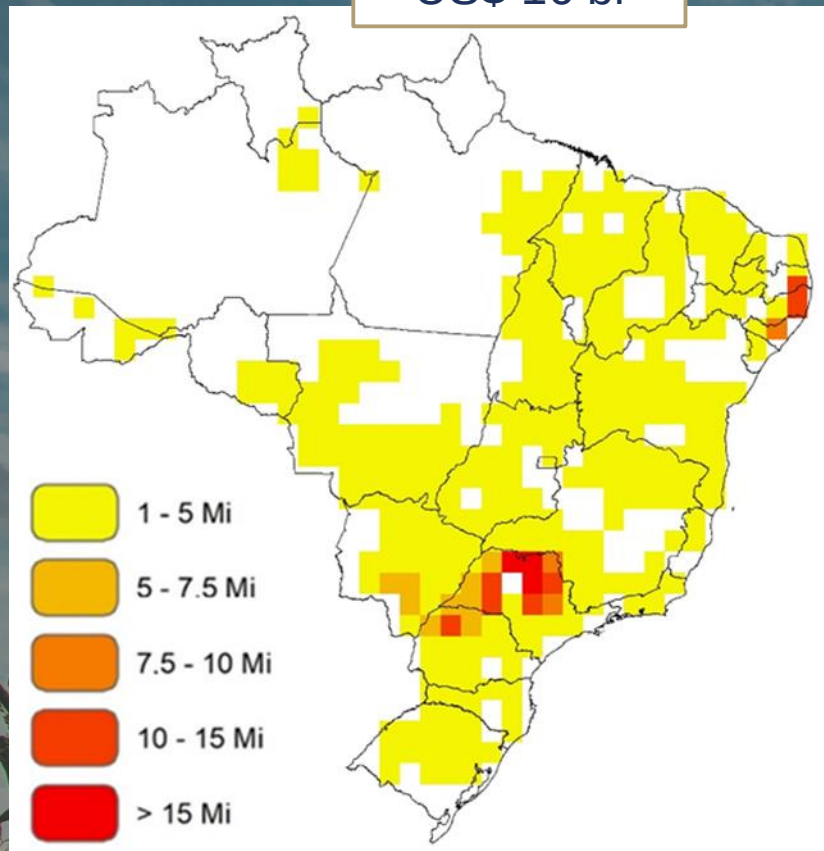
2003



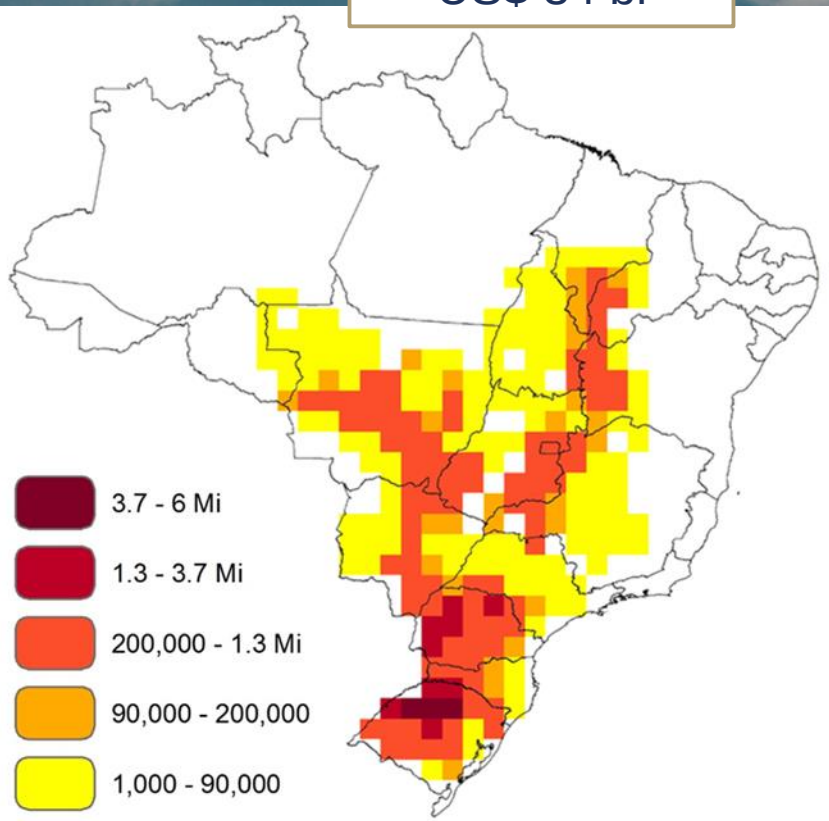

Precipitation
2004
2005
2009
2012
Soy
Crop Failure (ton. /1,000)
Soy
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Year
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
1,900
1,850
1,800
1,750
1,700
1,650
1,600
1,550
1,500
1,450
Precipitation (mm)

COMPARATIVE – Crop Failure (ton.)
1991-2014

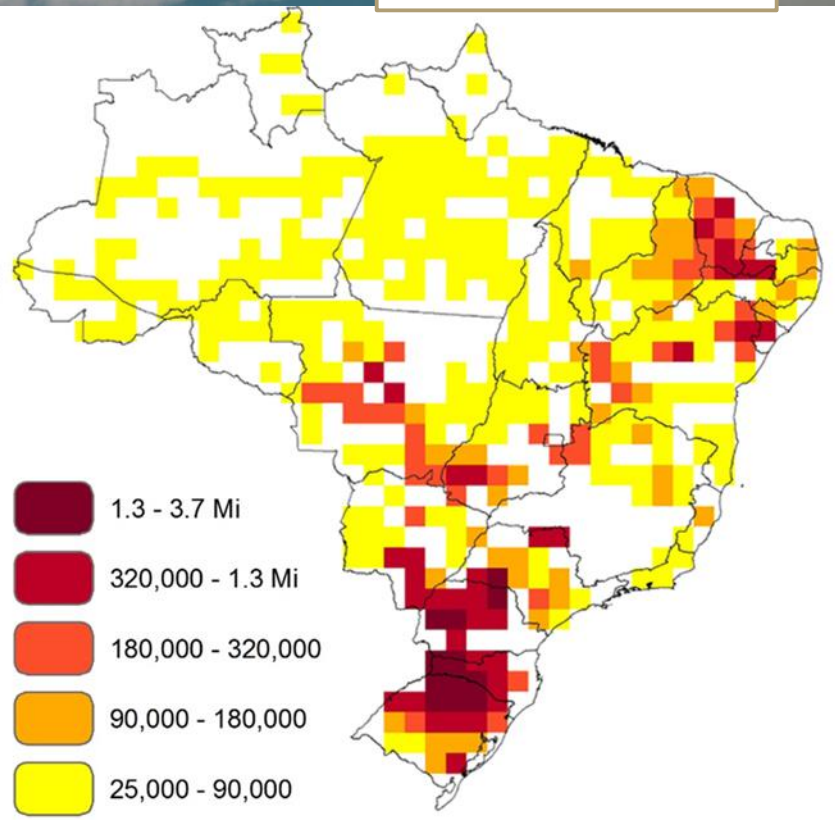
Sugarcane
Crop failures:
US$ 16 bi



Soy
Crop failures:
US$ 34 bi

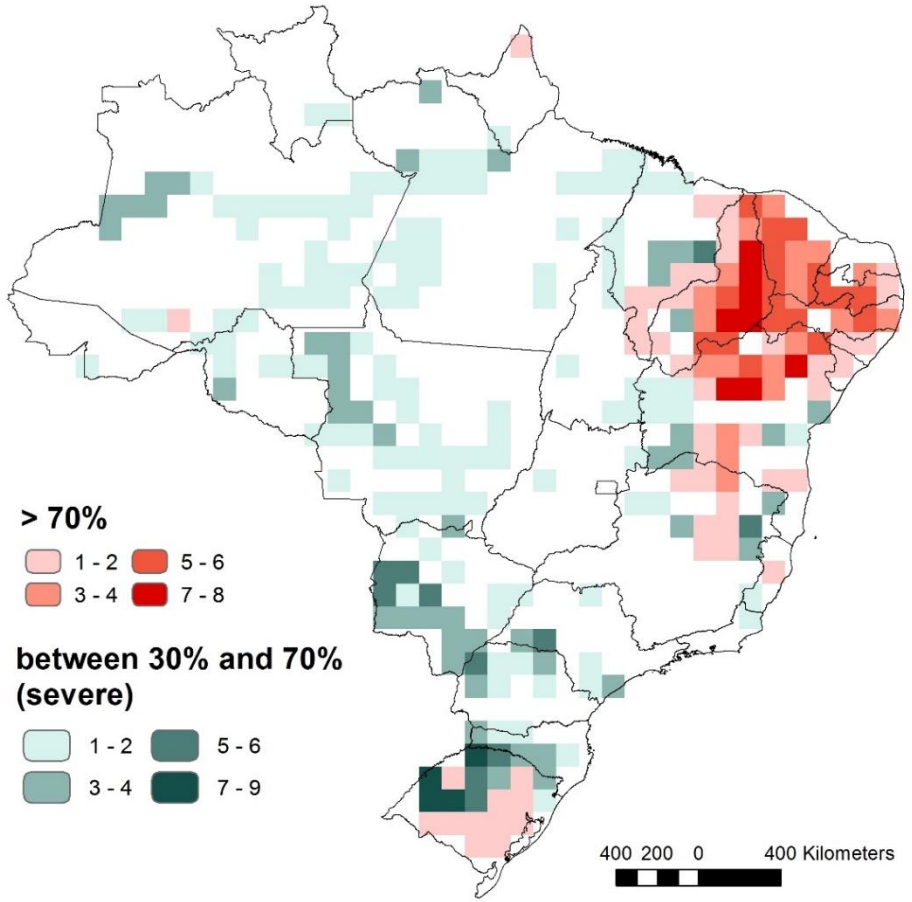


Corn
Crop failures:
US$ 9 bi

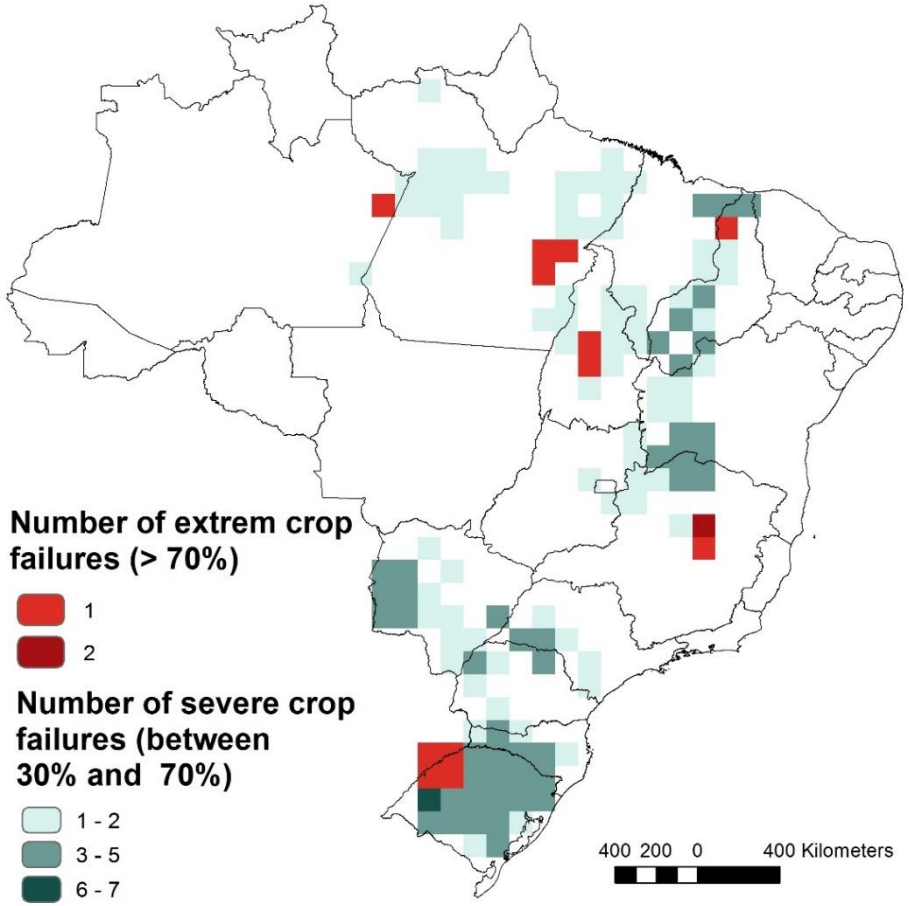


COMPARATIVE – Number of Extrem and Severe Crop Failure – 1991-2014

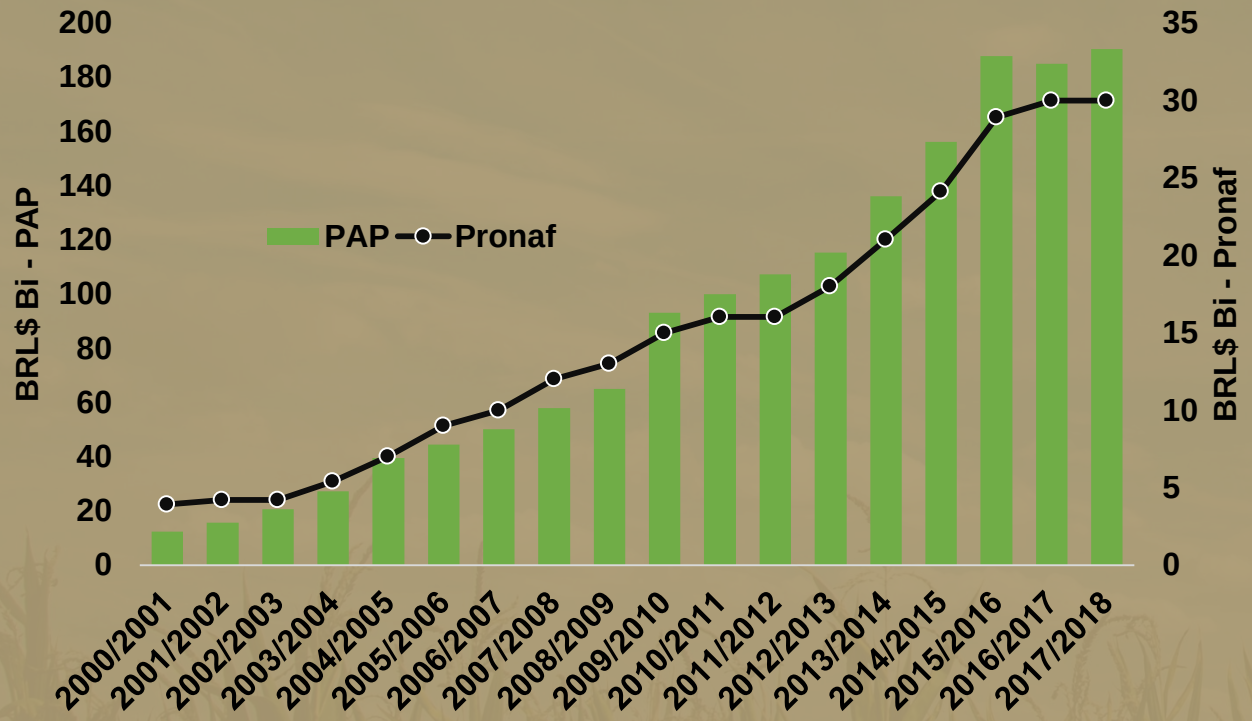
Corn



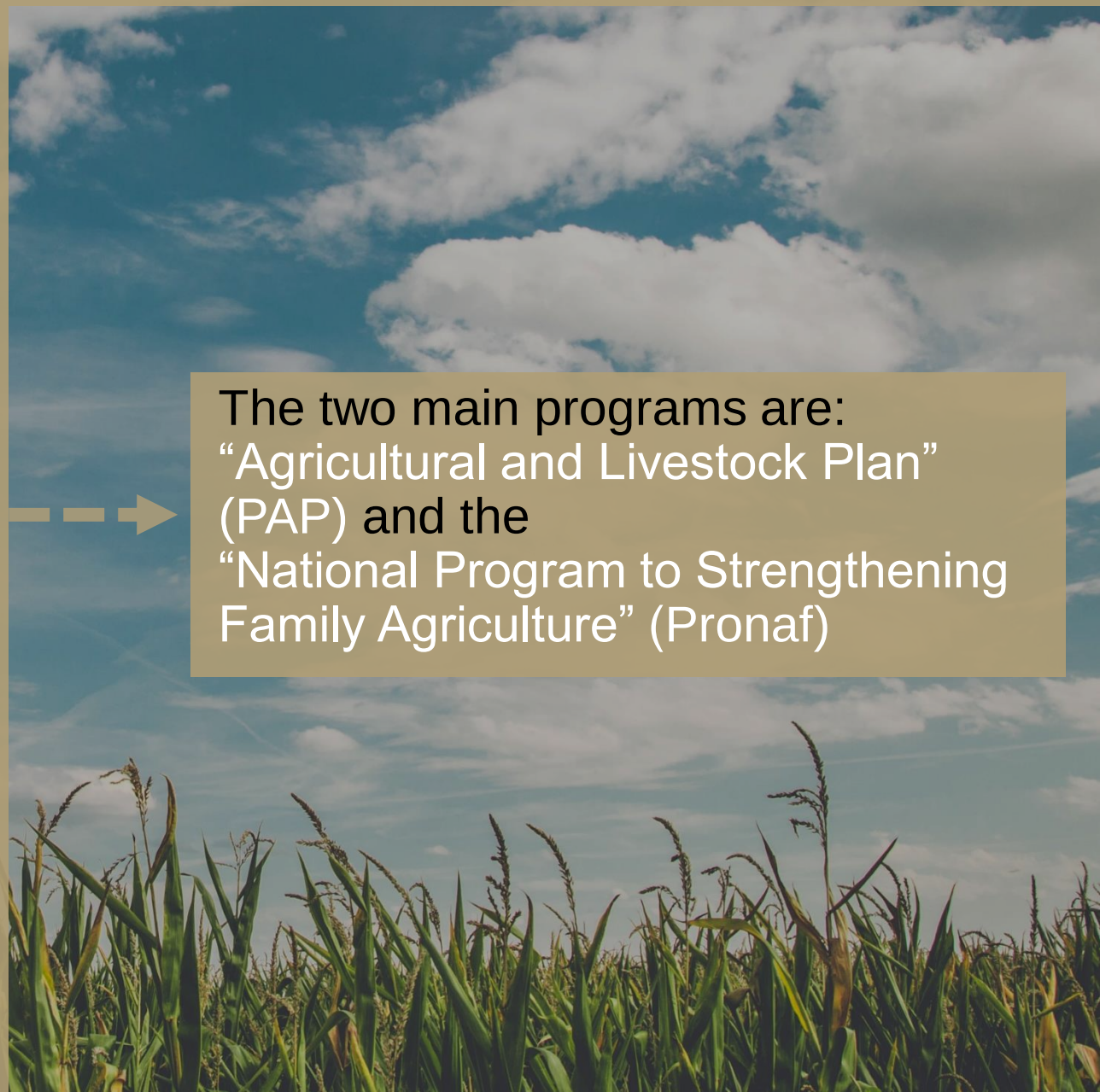
Soy



The public credit are among the instruments available to finance rural activities.

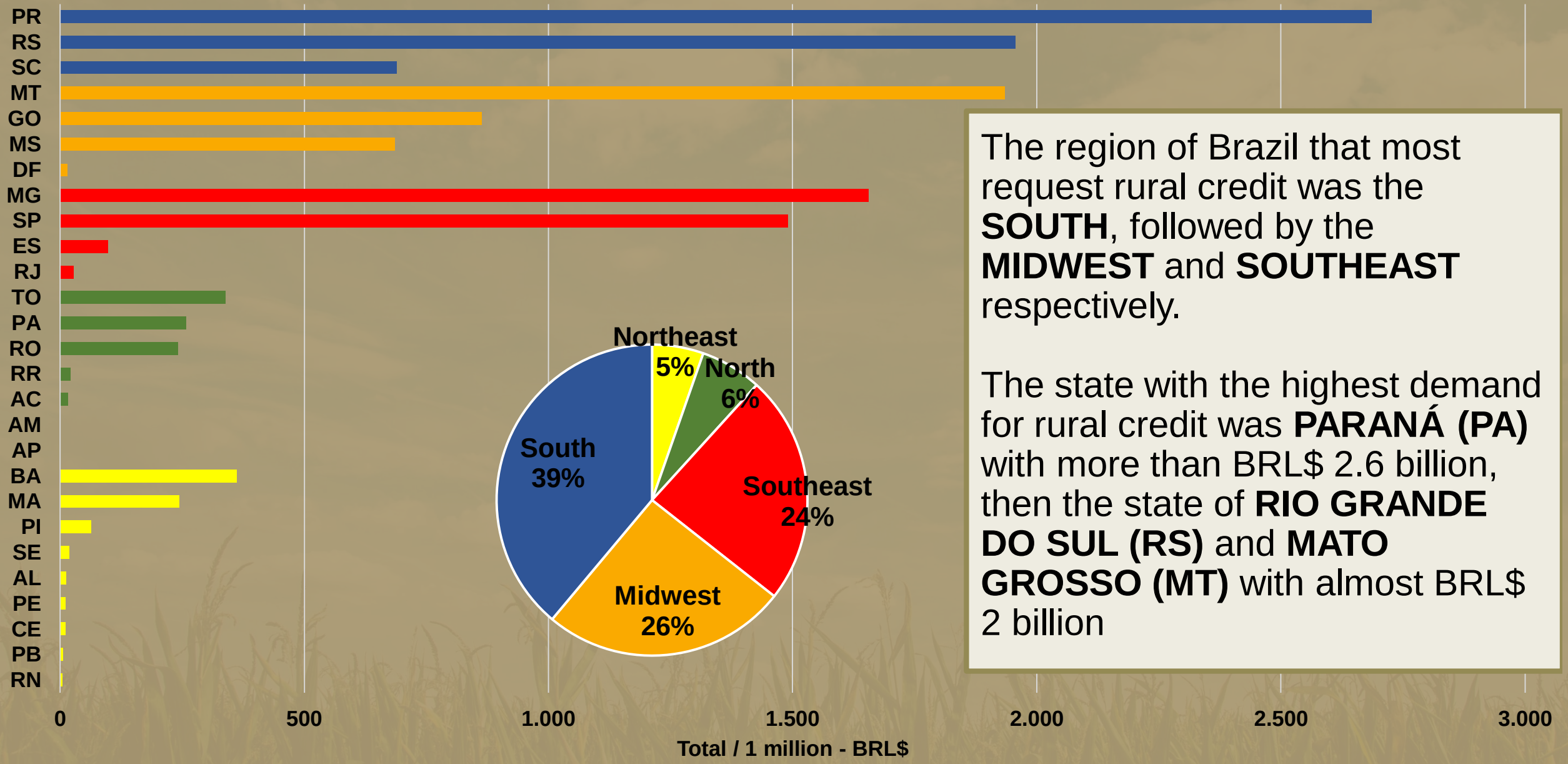


Source: SICOR/Central Bank of Brazil
Obs.: the year 2017/2018 are estimates of the amount of crédit.



The two main programs are:
"Agricultural and Livestock Plan" (PAP) and the
"National Program to Strengthening Family Agriculture" (Pronaf)

Rural Credit in Brazil - July 2016/May 2017



The region of Brazil that most request rural credit was the **SOUTH**, followed by the **MIDWEST** and **SOUTHEAST** respectively.

The state with the highest demand for rural credit was **PARANÁ (PA)** with more than BRL$ 2.6 billion, then the state of **RIO GRANDE DO SUL (RS)** and **MATO GROSSO (MT)** with almost BRL$ 2 billion

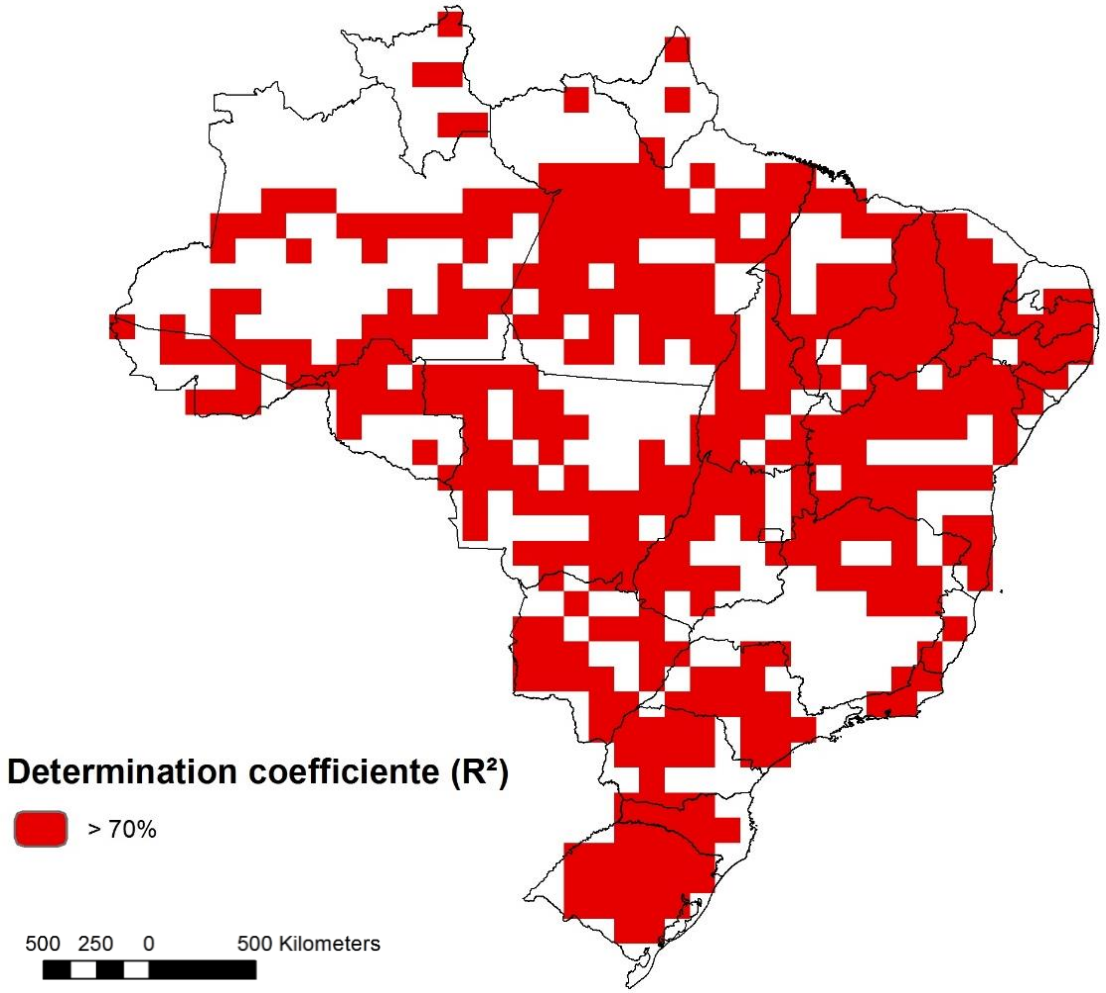
Source: SICOR/Central Bank of Brazil

Crop Failure in Brazil:

CORN

Period of Review:
1991 - 2014

Corn - Relationship between climate and crop failure



When **$R^2 > 0.7$** we consider that a climatic event caused a crop failure, in other words: **crop failures occur due to climatic events.** In this study, we consider only **areas where the crop failures are correlated with extreme climatic event.** The map on the right shows the total area studied.

We also subdivided the total area into **three other areas of study interest:**

Cerrado Biome

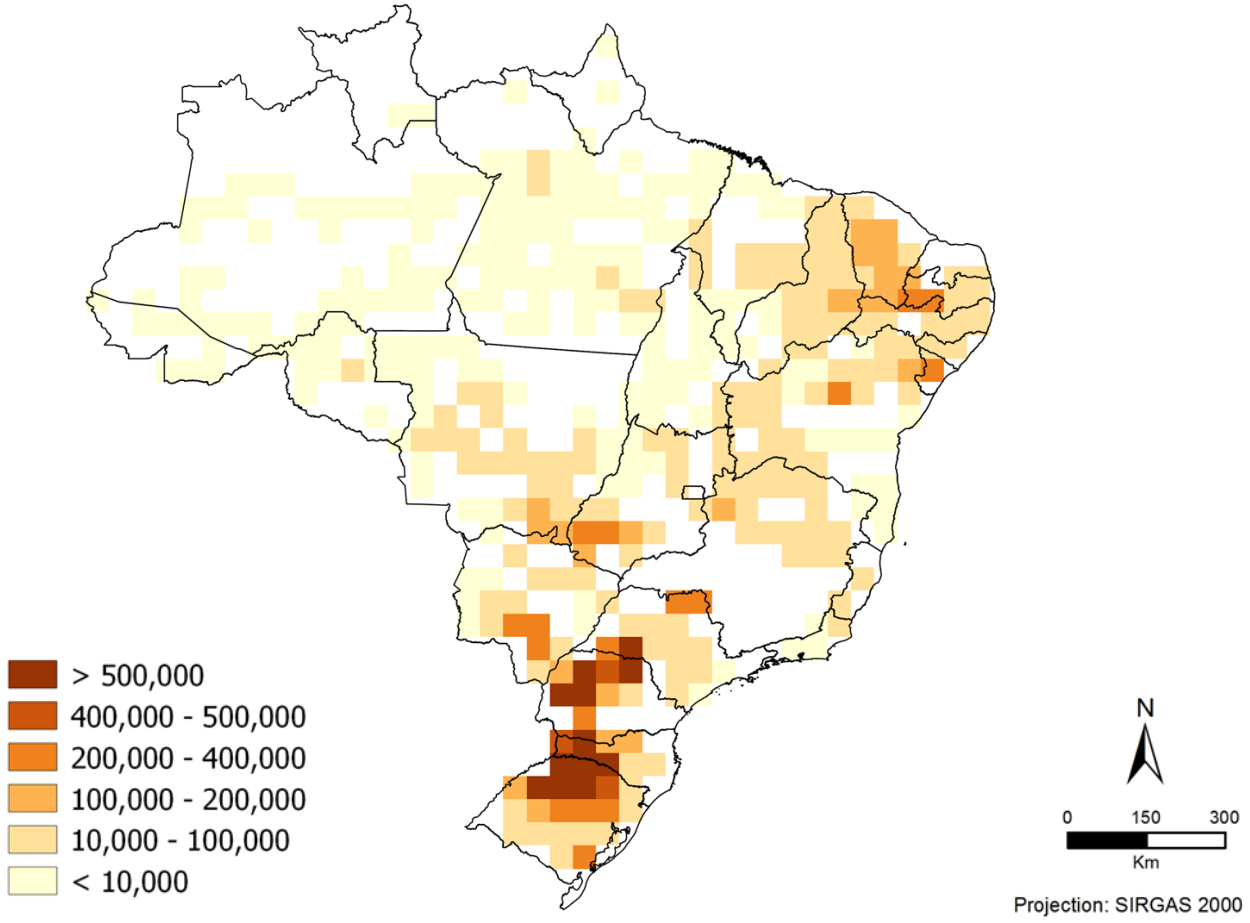
MATOPIBA

State of Mato Grosso

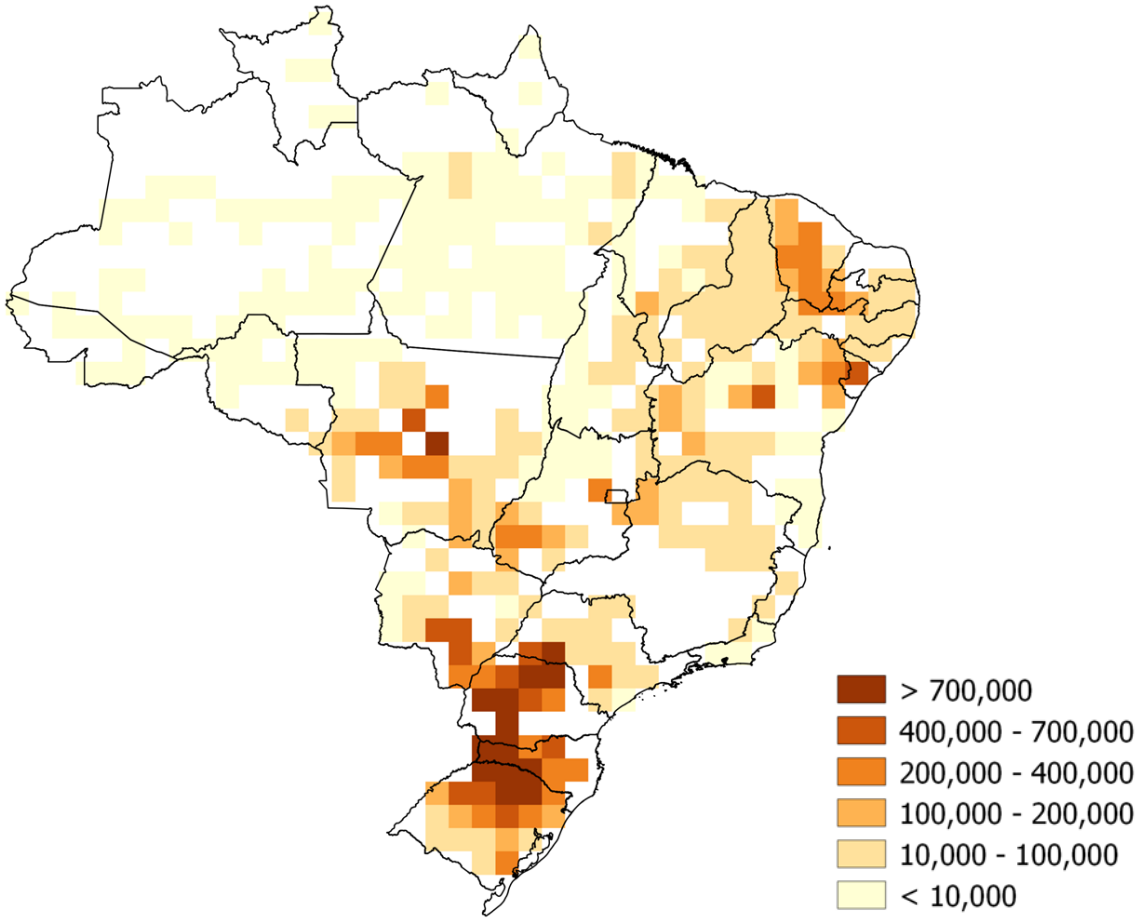
South region

Corn - Crop failures (tons) - 2 periods - Brazil

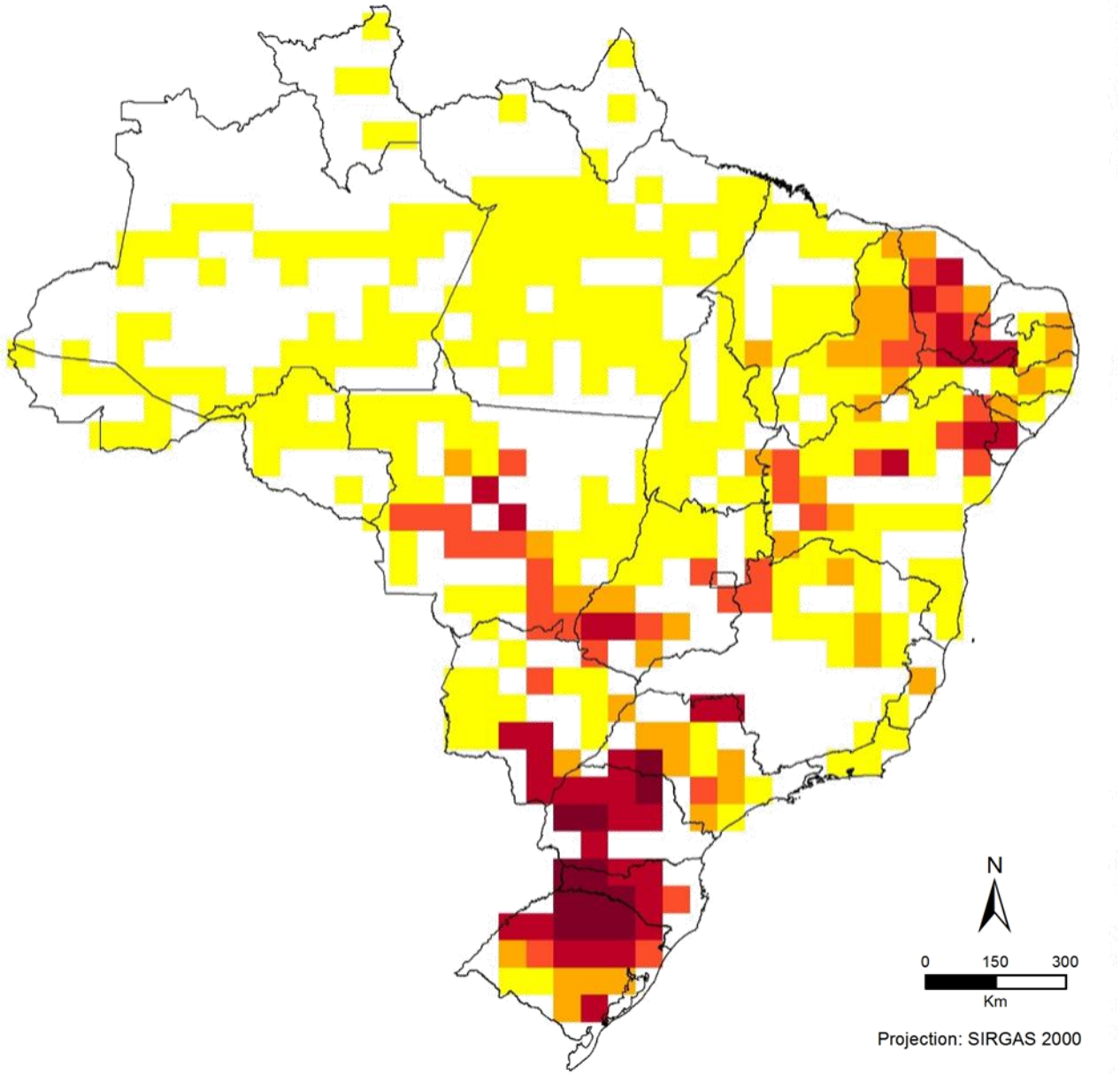
Scenario 1
Years: 1991-2002
Total Crop Failure: 33 millions tons



Scenario 2
Years: 2003-2014
Total Crop Failure: 54 millions tons



Corn - Crop failures (tons) - 1991-2014 - Brazil



*Total production:
1.1 billion tons

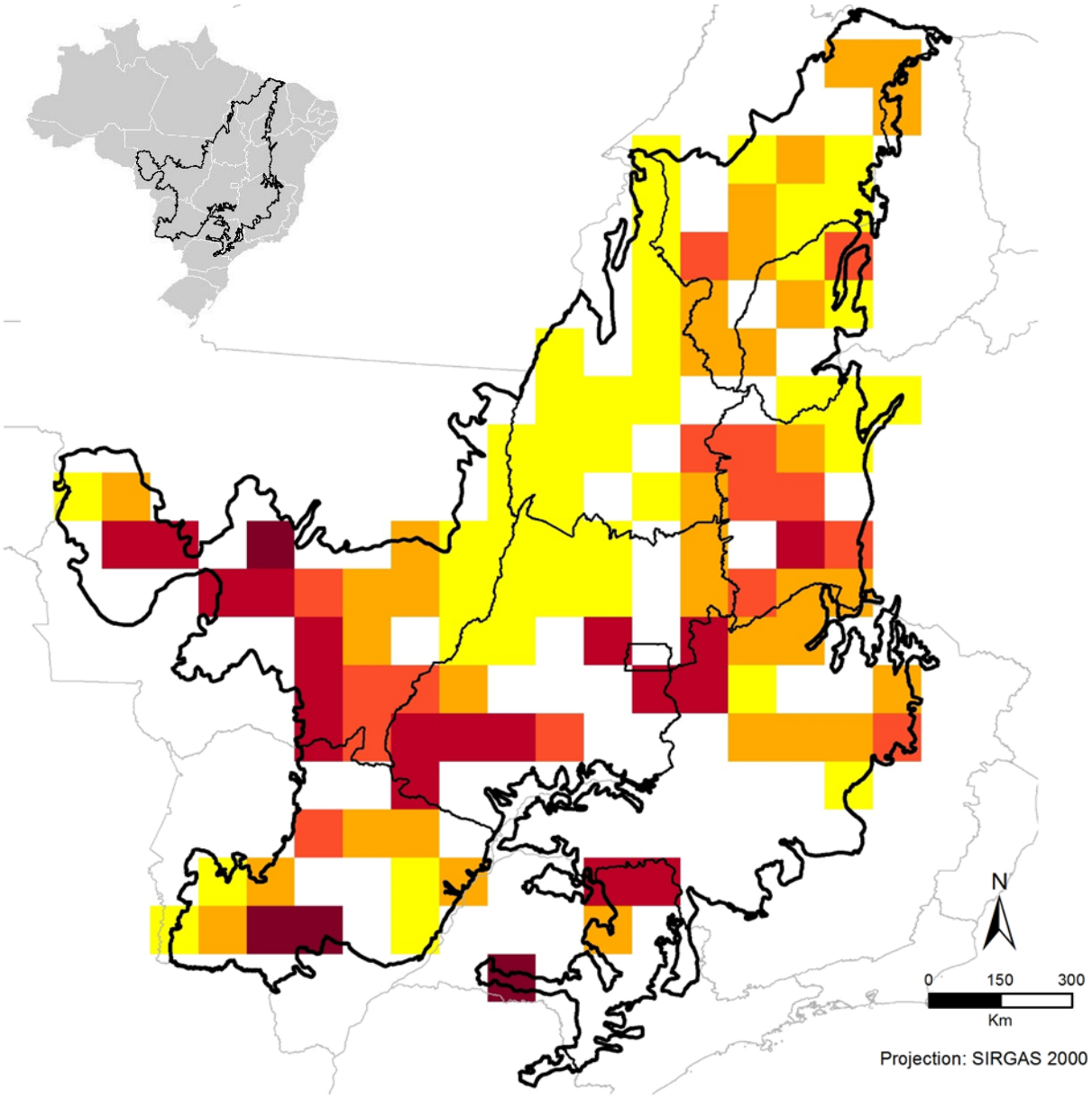
Crop failures:
87 million tons

Crop failures percentage in the report's scenario:
8%

1.3 - 3.7 Mi
320,000 - 1.3 Mi
180,000 - 320,000
90,000 - 180,000
25,000 - 90,000

*Source: IBGE, 2017.

Corn - Crop failures (tons) - 1991-2014 - Cerrado Biome



*Total production:
466 million tons

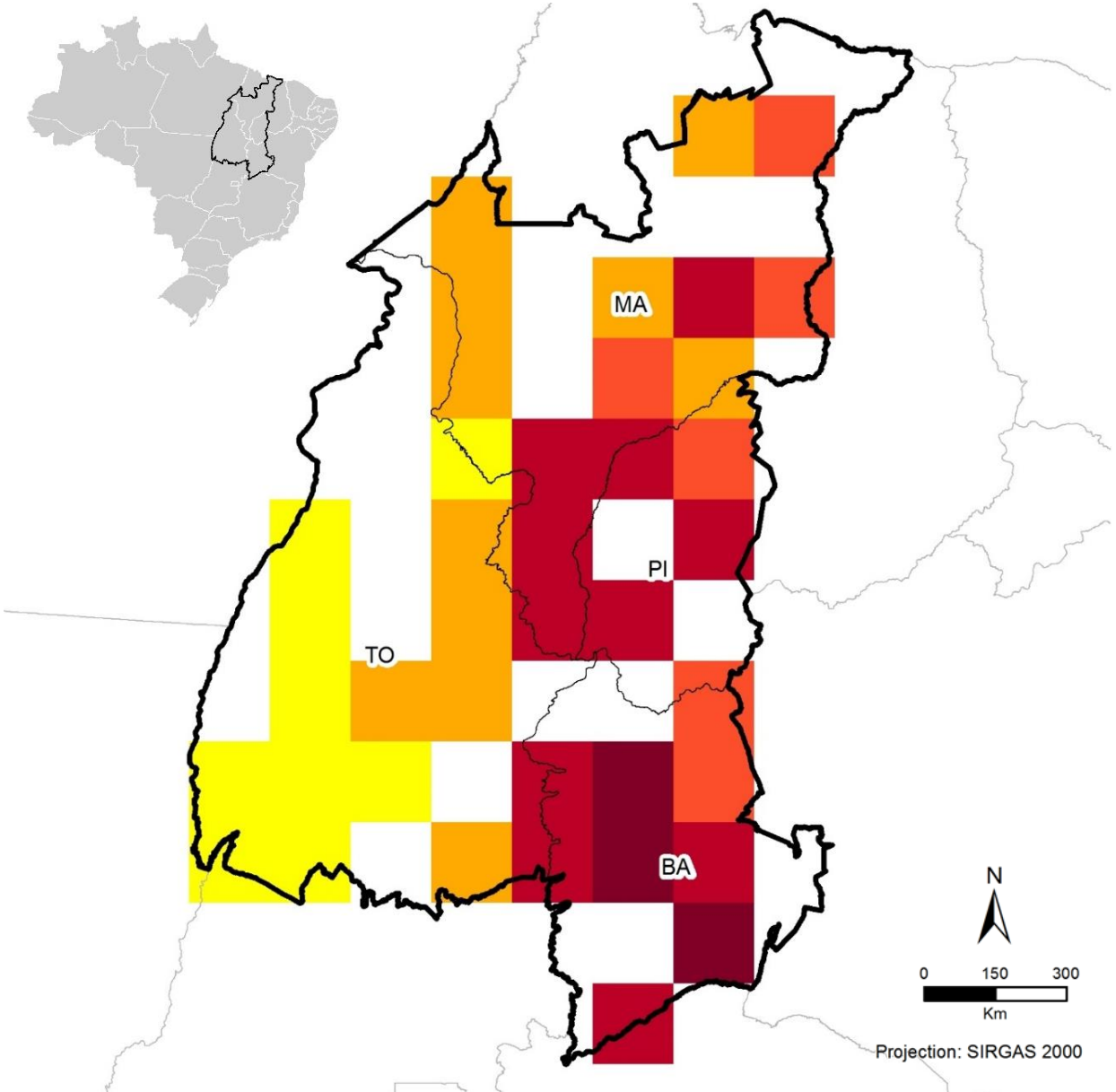
Crop failures:
22 million tons

Crop failures percentage in the report's scenario:
5%

850,000 - 2 Mi
230,000 - 850,000
105,000 - 230,000
40,000 - 105,000
4,000 - 40,000

*Source: IBGE, 2017.

Corn - Crop failures (tons) - 1991-2014 - MATOPIBA



*Total production:
42 million tons

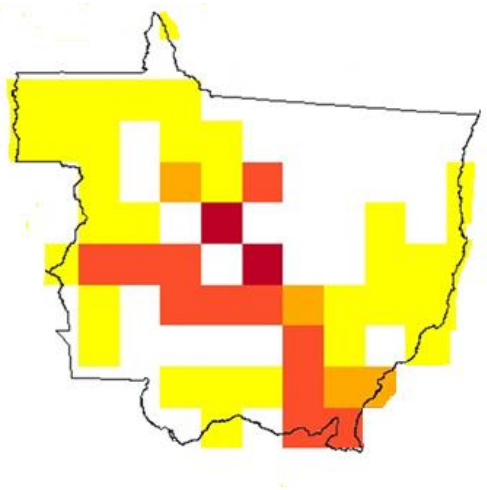
Crop failures:
3 million tons

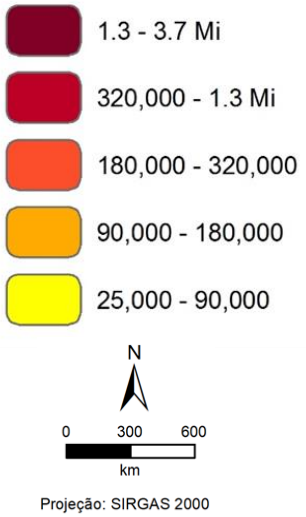
Crop failures percentage in the report's scenario:
7%

180,000 - 230,000
70,000 - 180,000
40,000 - 70,000
10,000 - 40,000
3,000 - 10,000

*Source: IBGE, 2017.

Corn - Crop failures (tons) - 1991-2014 - Regions



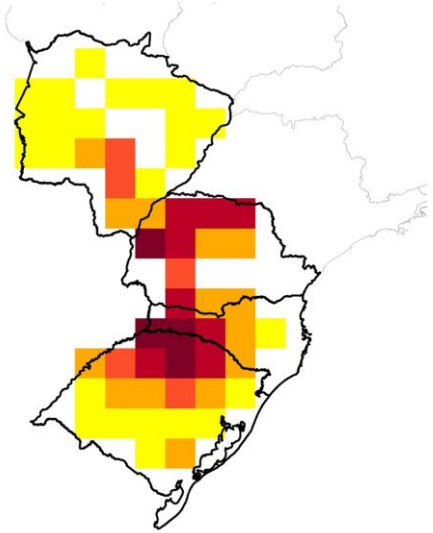


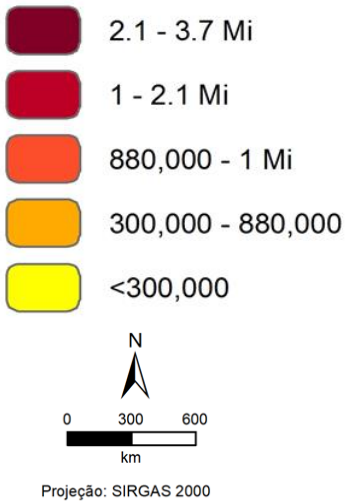
State of Mato Grosso

*Total production:
122 million tons

Crop failures:
7 million tons

Crop failures percentage in the report's scenario:
6%





South Region (SUL + MS)

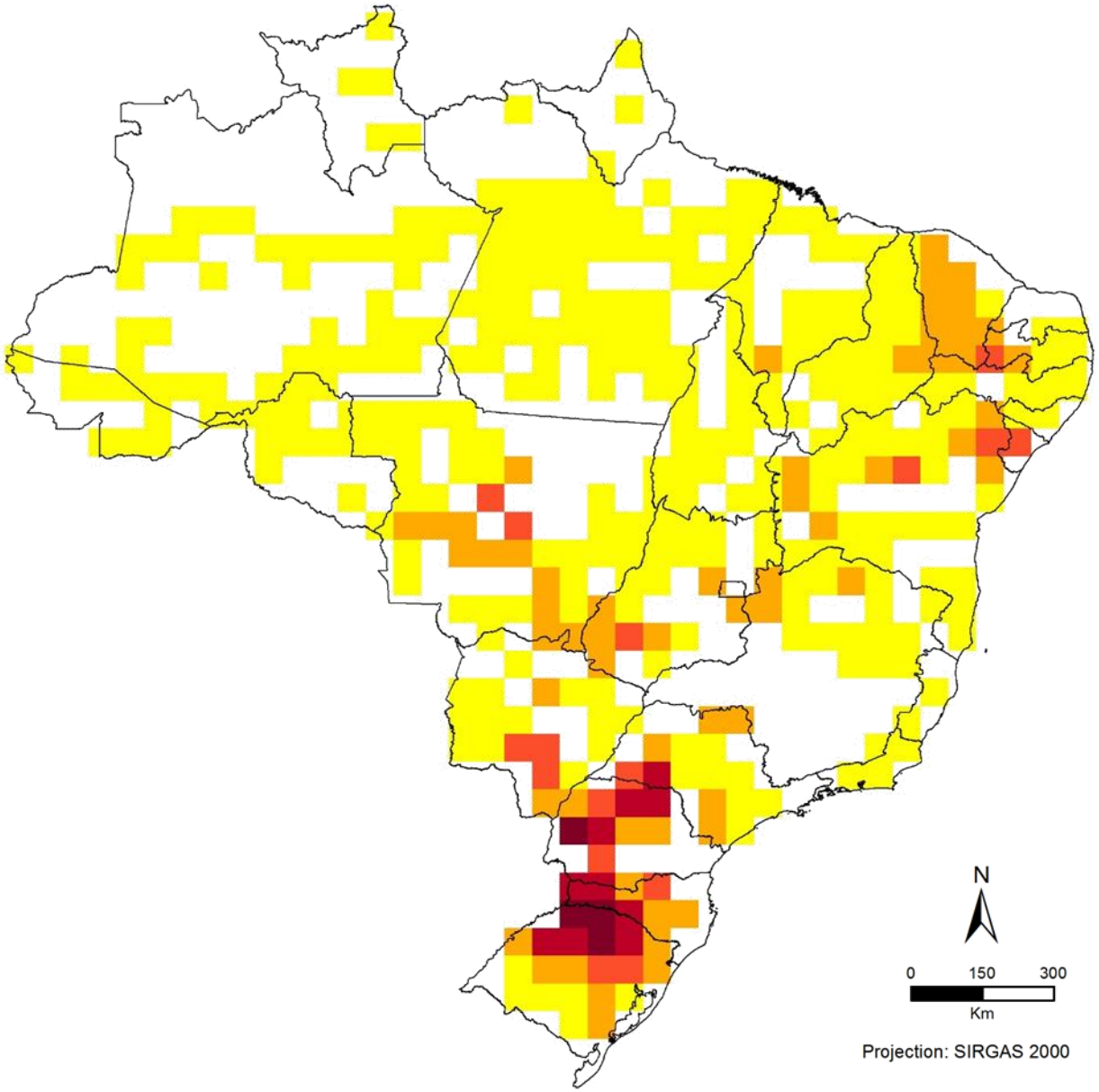
*Total production:
510 million tons

Crop failures:
44 million tons

Crop failures percentage in the report's scenario:
9%

*Source: IBGE, 2017.

Corn - Crop failures (US$) - 1991-2014 - Brazil



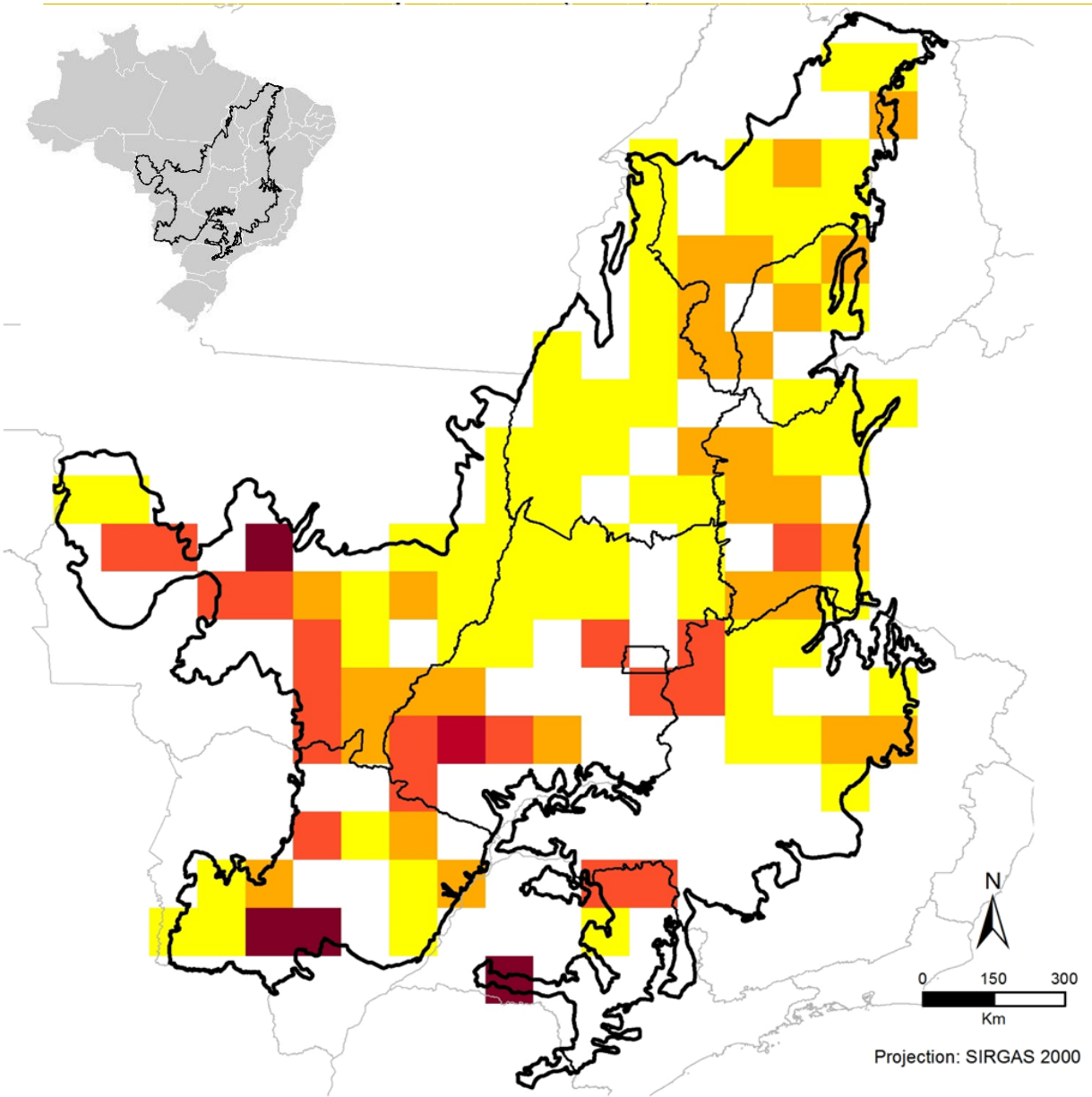
Crop failures:
US$ 16 bi

*Values to real:
BRL$ 53 bi

$450 - $650 Mi
$230 - $450 Mi
$100 - $230 Mi
$30 - $100 Mi
$5,000 - $30 Mi

*Exchange rate (Dec / 2017): 3,29

Corn - Crop failures (US$) - 1991-2014 - Cerrado Biome



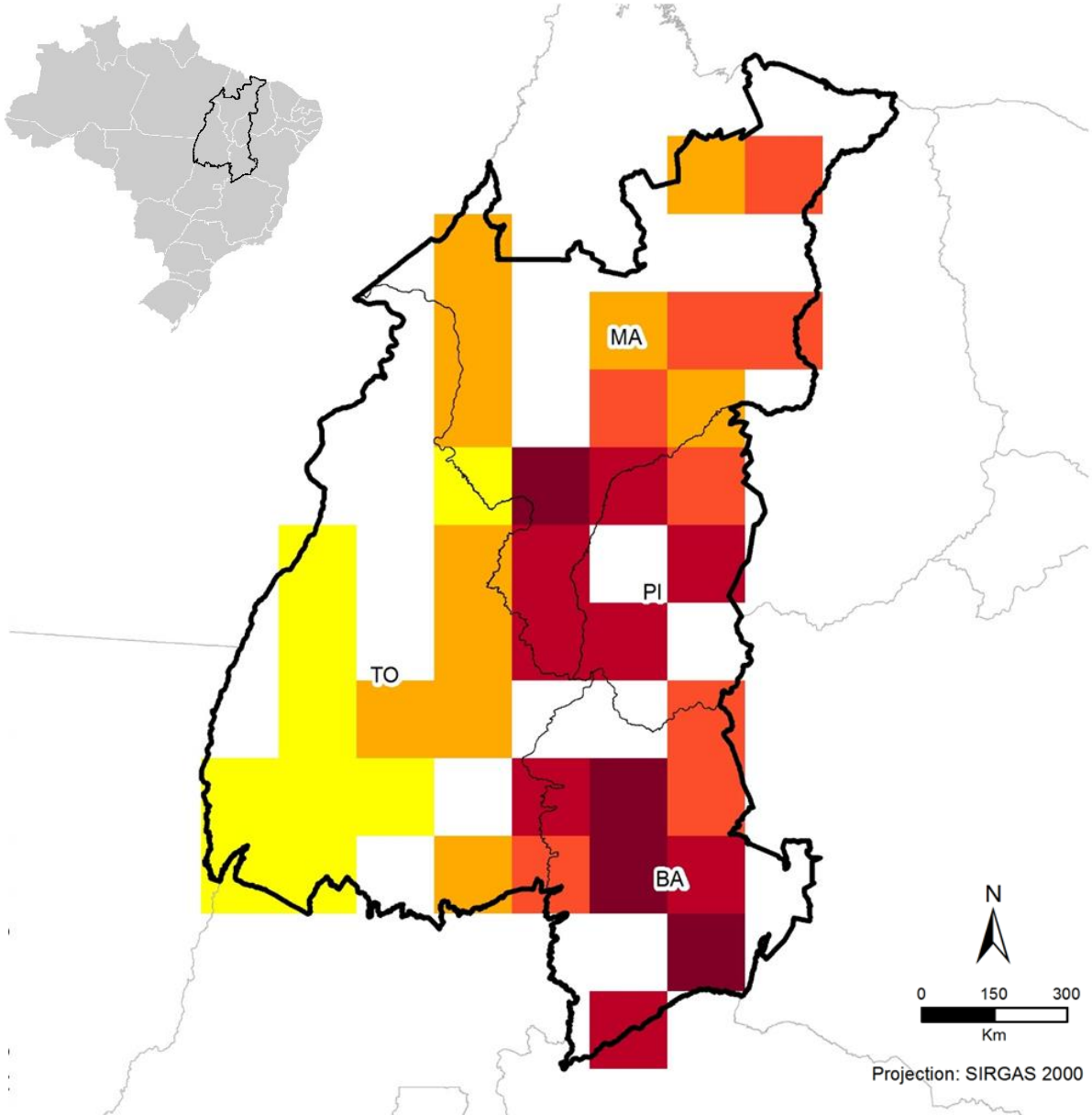
Crop failures:
US$ 4 bi

*Values to real:
BRL$ 13 bi

$140 - $350 Mi
$100 - $140 Mi
$40 - $100 Mi
$15 - $40 Mi
$600,00 - $15 Mi

*Exchange rate (Dec / 2017): 3,29

Corn - Crop failures (US$) - 1991-2014 - MATOPIBA



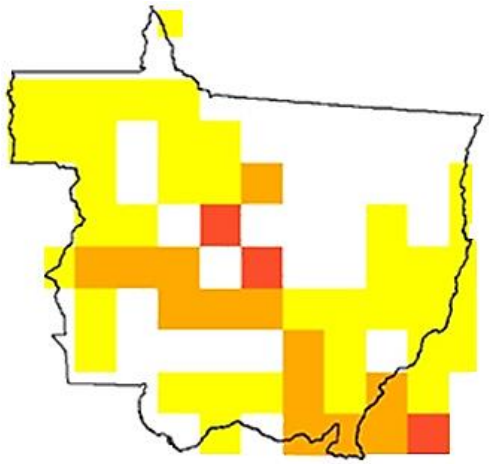
Crop failures:
US$ 602 mi

*Values to real:
BRL$ 2 bi

- $30 - $45 Mi
- $20 - $30 Mi
- $7 - $20 Mi
- $3 - $7 Mi
- $600,000 - $3 Mi

*Exchange rate (Dec / 2017): 3,29

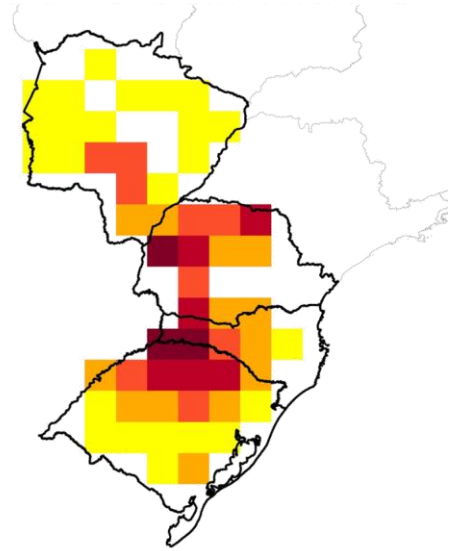
Corn - Crop failures (US$) - 1991-2014 - Regions



State of Mato Grosso

Crop failures:
US$ 1,5 bi

*Values to real:
BRL$ 5 bi



South Region (South + MS)

Crop failures:
US$ 8 bi

*Values to real:
BRL$ 26 bi

*Exchange rate (Dec / 2017): 3,29

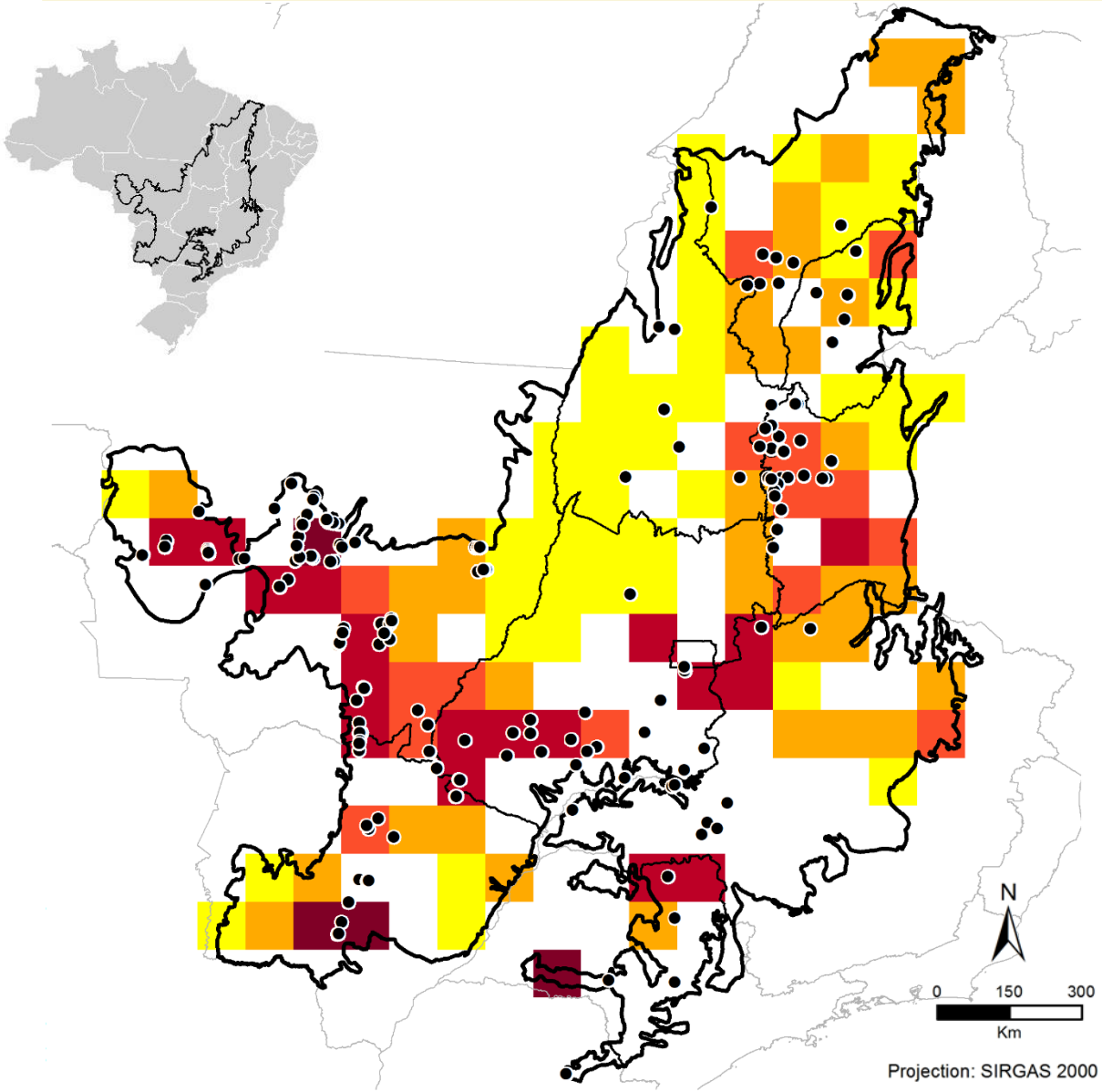
Crop Failure in Cerrado:

Industries

CORN

Period of Review:
1991 - 2014

Corn - Crop (tons) - 1991-2014 - Brazil's 6 major industries



*Total production:
466 million tons

Crop failures:
22 million tons

Crop failures percentage in the report's scenario:
5%

Industries

- **Silos and Warehouses**

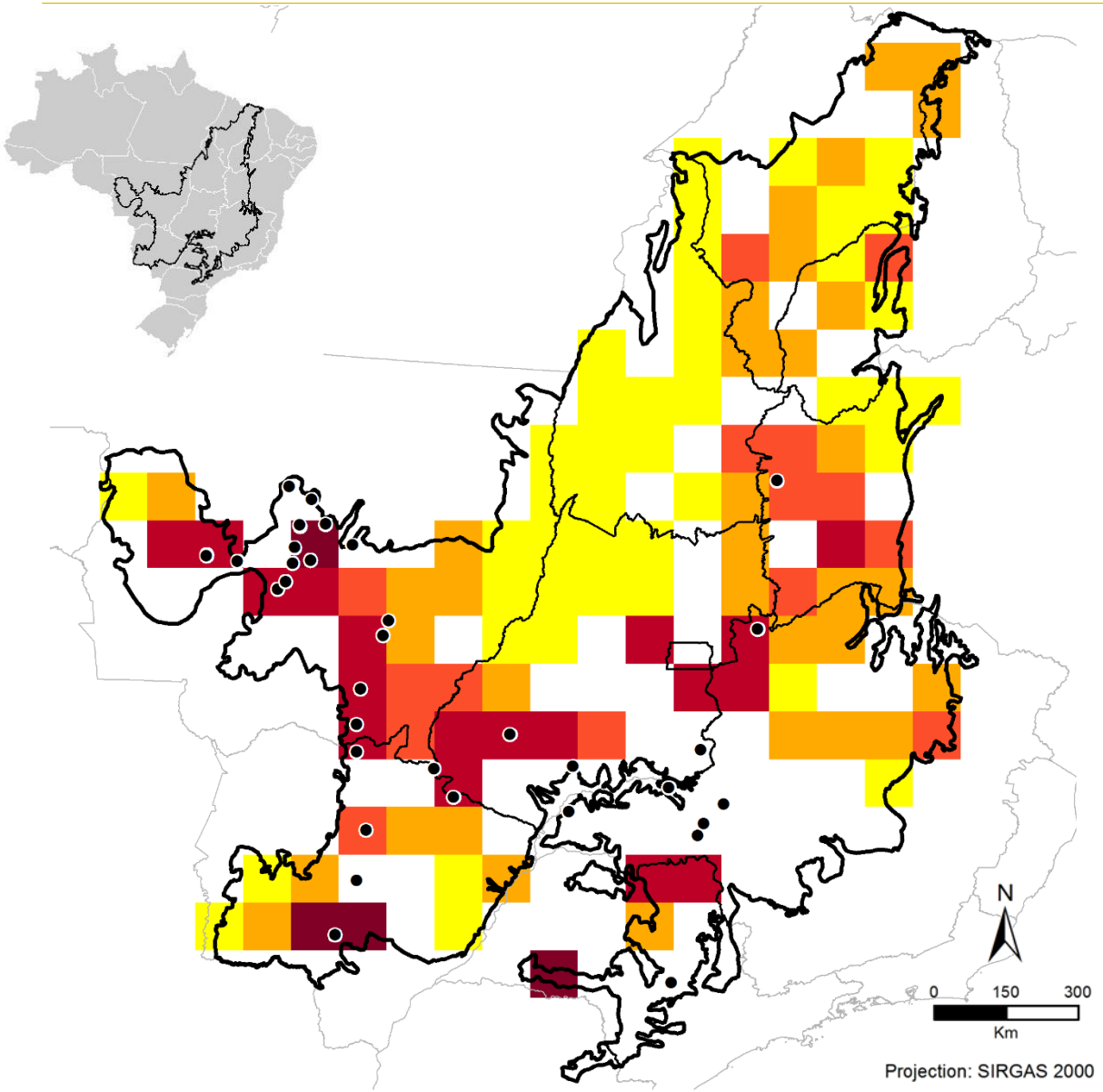
Source : CONAB.

850,000 - 2 Mi
230,000 - 850,000
105,000 - 230,000
40,000 - 105,000
4,000 - 40,000

INDUSTRIES: ADM, BUNGE, CARGILL, LDC, AMAGGI, COFCO/NIDERA

*Source: IBGE, 2017.

Corn - Crop (tons) - 1991-2014 - ADM



*Total production:
466 million tons

Crop failures:
22 million tons

Crop failures percentage in the report's scenario:
5%

Industries

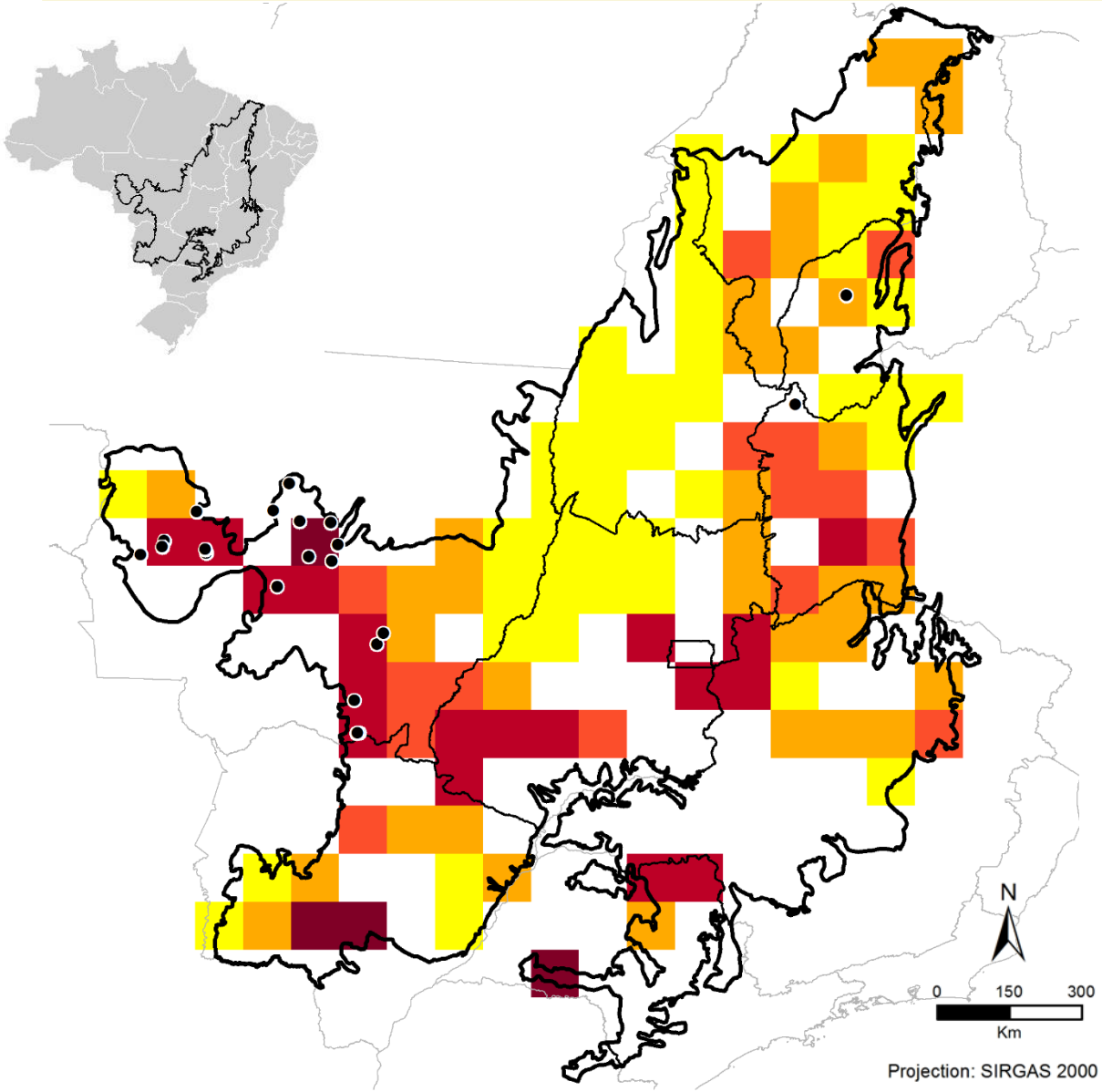
- **Silos and Warehouses**

Source : CONAB.

850,000 - 2 Mi
230,000 - 850,000
105,000 - 230,000
40,000 - 105,000
4,000 - 40,000

*Source: IBGE, 2017.

Corn - Crop (tons) - 1991-2014 - Amaggi



*Total production:
466 million tons

Crop failures:
22 million tons

Crop failures percentage in the report's scenario:
5%

Industries

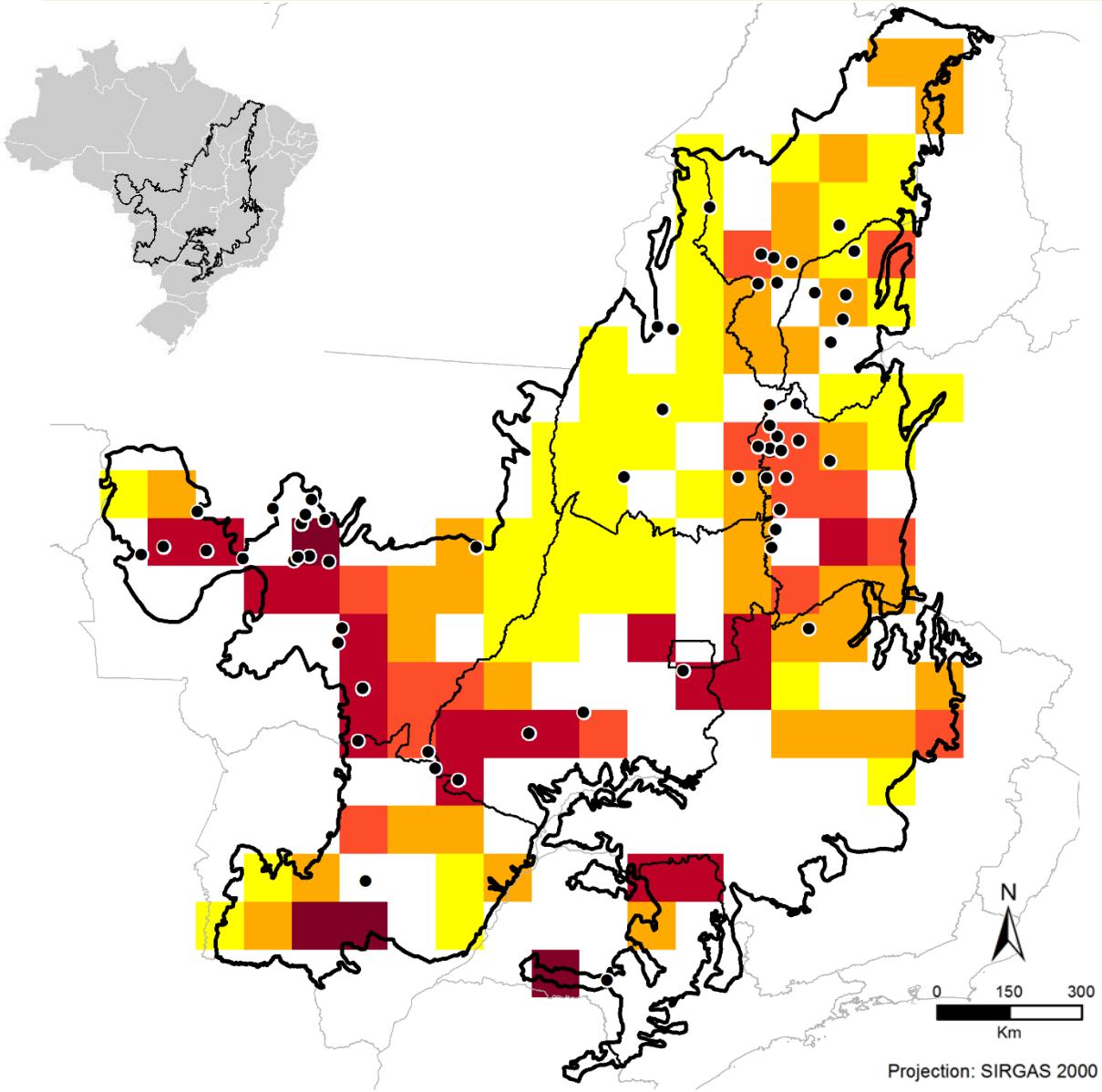
- **Silos and Warehouses**

Source : CONAB.

850,000 - 2 Mi
230,000 - 850,000
105,000 - 230,000
40,000 - 105,000
4,000 - 40,000

*Source: IBGE, 2017.

Corn - Crop (tons) - 1991-2014 - Bunge



*Total production:
466 million tons

Crop failures:
22 million tons

Crop failures percentage in the report's scenario:
5%

Industries

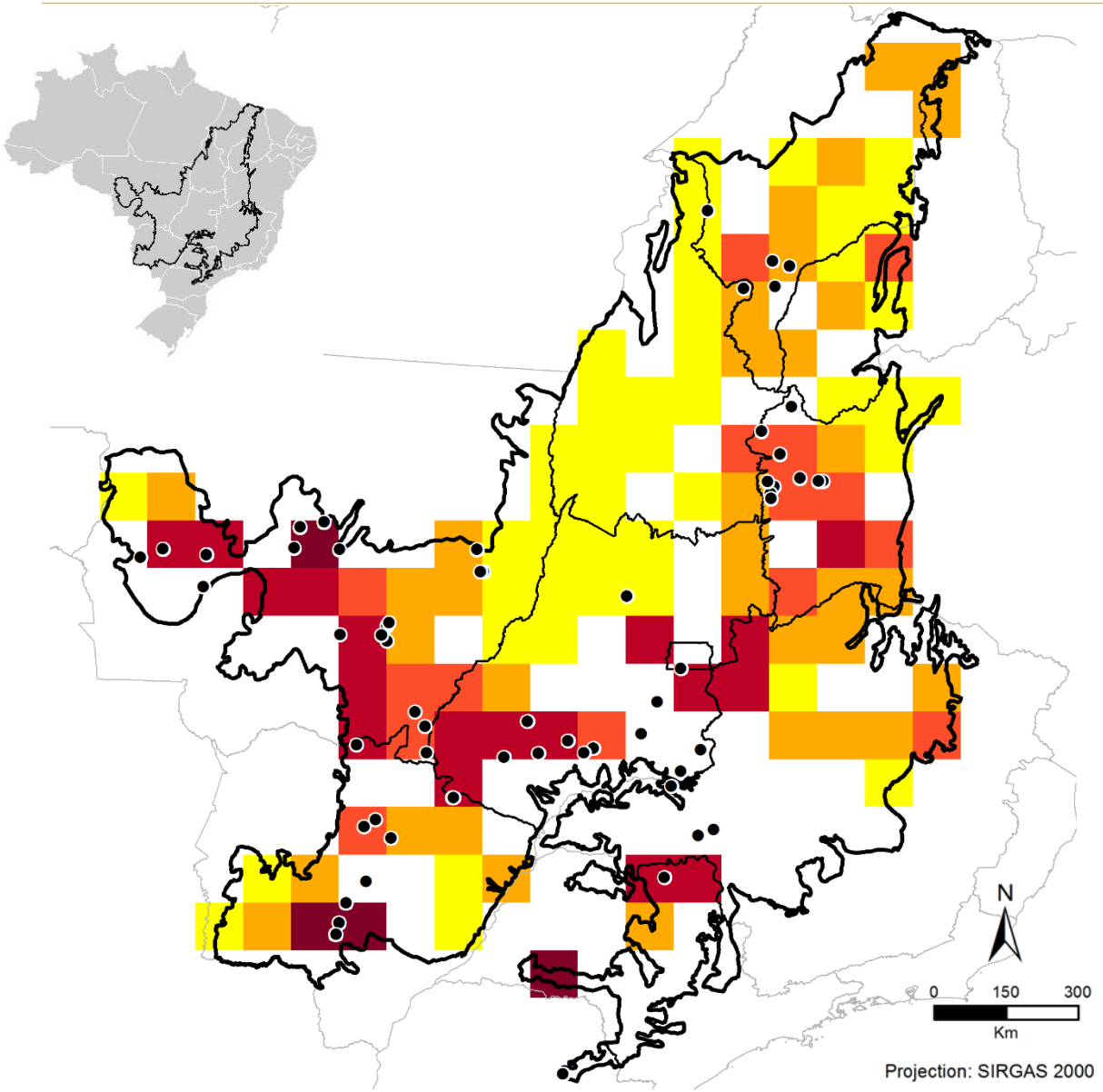
- **Silos and Warehouses**

Source : CONAB.

850,000 - 2 Mi
230,000 - 850,000
105,000 - 230,000
40,000 - 105,000
4,000 - 40,000

*Source: IBGE, 2017.

Corn - Crop (tons) - 1991-2014 - Cargill



*Total production:
466 million tons

Crop failures:
22 million tons

Crop failures percentage in the report's scenario:
5%

Industries

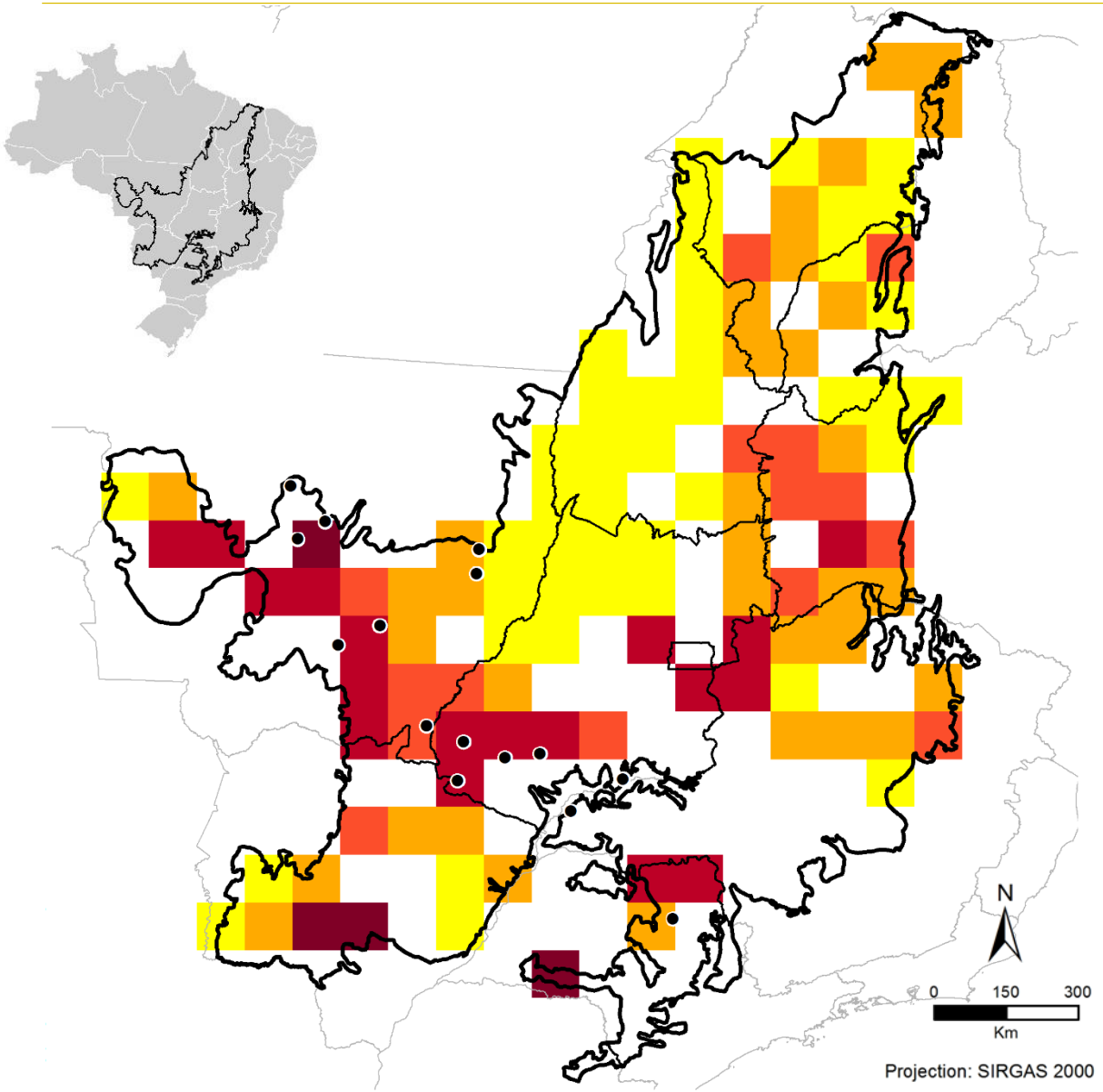
- **Silos and Warehouses**

Source : CONAB.

850,000 - 2 Mi
230,000 - 850,000
105,000 - 230,000
40,000 - 105,000
4,000 - 40,000

*Source: IBGE, 2017.

Corn - Crop (tons) - 1991-2014 - LDC



*Total production:
466 million tons

Crop failures:
22 million tons

Crop failures percentage in the report's scenario:
5%

Industries

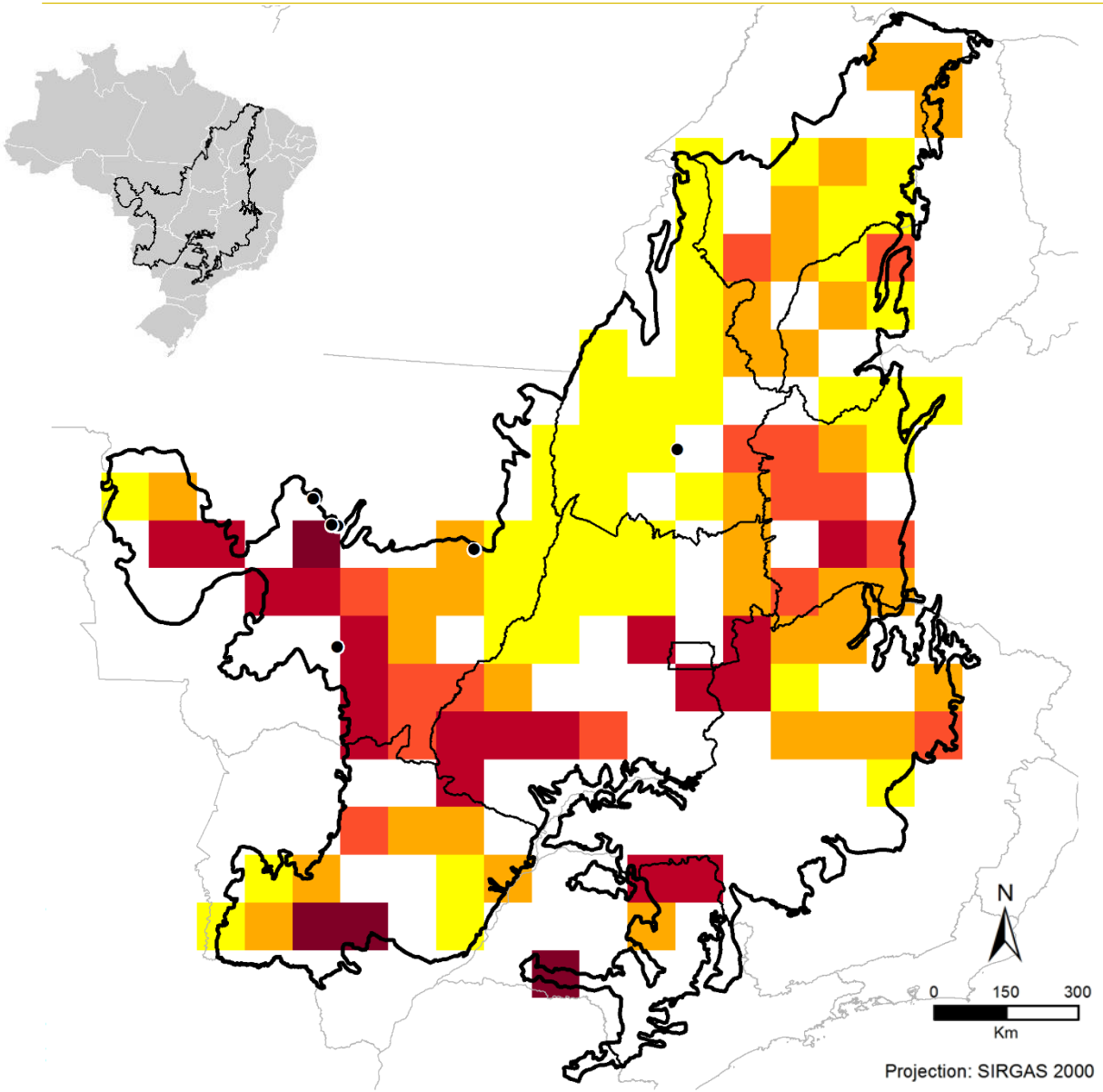
- **Silos and Warehouses**

Source : CONAB.

850,000 - 2 Mi
230,000 - 850,000
105,000 - 230,000
40,000 - 105,000
4,000 - 40,000

*Source: IBGE, 2017.

Corn - Crop (tons) - 1991-2014 - Nidera



*Total production:
466 million tons

Crop failures:
22 million tons

Crop failures percentage in the report's scenario:
5%

Industries

- **Silos and Warehouses**

Source : CONAB.

850,000 - 2 Mi
230,000 - 850,000
105,000 - 230,000
40,000 - 105,000
4,000 - 40,000

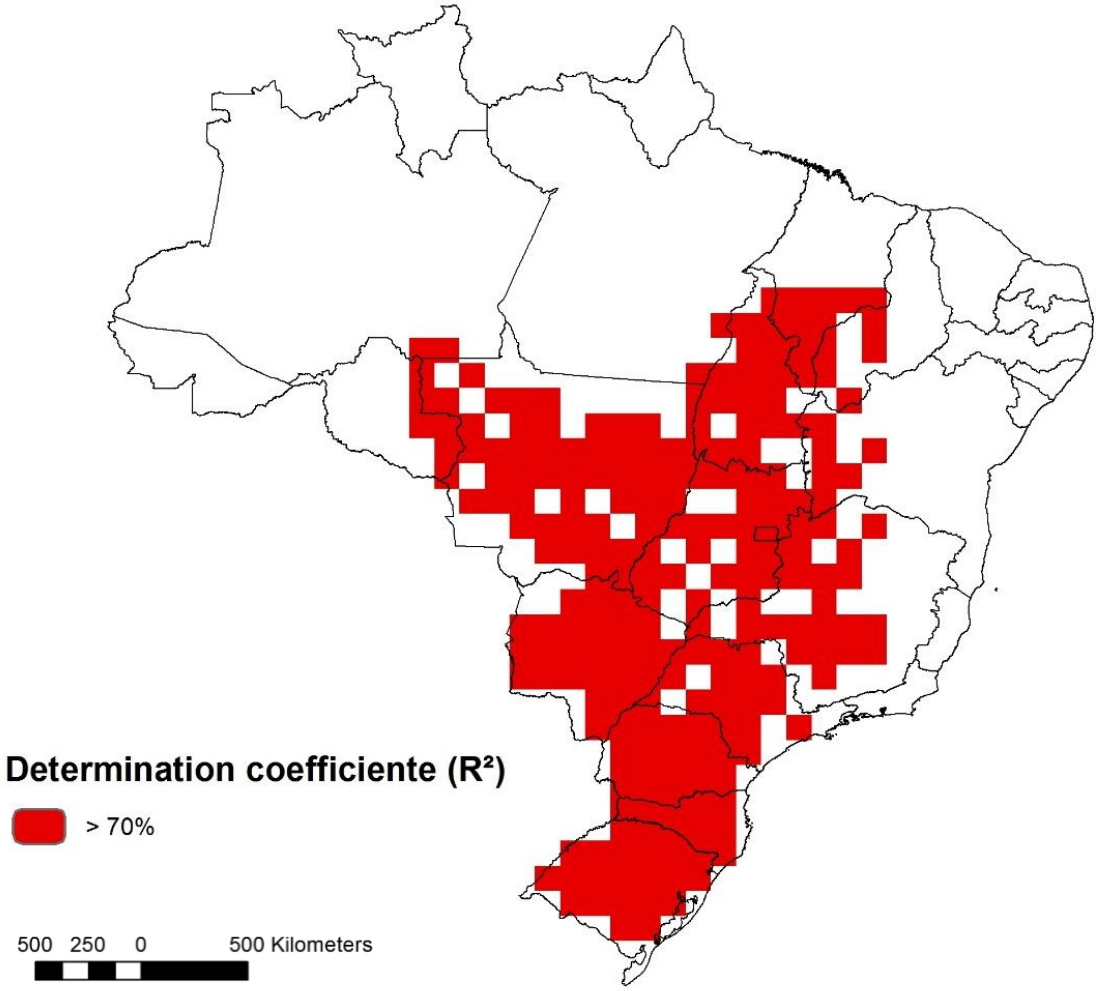
*Source: IBGE, 2017.

Crop failure in Brazil:

SOY

Period of Review:
1991 - 2014

Soy - Relationship between climate and crop failure



When **$R^2 > 0.7$** we consider that a climatic event caused a crop failure, in other words: **crop failures occur due to climatic events.** In this study, we consider only **areas where the crop failures are correlated with extreme climatic event.** The map on the right shows the total area studied.

We also subdivided the total area into **three other areas of study interest:**

Cerrado Biome

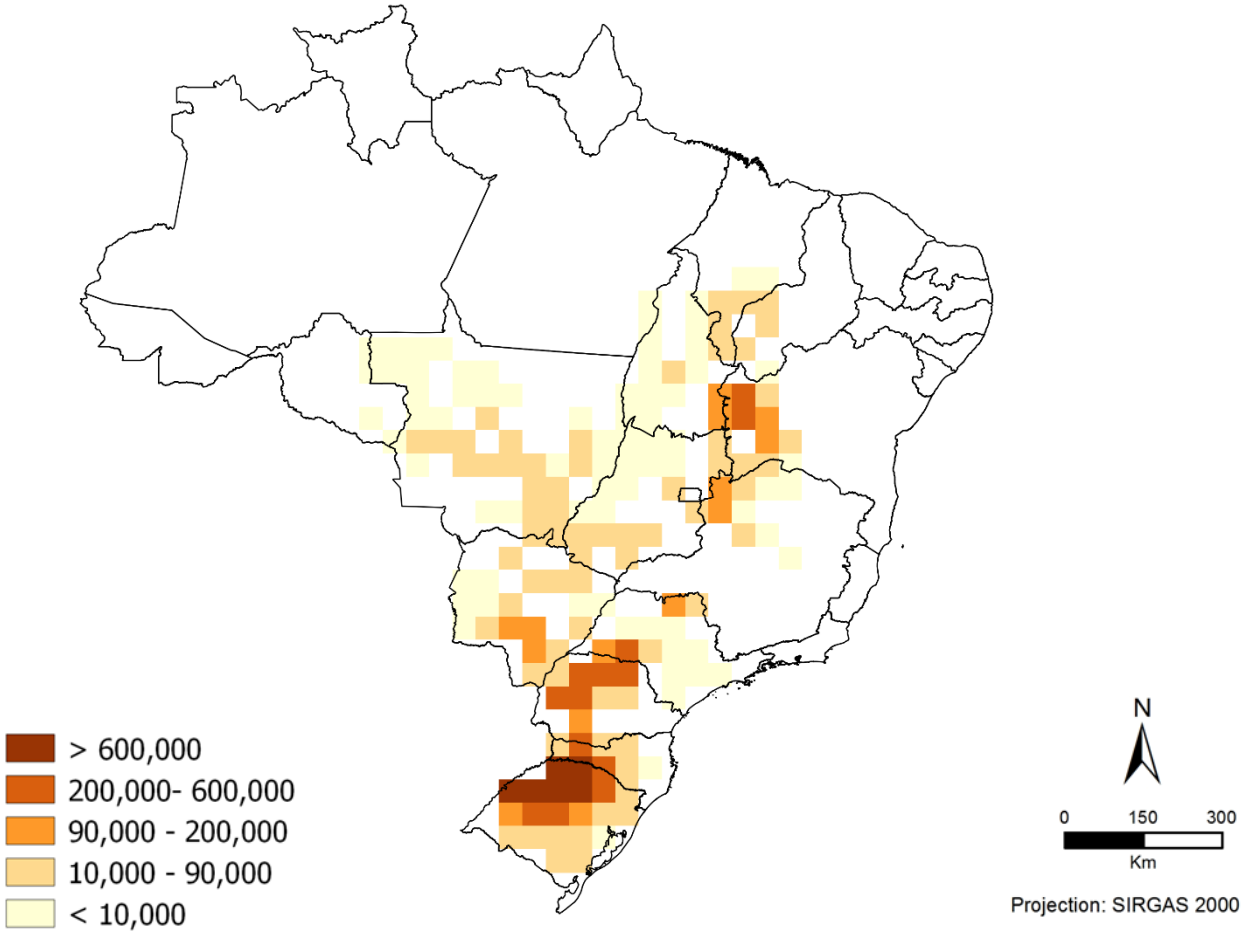
MATOPIBA

State of Mato Grosso

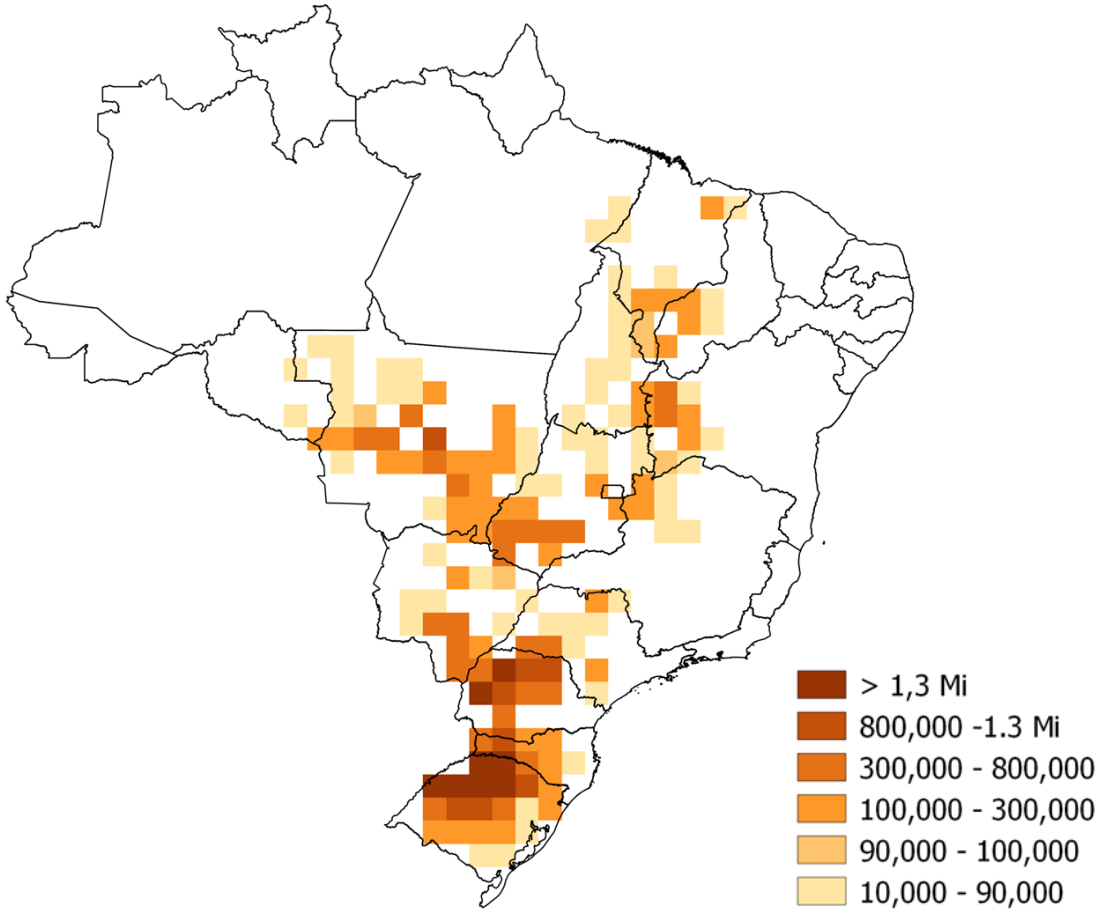
South region

Soy - Crop failures (tons) - 2 periods - Brazil

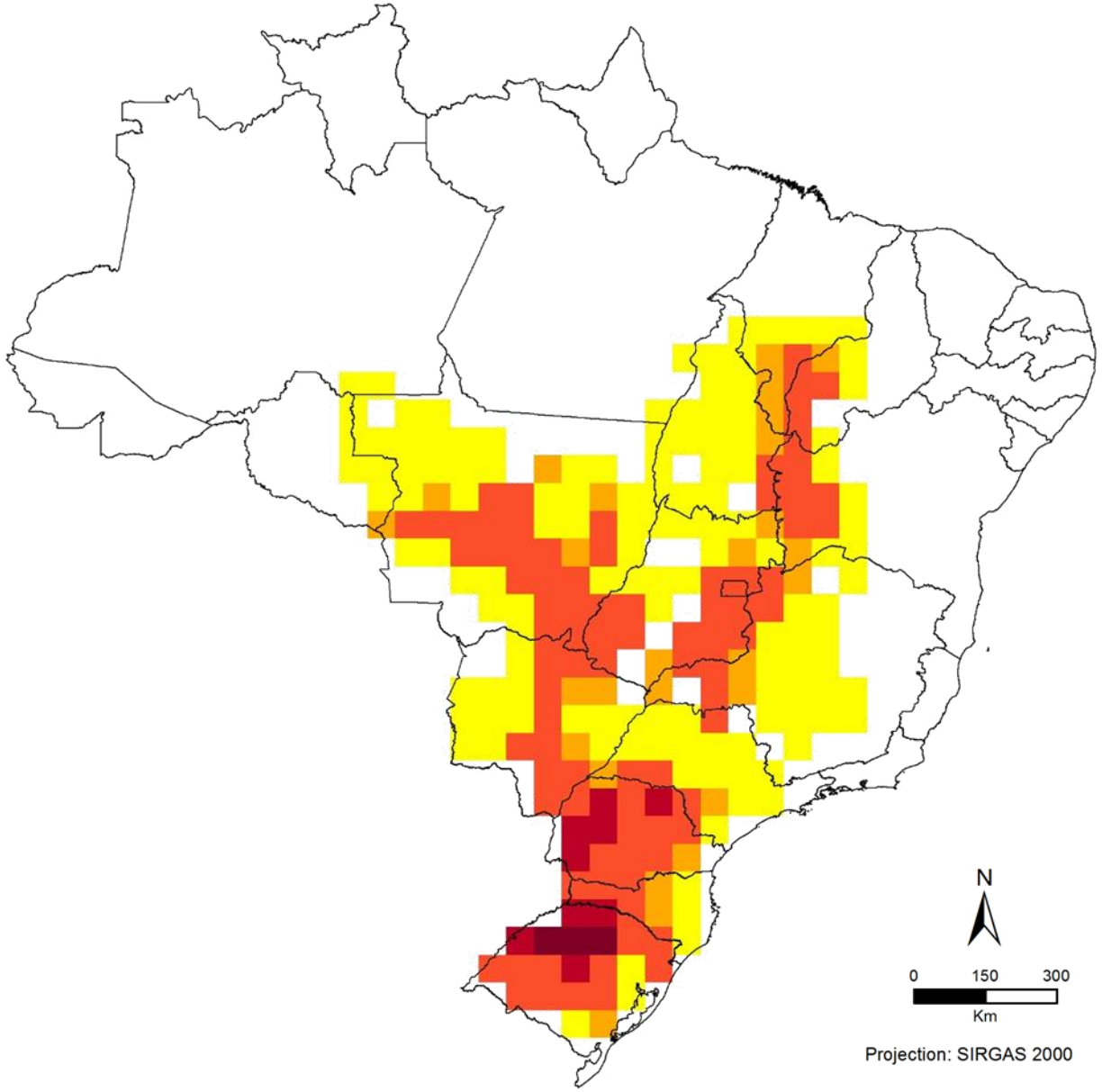
Scenario 1
Years: 1991-2002
Total Crop Failure: 21 millions tons



Scenario 2
Years: 2003-2014
Total Crop Failure: 67 millions tons



Soy - Crop failures (tons) - 1991-2014 - Brazil



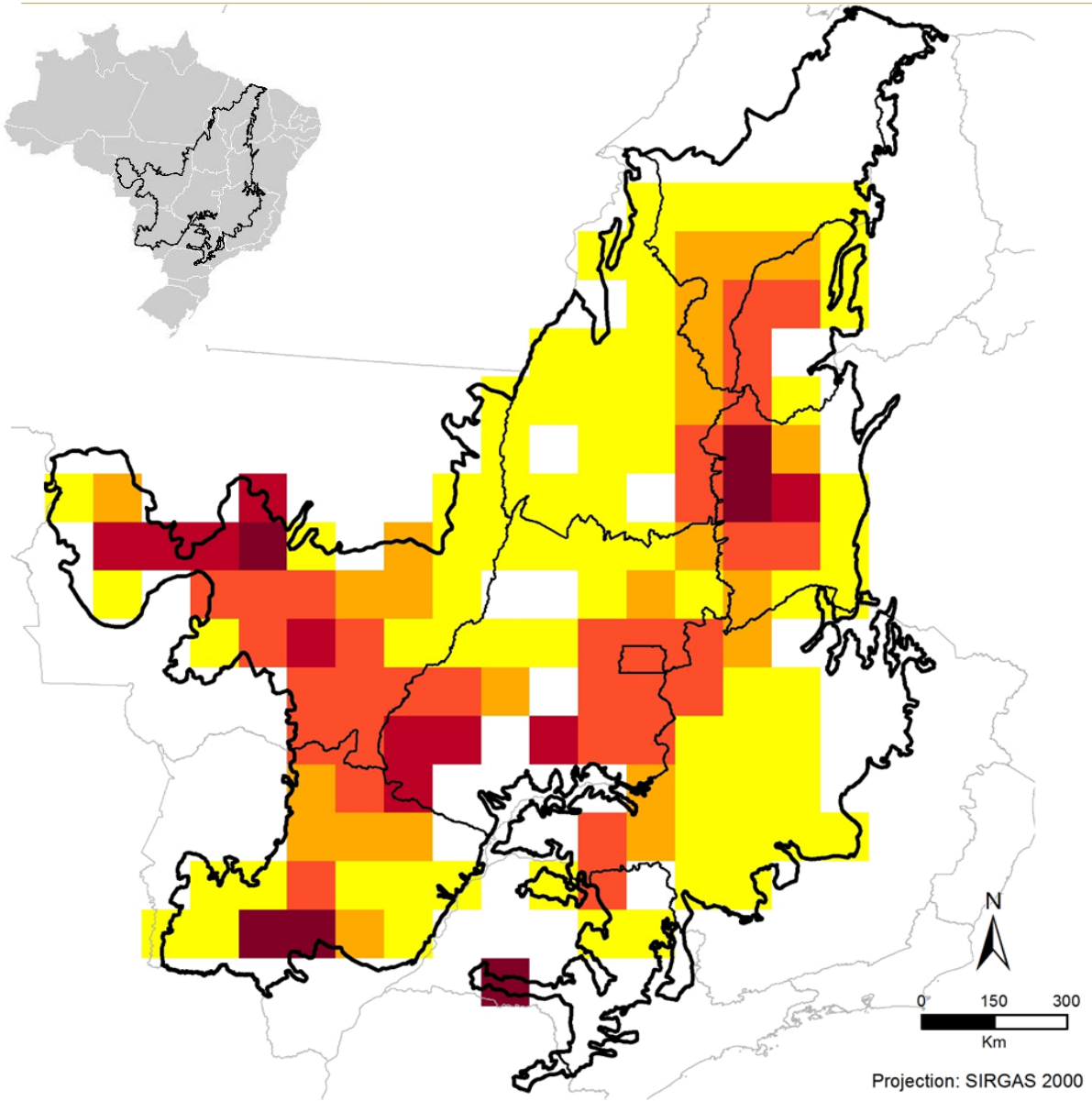
*Total production:
1 billion tons

Crop failures:
88 million tons

Crop failures percentage in the report's scenario:
8%

*Source: IBGE, 2017.

Soy - Crop failures (tons) - 1991-2014 - Cerrado Biome



*Total production:
619 million tons

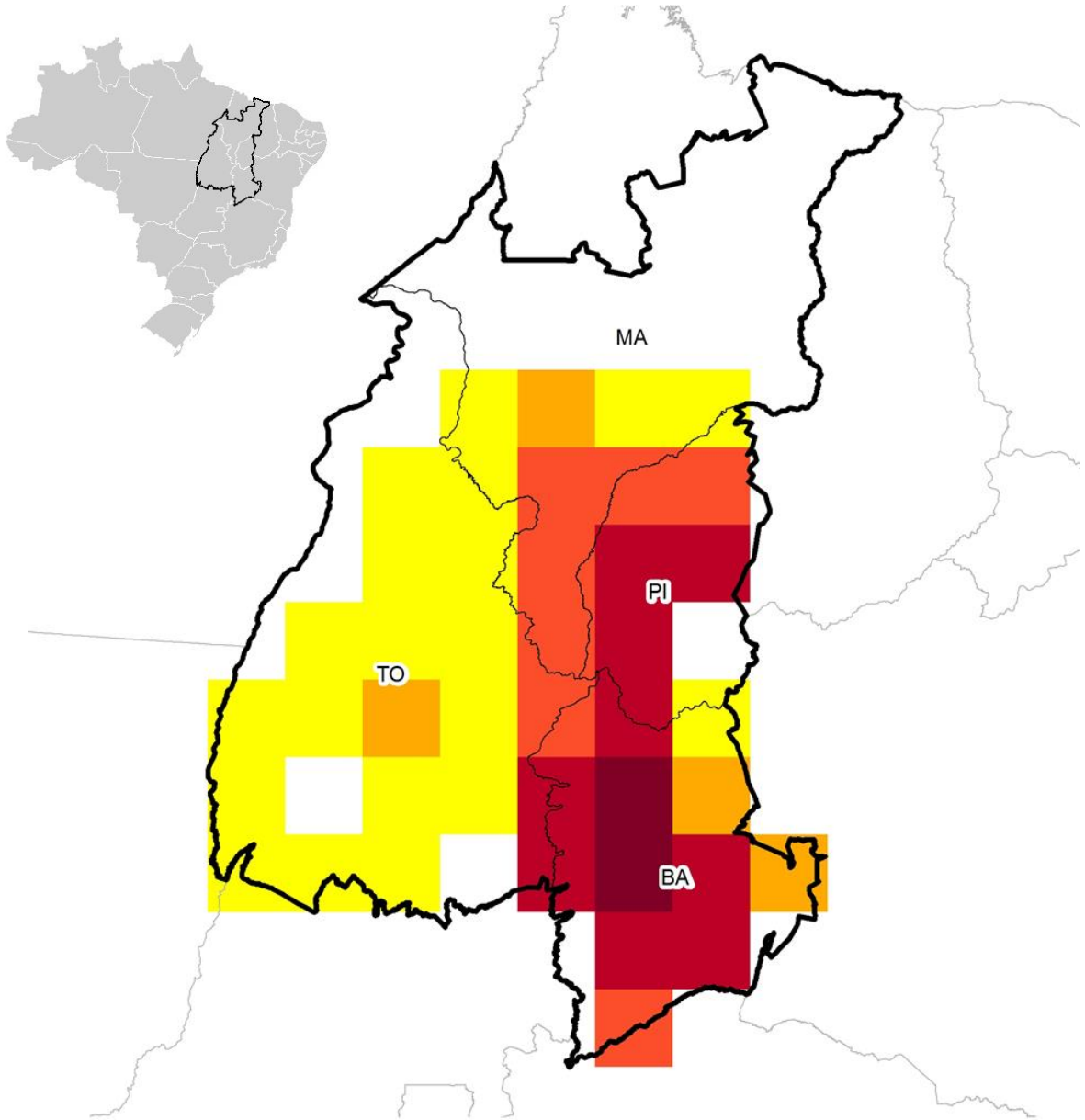
Crop failures:
27 million tons

Crop failures percentage in the report's scenario:
4%

680,000 - 1.2 Mi
420,000 - 680,000
210,000 - 420,000
80,000 - 210,000
< 80,000

*Source: IBGE, 2017.

Soy- Crop failures (tons) - 1991-2014 - MATOPIBA



*Total production:
85 million tons

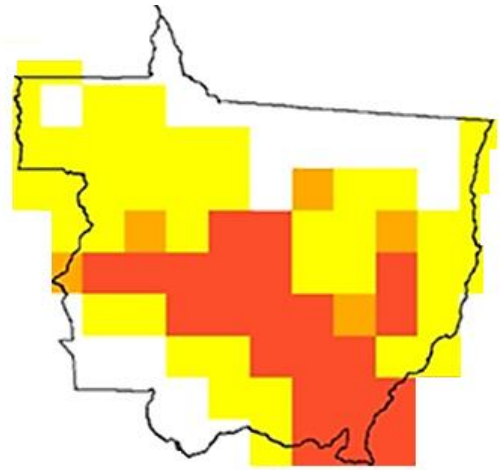
Crop failures:
7 million tons

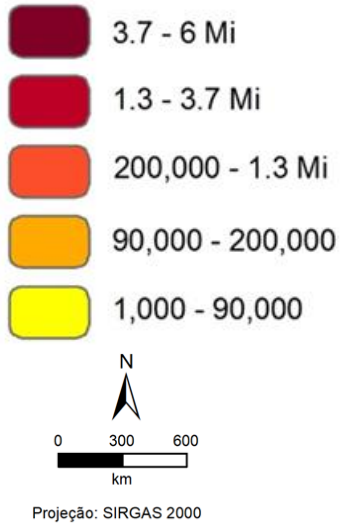
Crop failures percentage in the report's scenario:
8%

680,000 - 720,000
260,000 - 680,000
130,000 - 260,000
40,000 - 130,000
< 40,000

*Source: IBGE, 2017.

Soy - Crop failures (tons) - 1991-2014 - Regions



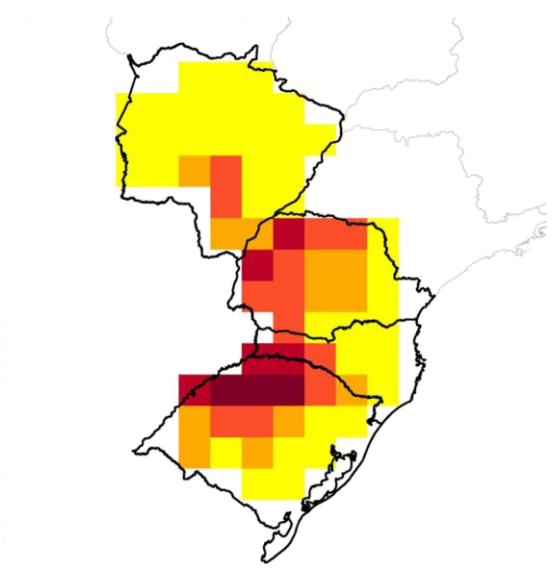


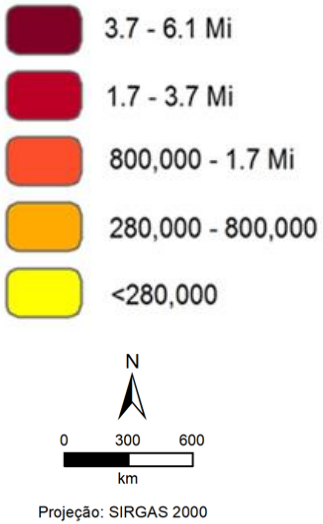
State of Mato Grosso

*Total production:
300 million tons

Crop failures:
53 million tons

Crop failures percentage in the report's scenario:
11%





South Region

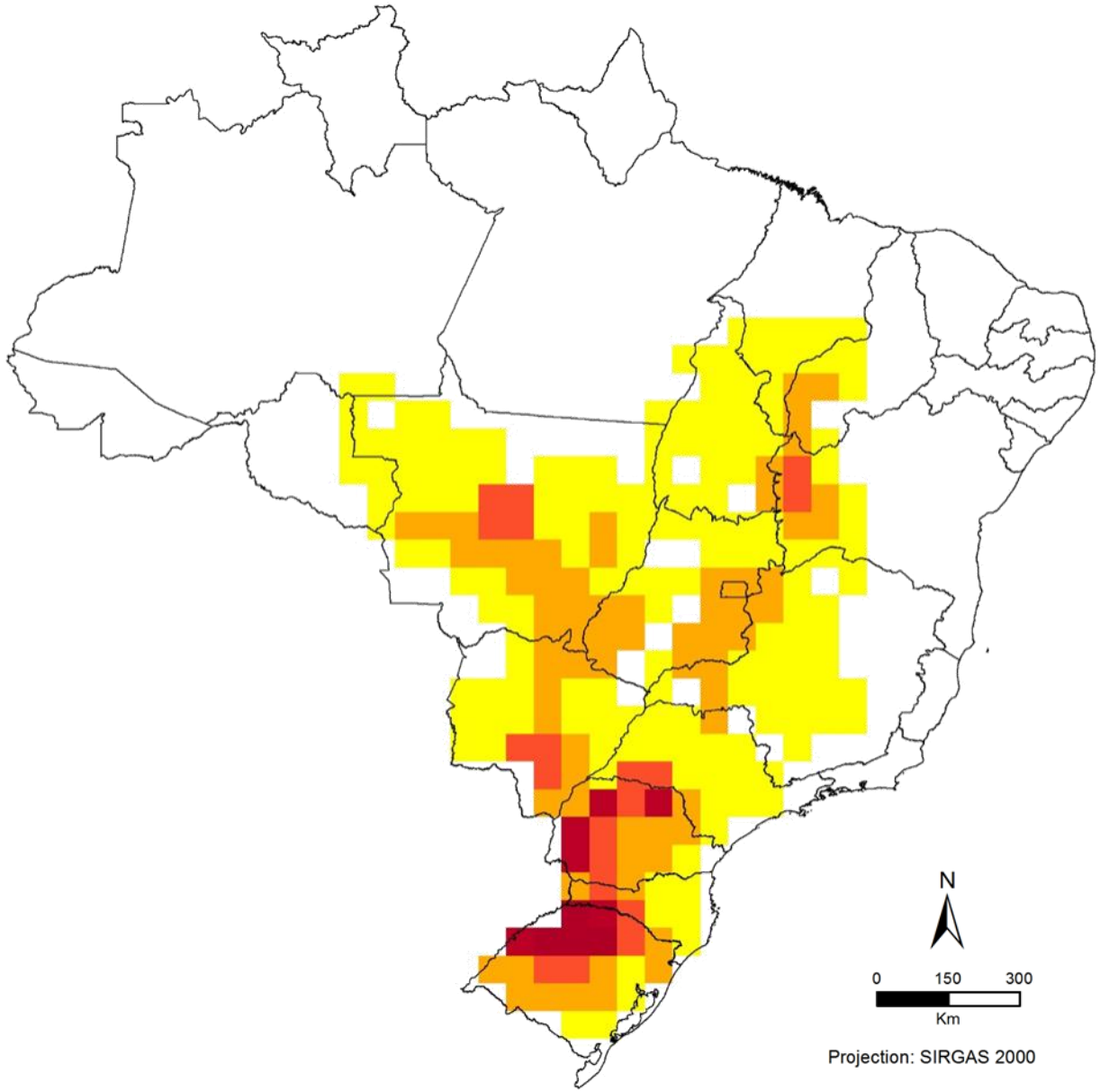
*Total production:
491 million tons

Crop failures:
53 million tons

Crop failures percentage in the report's scenario:
11%

*Source: IBGE, 2017.

Soy - Crop failures (US$) - 1991-2014 - Brazil



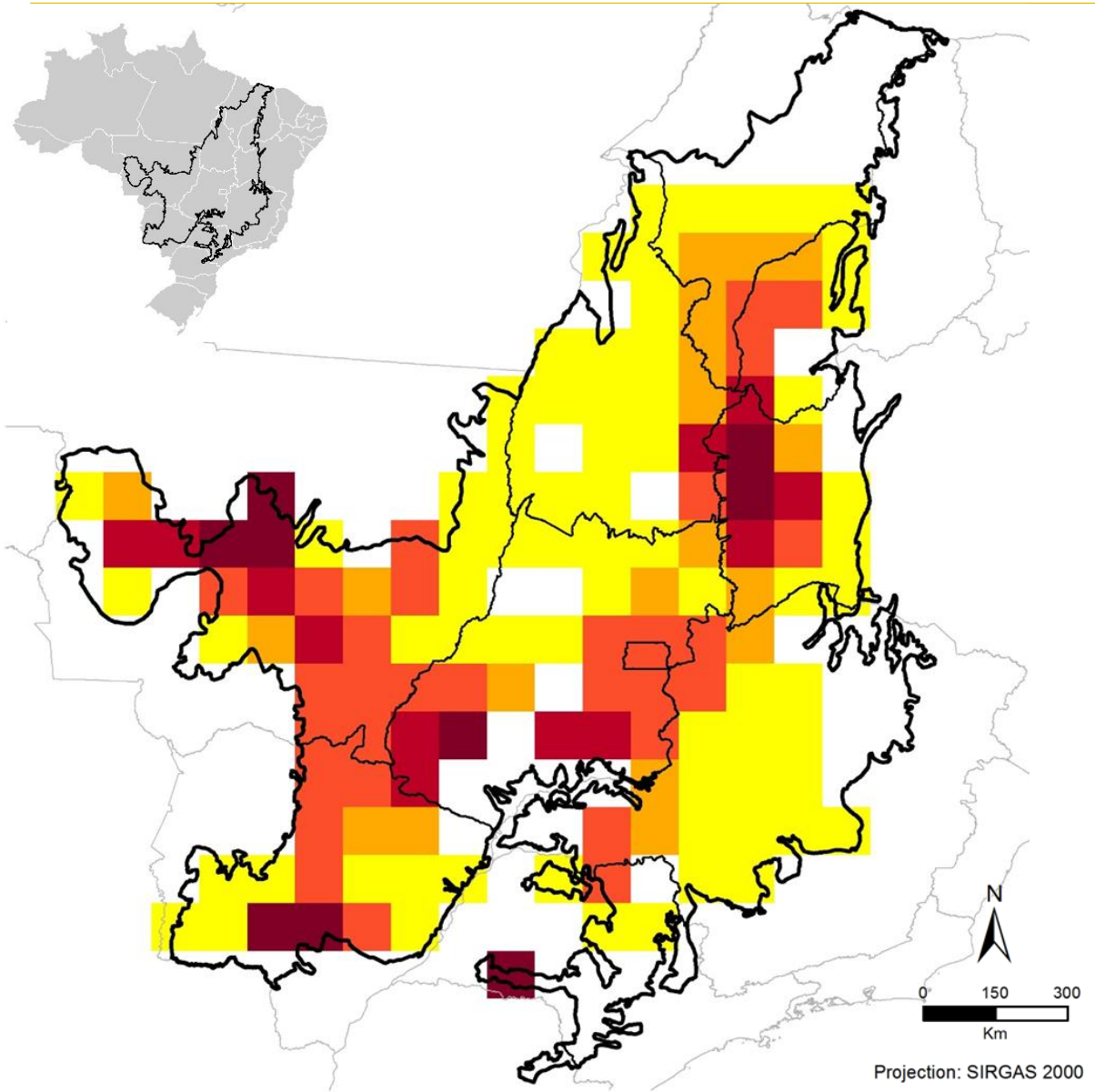
Crop failures:
US$ 34 bi

*Values to real:
BRL$ 113 bi

$1.5 - $2.3 Bi
$650 - $1.5 Bi
$280 - $650 Mi
$80- $280 Mi
< $80 Mi

*Exchange rate (Dec / 2017): 3,29

Soy - Crop failures (US$) - 1991-2014 - Cerrado Biome



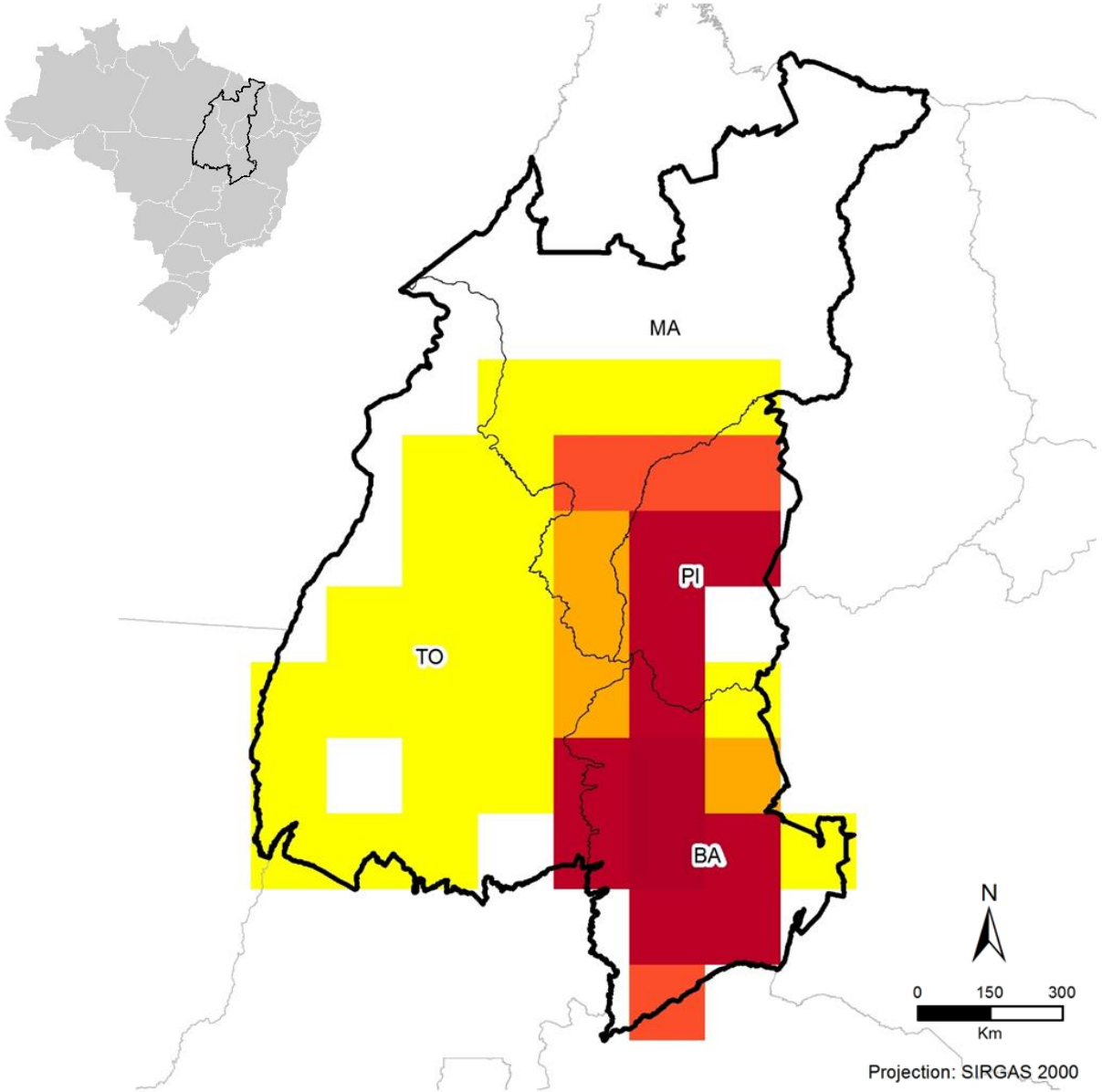
Crop failures:
US$ 10 bi

*Values to real:
BRL$ 33 bi

$270 - 426 Mi
$150 - $ 270 Mi
$80 - $150 Mi
$30 - $80 Mi
$6,000 - $30 Mi

*Exchange rate (Dec / 2017): 3,29

Soy - Crop failures (US$) - 1991-2014 - MATOPIBA



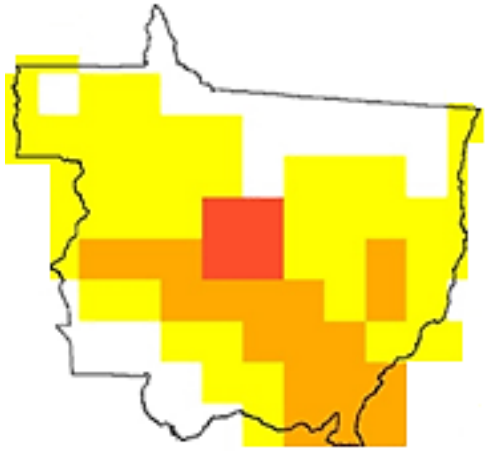
Crop failures:
US$ 2.7 bi

*Values to real:
BRL$ 9 bi

$270 - $285 Mi
$110 - $270 Mi
$60 - $110 Mi
$35 - $ 60 Mi
$600,00 - $35 Mi

*Exchange rate (Dec / 2017): 3,29

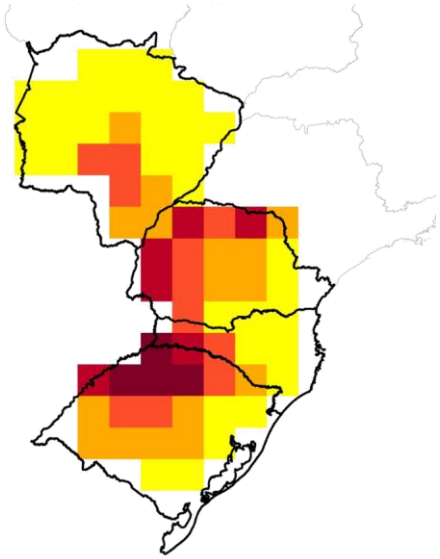
Soy - Crop failures (US$) - 1991-2014 - Regions

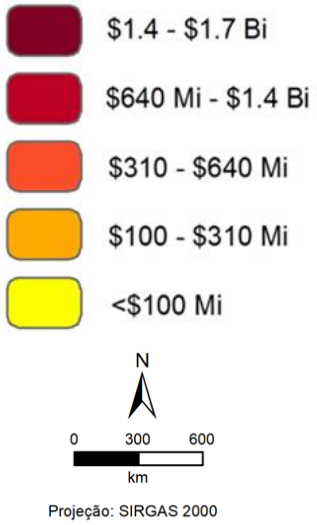


State of Mato Grosso

Crop failures:
US$ 4 bi

*Values to real:
BRL$ 13 bi





South Region

Crop failures:
US$ 20 bi

*Values to real:
BRL$ 66 bi

*Exchange rate (Dec / 2017): 3,29

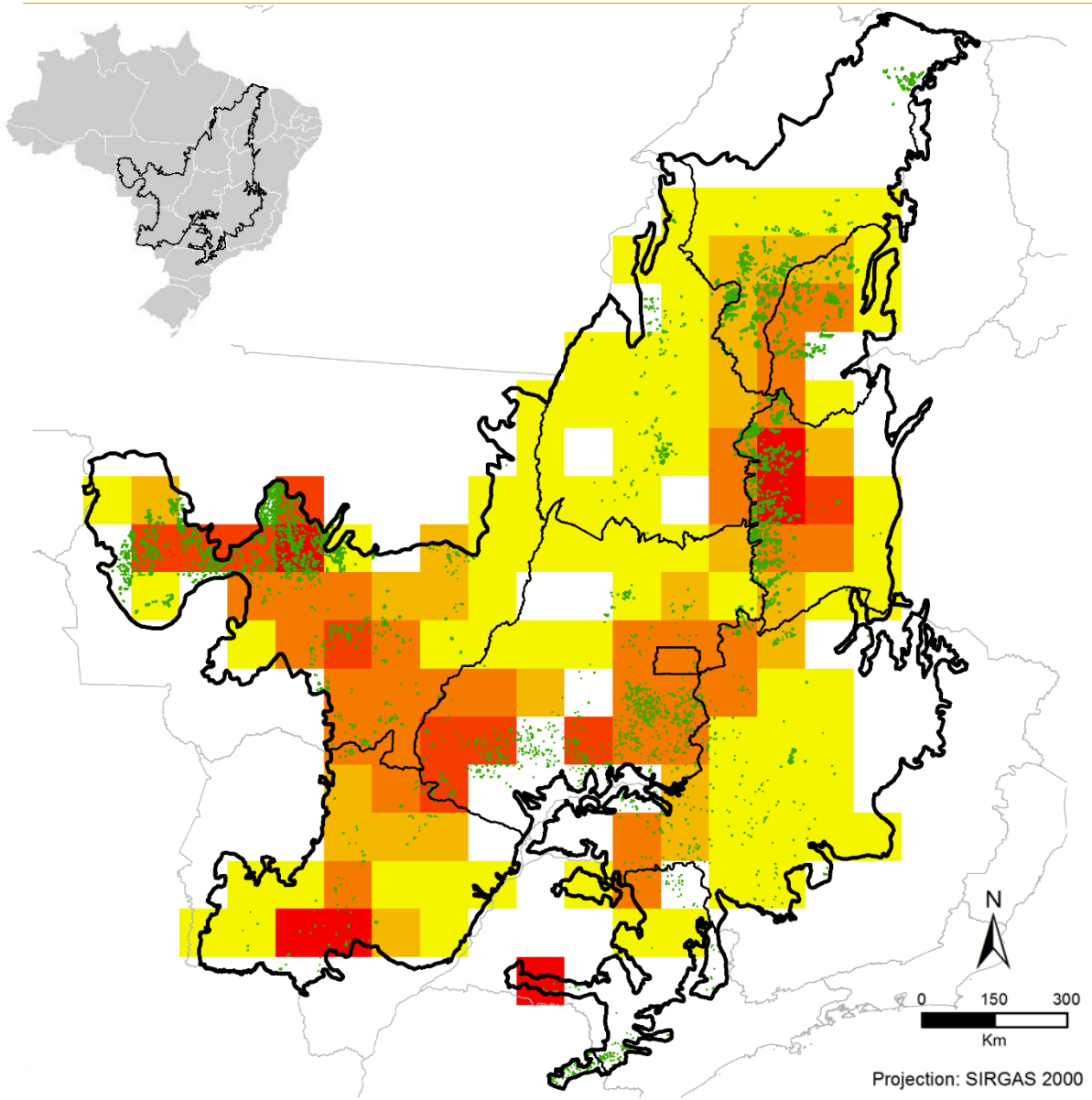
Crop failure in Brazil:

Expansion

SOY

Period of Review: 1991 - 2014

Soy - Crop failures (tons) - 1991-2014 - Cerrado Biome



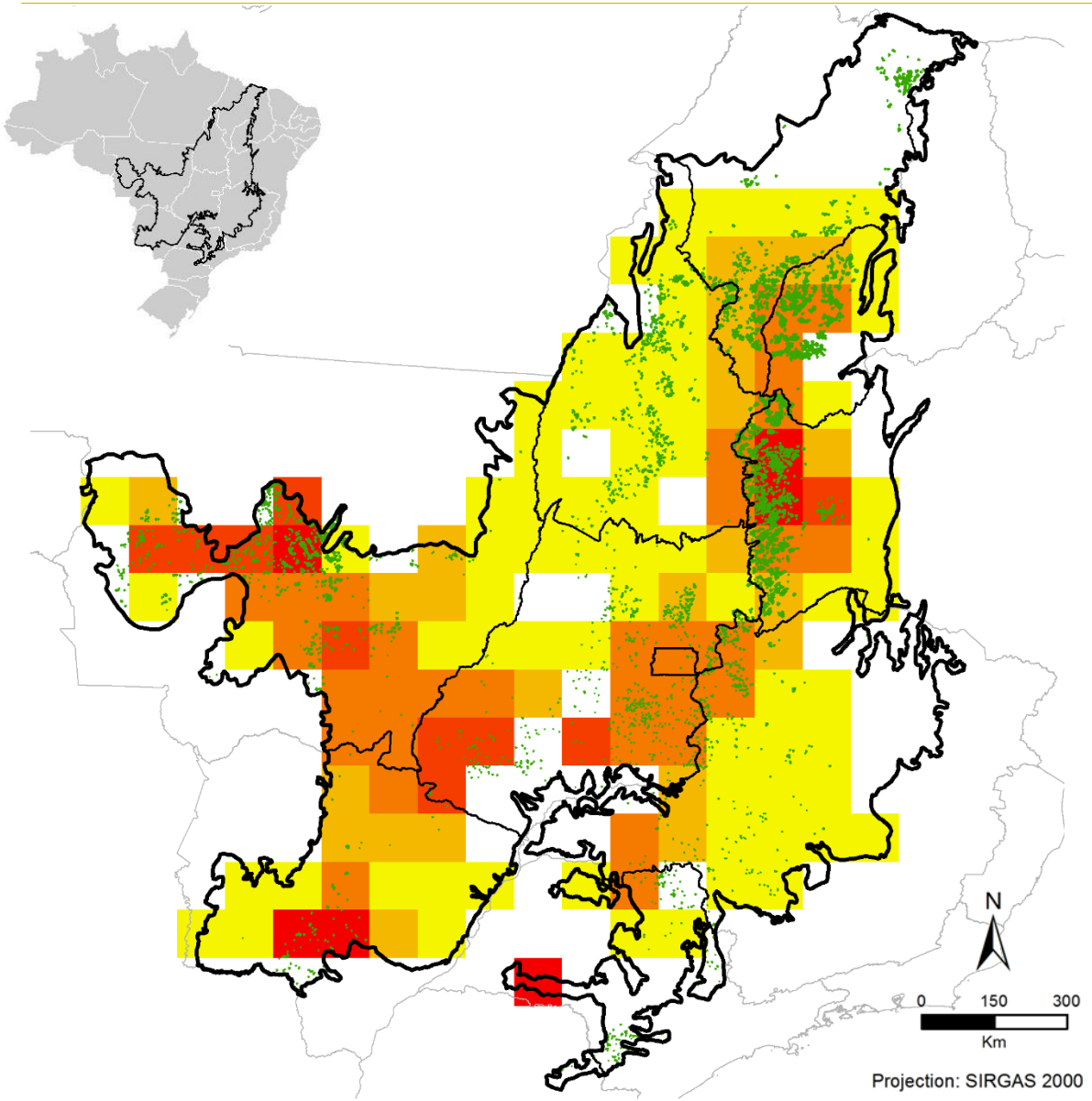
*Total production:
619 million tons

Crop failures:
25 million tons

Crop failures percentage in the report's scenario:
4%

*Source: IBGE, 2017.

Soy - Crop failures (tons) - 1991-2014 - Cerrado Biome



*Total production:
619 million tons

Crop failures:
25 million tons

Crop failures percentage in the report's scenario:
4%

Crop failures (tons)

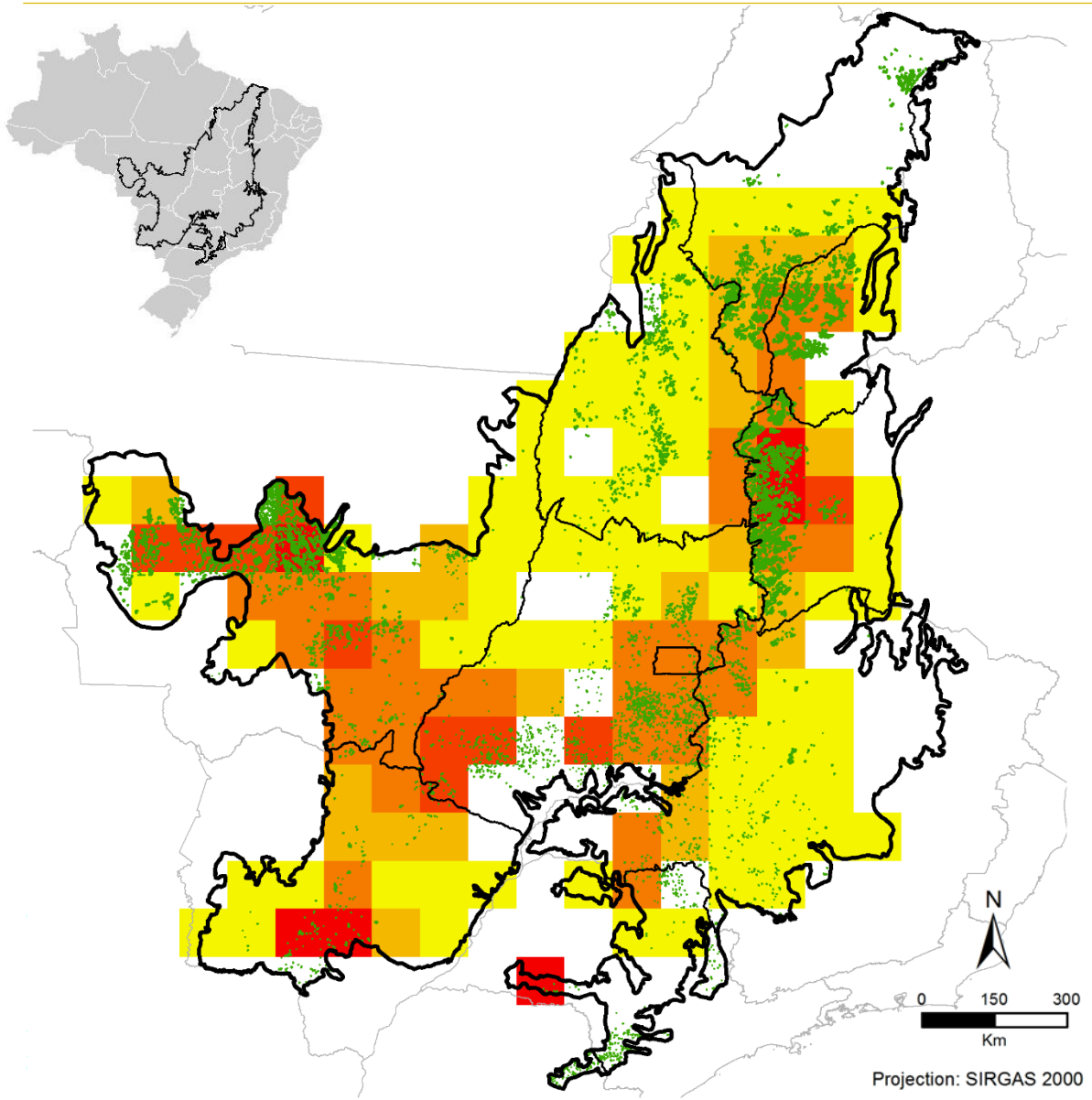
- 680,000 - 1.2 Mi
- 420,000 - 680,000
- 210,000 - 420,000
- 80,000 - 210,000
- < 80,000

Expansion (2007 – 2014)

- Native vegetation

*Source: IBGE, 2017.

Soy - Crop failures (tons) - 1991-2014 - Cerrado Biome



*Total production:
619 million tons

Crop failures:
25 million tons

Crop failures percentage in the report's scenario:
4%

Crop failures (tons)

- 680,000 - 1.2 Mi
- 420,000 - 680,000
- 210,000 - 420,000
- 80,000 - 210,000
- < 80,000

Expansion (2000 – 2014)

- Native vegetation

*Source: IBGE, 2017.

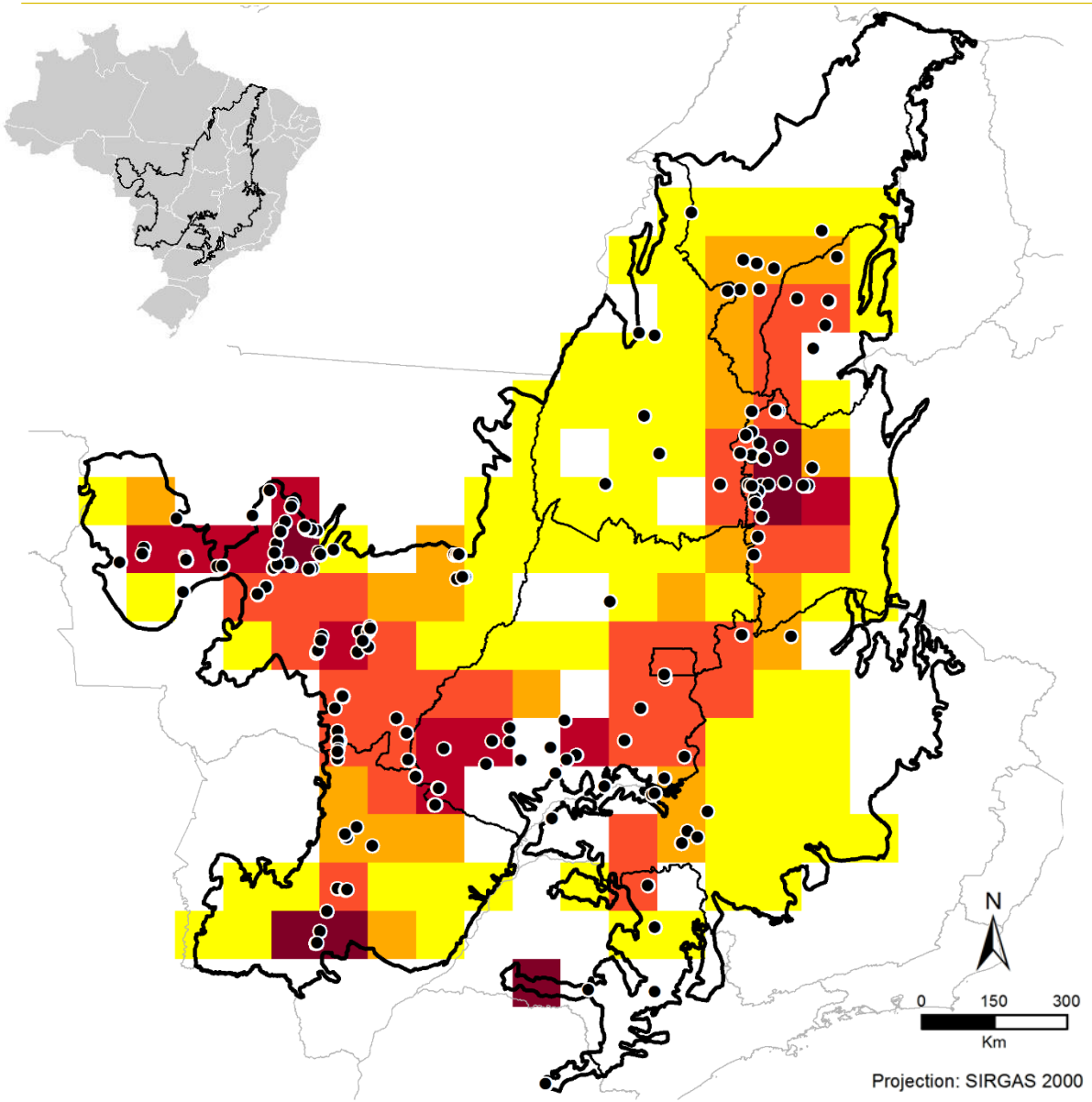
Crop failure in Brazil:

Industries

SOY

Period of Review:
1991 - 2014

Soy - Crop (tons) - 1991-2014 - Brazil's 6 major industries



*Total production:
619 million tons

Crop failures:
27 million tons

Crop failures percentage in the report's scenario:
4%

Industries

- **Silos, Warehouses e Crushers**

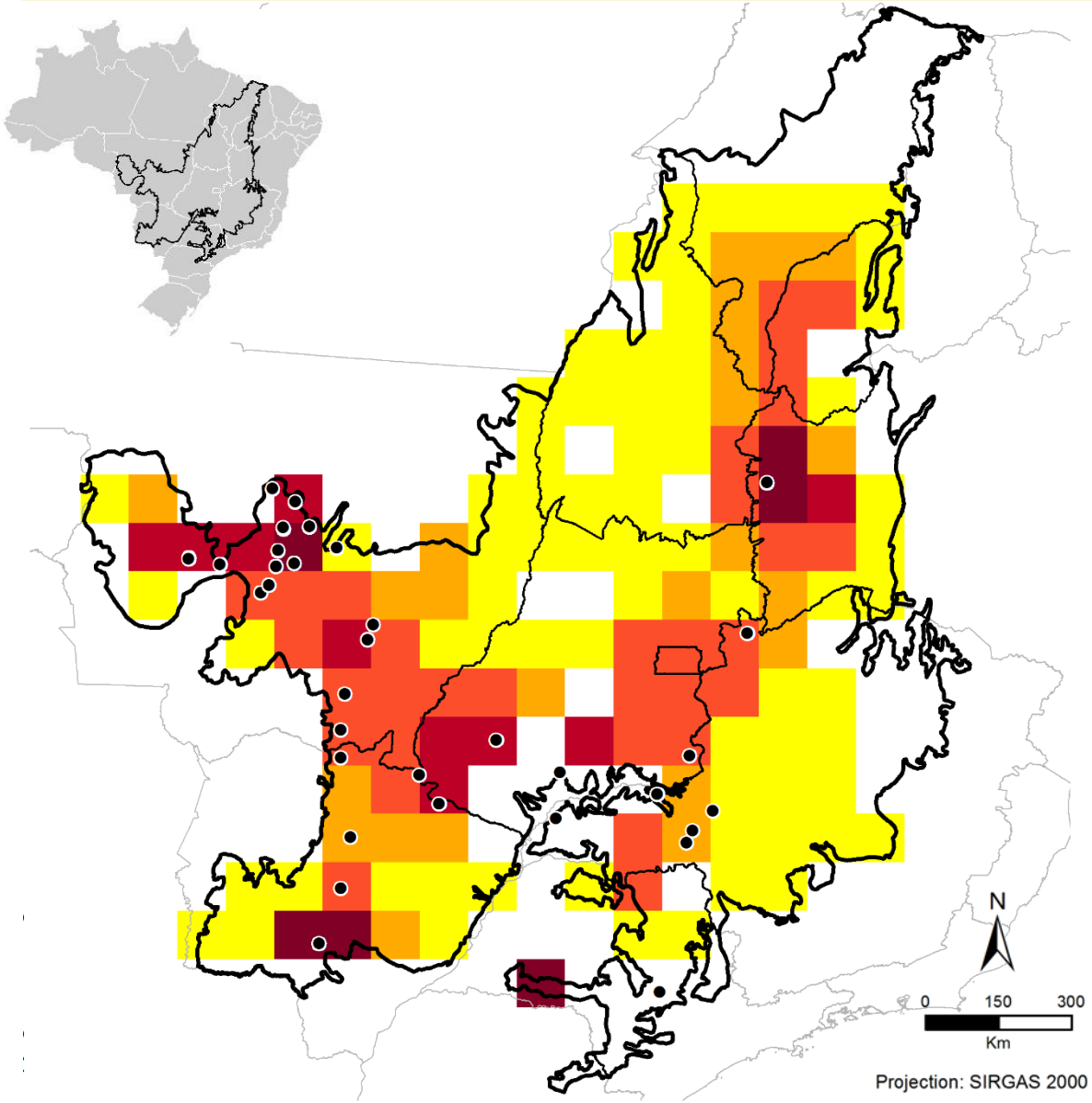
Source : CONAB.

- 680,000 - 1.2 Mi
- 420,000 - 680,000
- 210,000 - 420,000
- 80,000 - 210,000
- < 80,000

INDUSTRIES: ADM, BUNGE, CARGILL, LDC, AMAGGI, COFCO/NIDERA

*Source: IBGE, 2017.

Soy - Crop (tons) - 1991-2014 - ADM



*Total production:
619 million tons

Crop failures:
27 million tons

Crop failures percentage in the report's scenario:
4%

Industries

- **Silos, Warehouses e Crushers**

Source : CONAB.

680,000 - 1.2 Mi

420,000 - 680,000

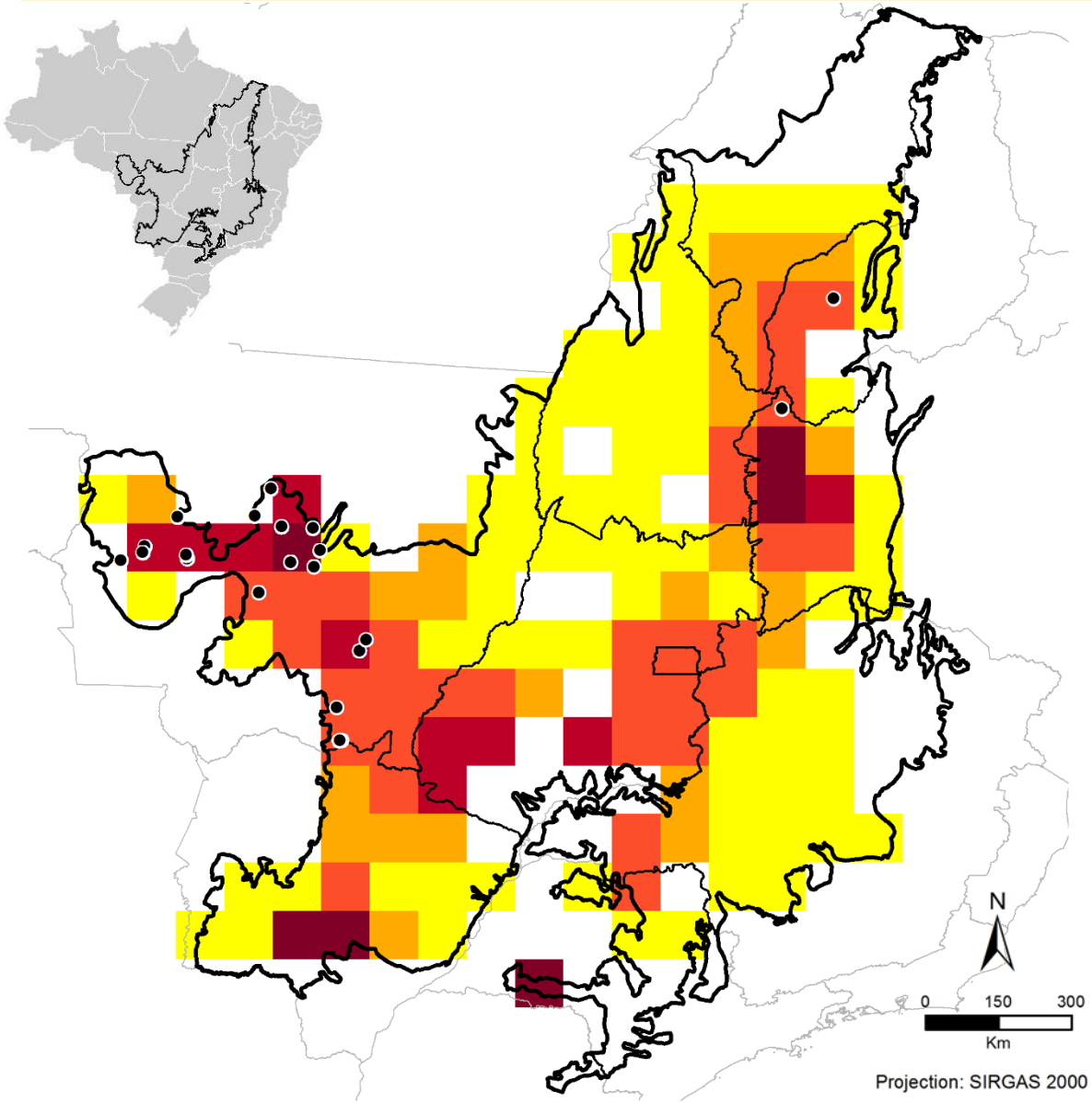
210,000 - 420,000

80,000 - 210,000

< 80,000

*Source: IBGE, 2017.

Soy - Crop (tons) - 1991-2014 - Amaggi



*Total production:
619 million tons

Crop failures:
27 million tons

Crop failures percentage in the report's scenario:
4%

Industries

- **Silos, Warehouses e Crushers**

Source : CONAB.

680,000 - 1.2 Mi

420,000 - 680,000

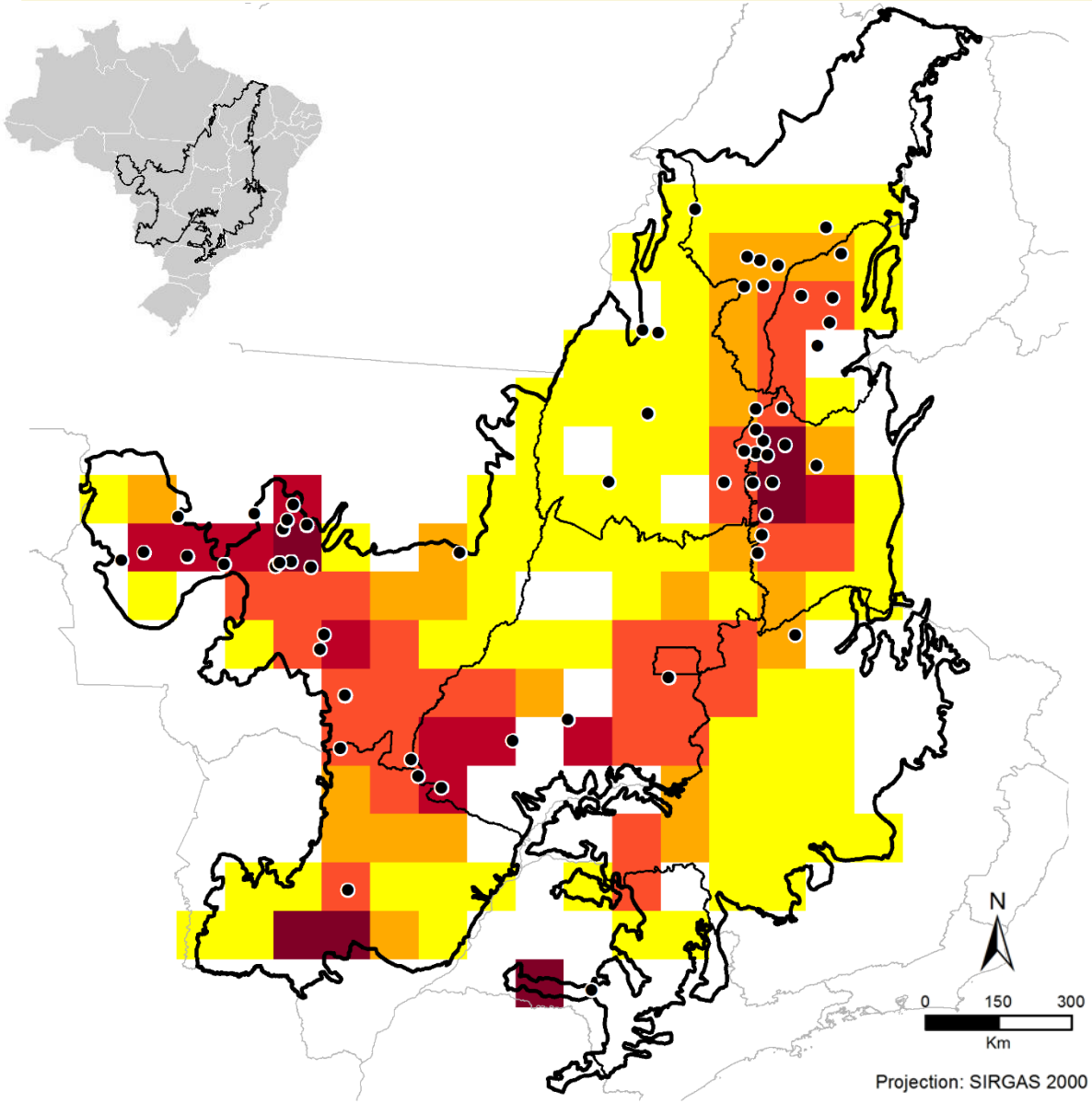
210,000 - 420,000

80,000 - 210,000

< 80,000

*Source: IBGE, 2017.

Soy - Crop (tons) - 1991-2014 - Bunge



*Total production:
619 million tons

Crop failures:
27 million tons

Crop failures percentage in the report's scenario:
4%

Industries

- **Silos, Warehouses e Crushers**

Source : CONAB.

680,000 - 1.2 Mi

420,000 - 680,000

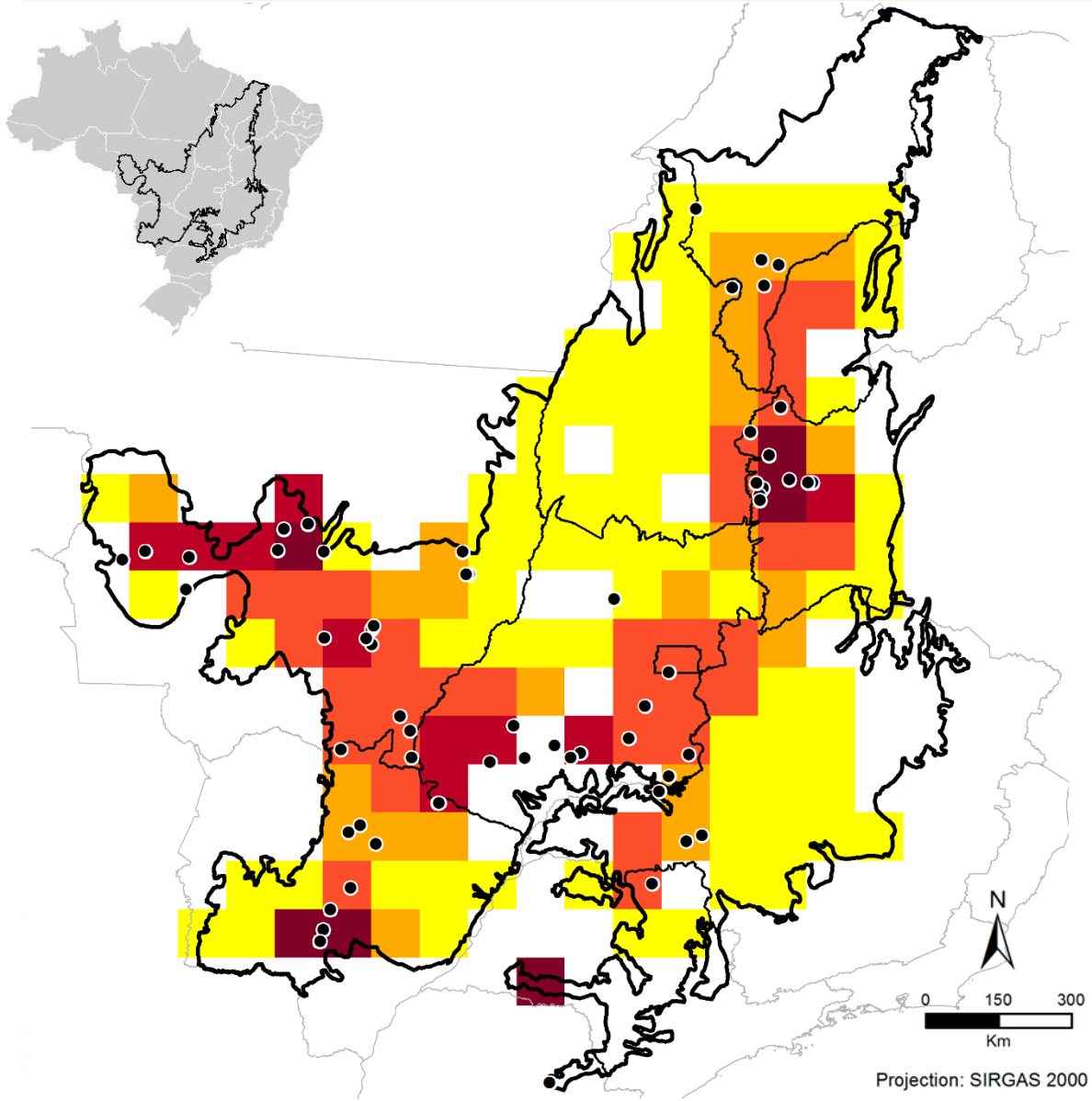
210,000 - 420,000

80,000 - 210,000

< 80,000

*Source: IBGE, 2017.

Soy - Crop (tons) - 1991-2014 - Cargill



*Total production:
619 million tons

Crop failures:
27 million tons

Crop failures percentage in the report's scenario:
4%

Industries

- **Silos, Warehouses e Crushers**

Source : CONAB.

680,000 - 1.2 Mi

420,000 - 680,000

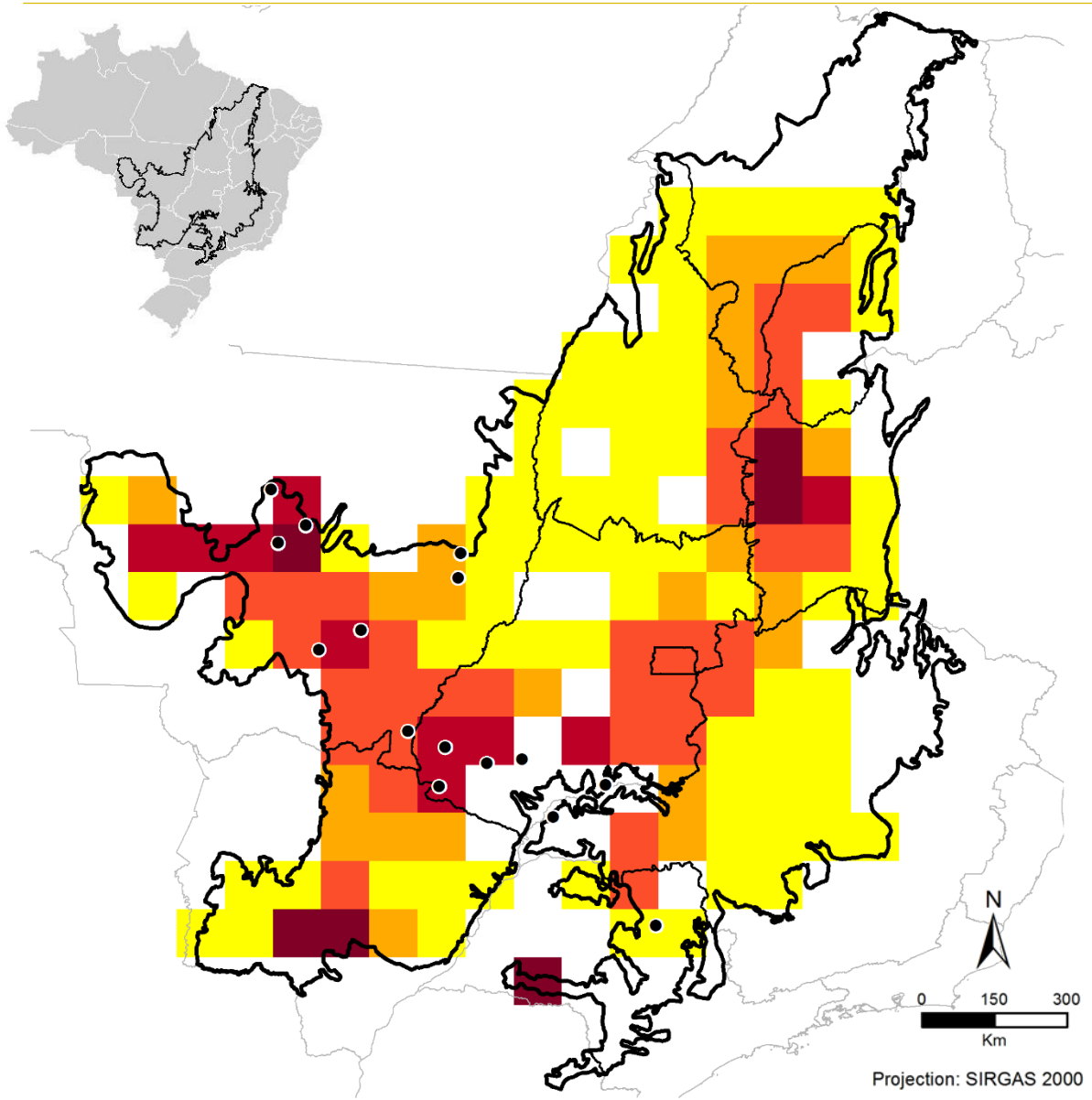
210,000 - 420,000

80,000 - 210,000

< 80,000

*Source: IBGE, 2017.

Soy - Crop (tons) - 1991-2014 - LDC



*Total production:
619 million tons

Crop failures:
27 million tons

Crop failures percentage in the report's scenario:
4%

Industries

- **Silos, Warehouses e Crushers**

Source : CONAB.

680,000 - 1.2 Mi

420,000 - 680,000

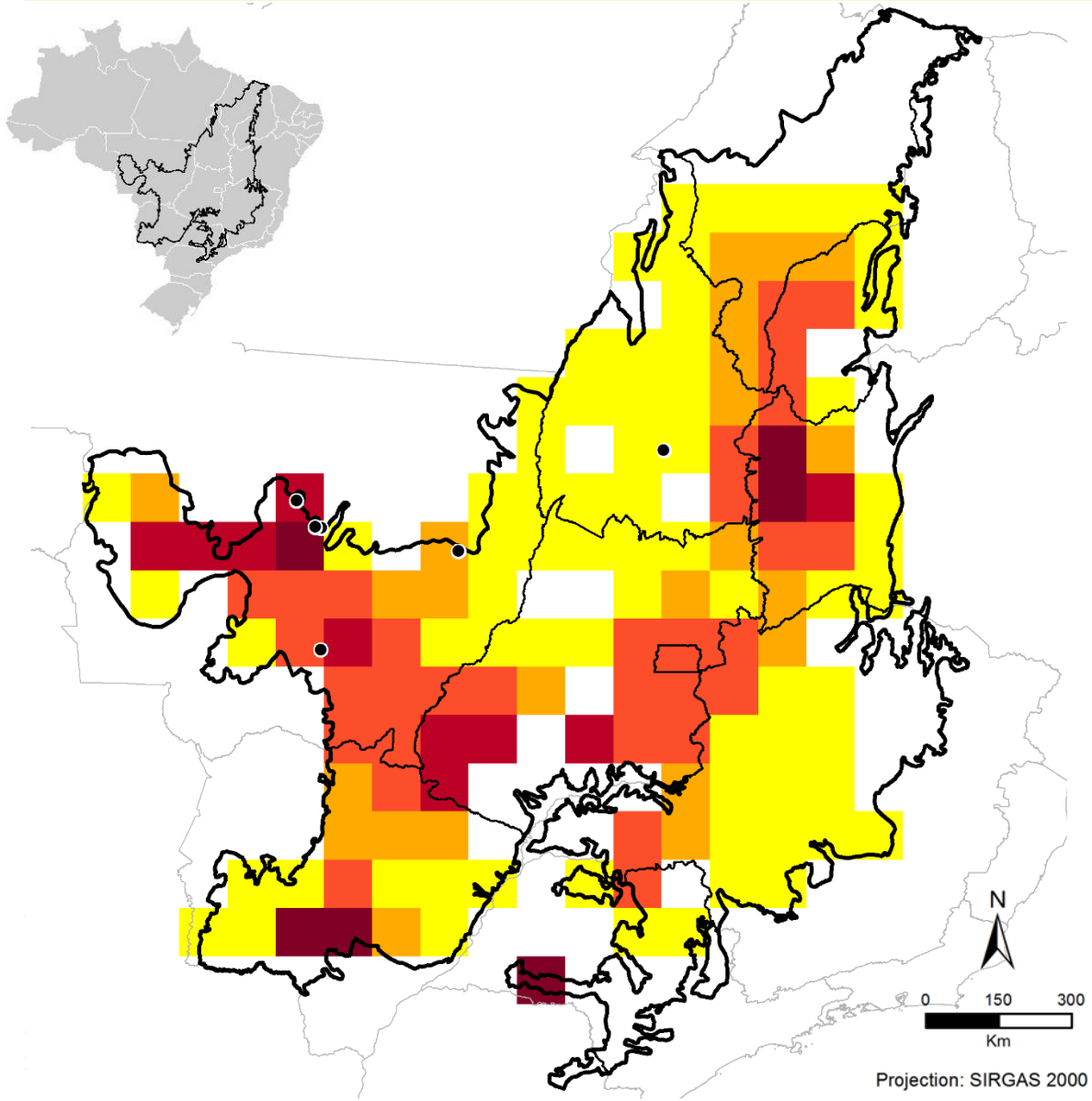
210,000 - 420,000

80,000 - 210,000

< 80,000

*Source: IBGE, 2017.

Soy - Crop (tons) - 1991-2014 - Nidera



*Total production:
619 million tons

Crop failures:
27 million tons

Crop failures percentage in the report's scenario:
4%

Industries

- **Silos, Warehouses e Crushers**

Source : CONAB.

680,000 - 1.2 Mi

420,000 - 680,000

210,000 - 420,000

80,000 - 210,000

< 80,000

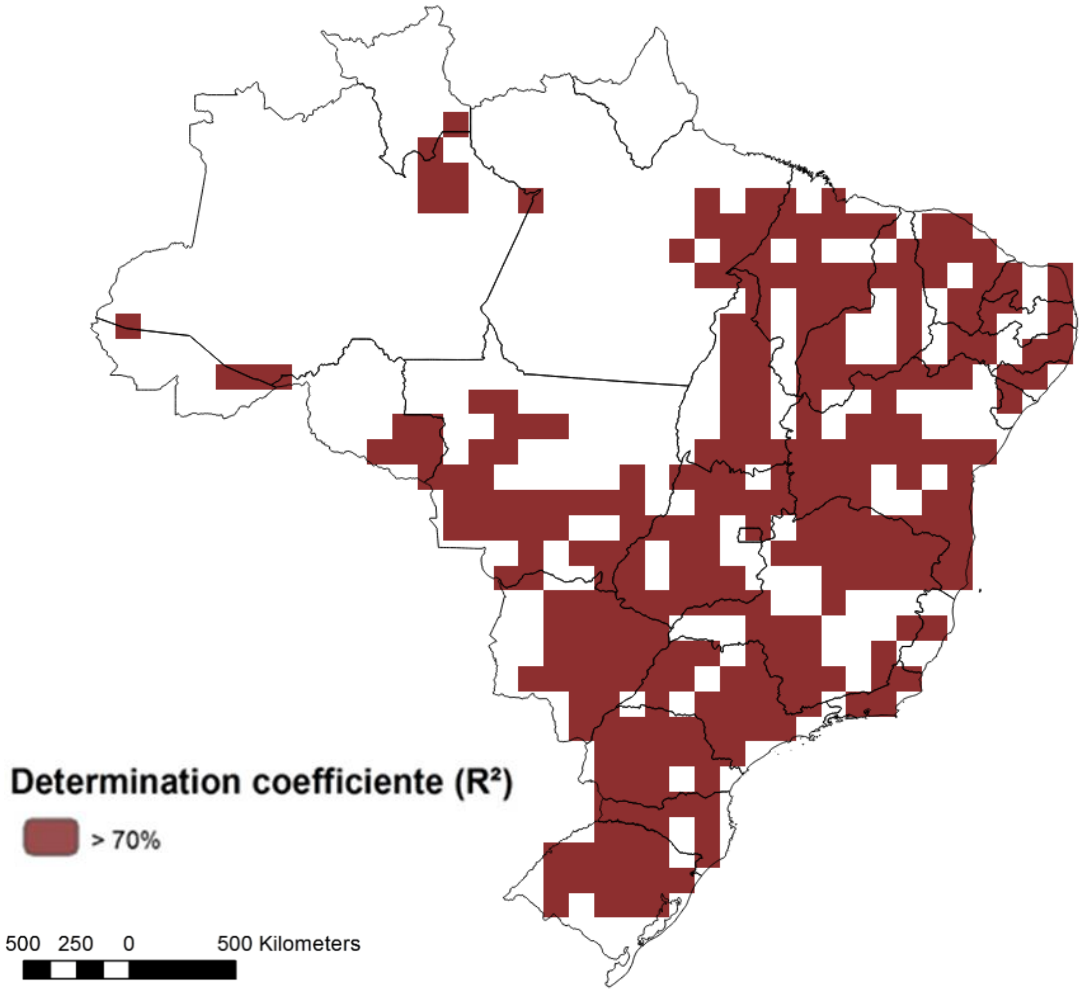
*Source: IBGE, 2017.

Crop failure in Brazil:

SUGARCANE

Period of Review:
1991 - 2014

Sugarcane - Relationship between climate and crop failure



When **$R^2 > 0.7$** we consider that a climatic event caused a crop failure, in other words: **crop failures occur due to climatic events.** In this study, we consider only **areas where the crop failures are correlated with extreme climatic event.** The map on the right shows the total area studied.

We also subdivided the total area into **three other areas of study interest:**

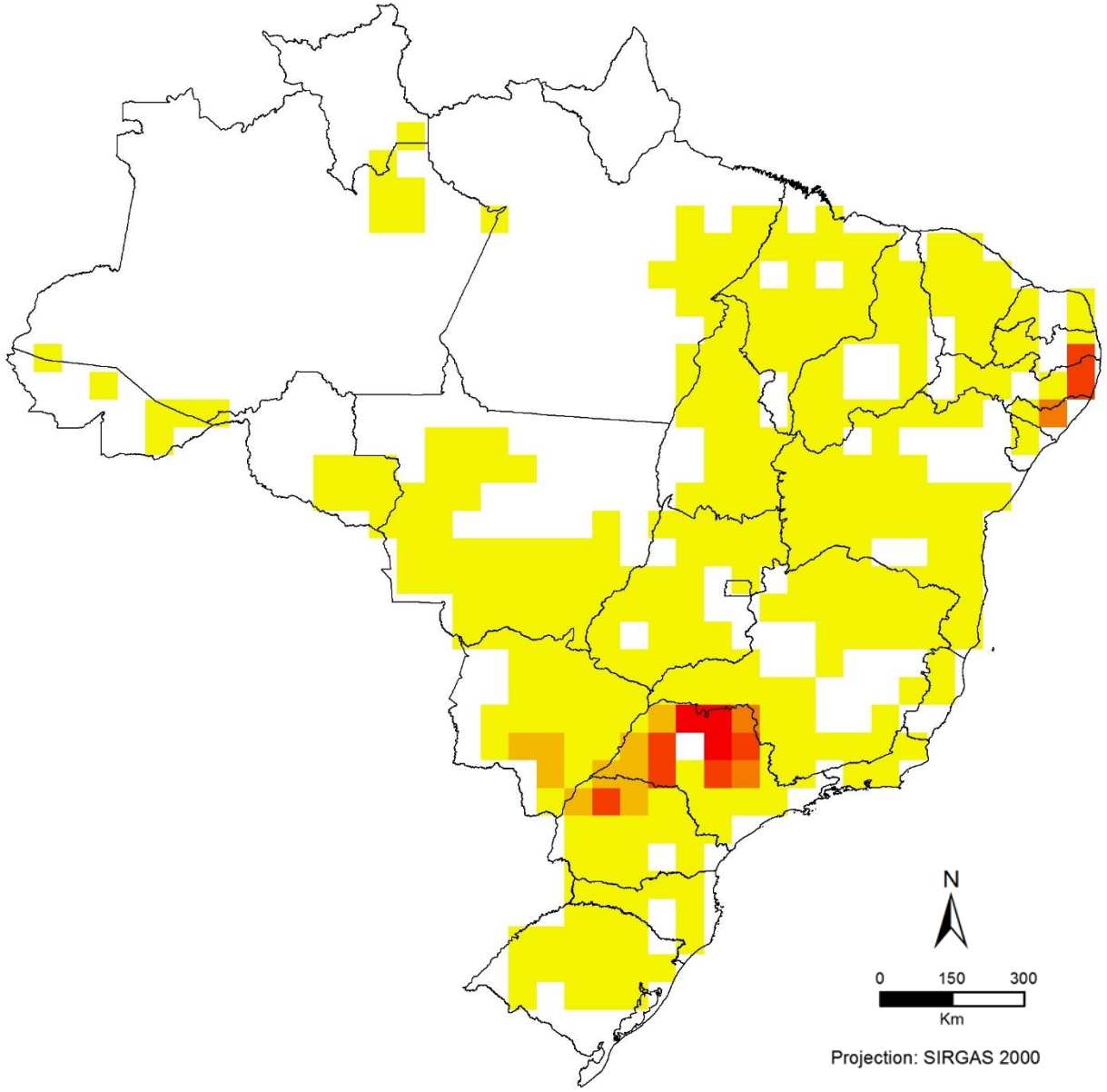
Cerrado Biome

MATOPIBA

State of Mato Grosso

South region

Sugarcane - Crop failures (tons) - 1991-2014 - Brazil



Total production:
9,1 billion tons

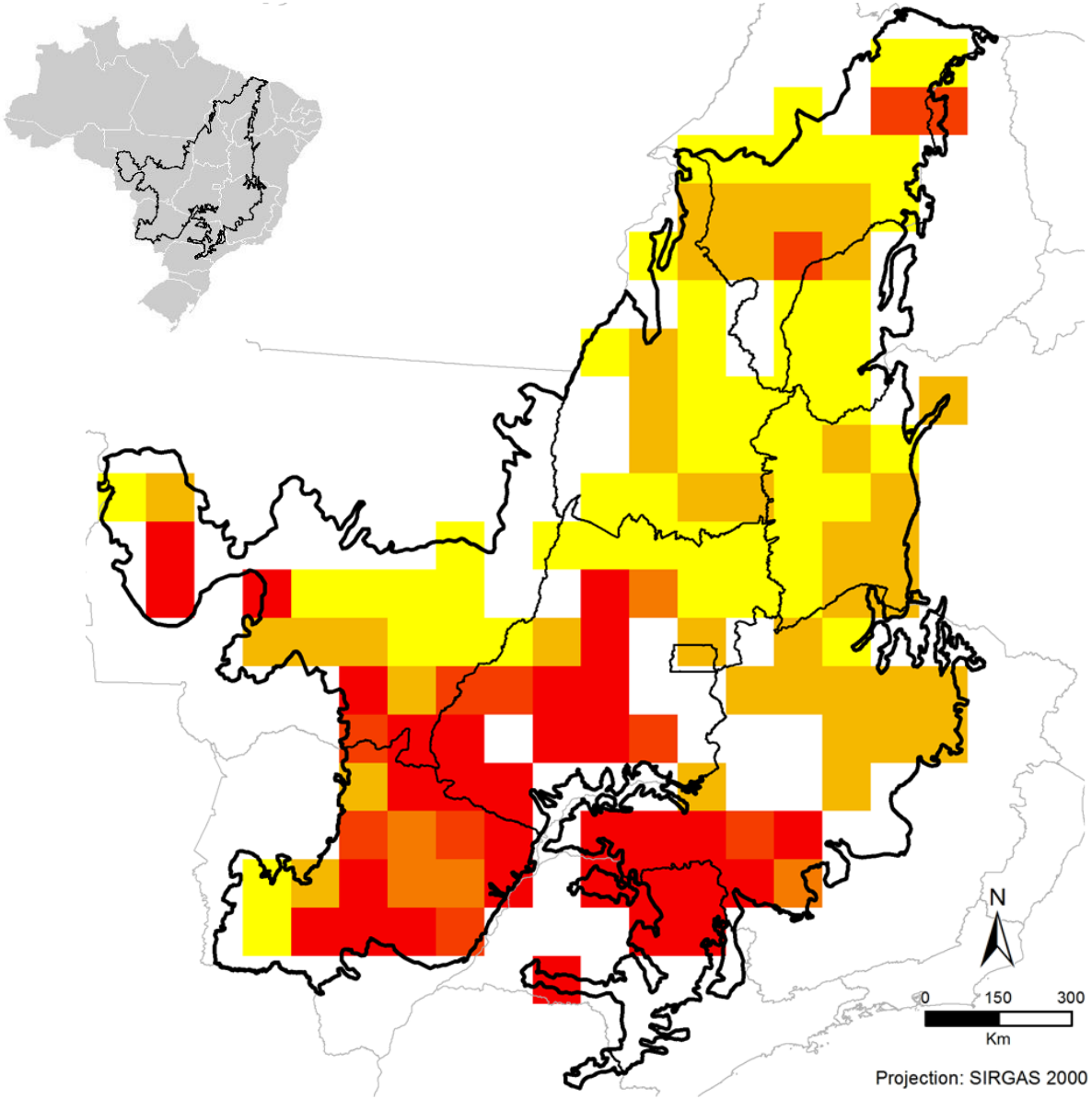
Total Production - TRS (Total Recoverable Sugars):
1,3 billion

Source: UNICA (Union of the Sugar Cane Agribusiness of São Paulo) - producers in Brazil are currently paid by the content of Total Recoverable Sugars (TRS)

Crop failures:
365 million tons

Crop failures - TRS (Total Recoverable Sugars)
56 million (15% total)

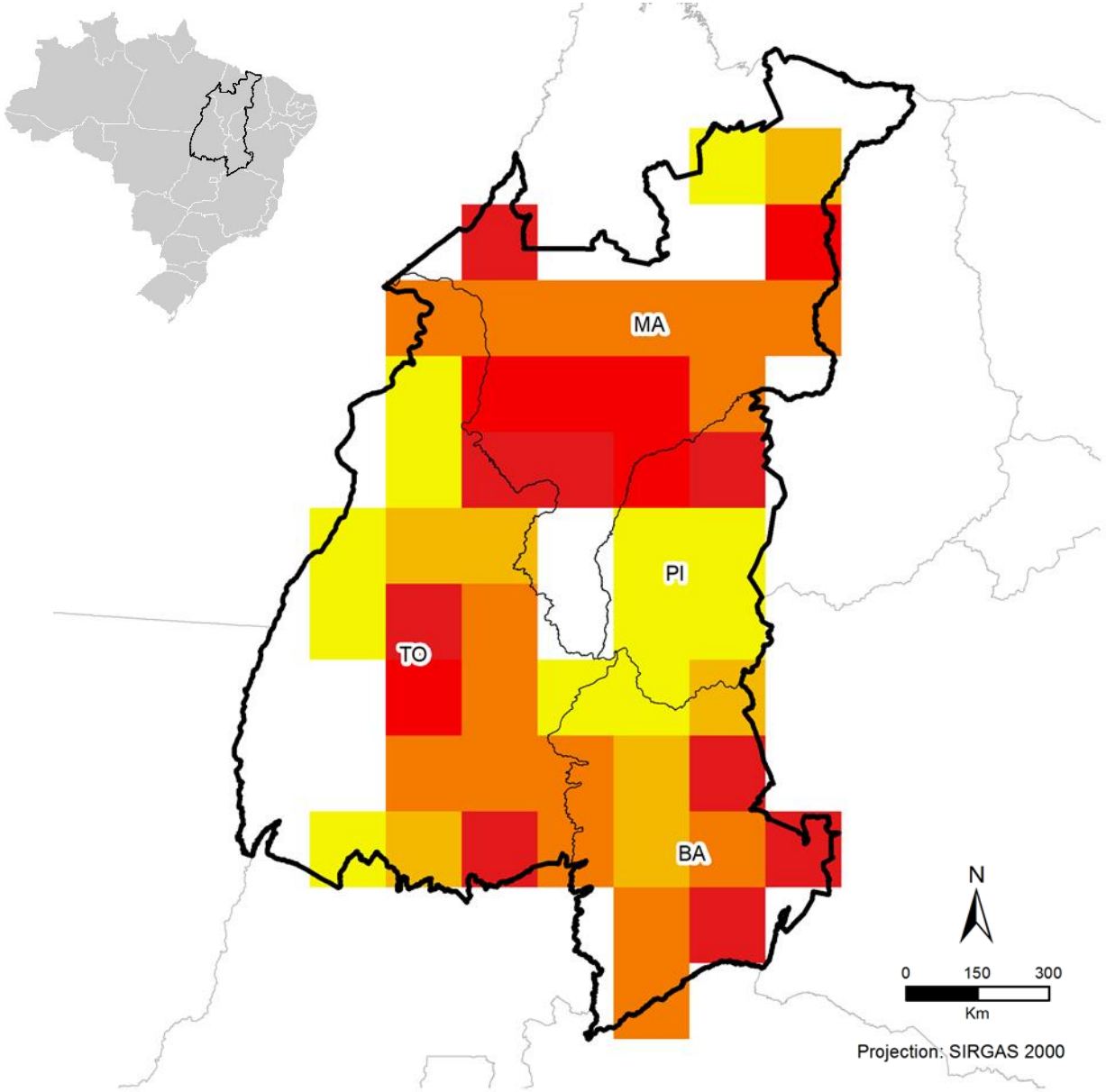
Sugarcane - Crop failures (tons) - 1991-2014 - Cerrado Biome



Crop failures:
182 million tons

Crop failures - TRS (Total Recoverable Sugars)
49 million (27% total)

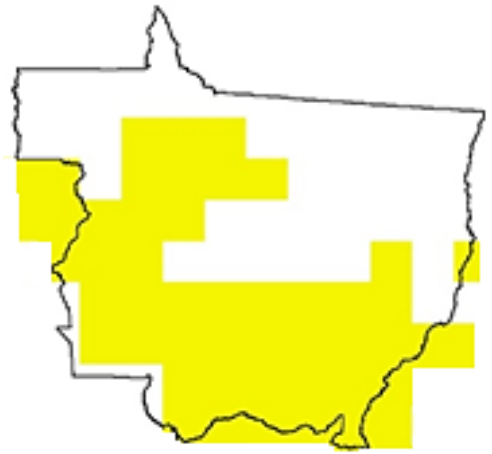
Sugarcane - Crop failures (tons) - 1991-2014 - MATOPIBA

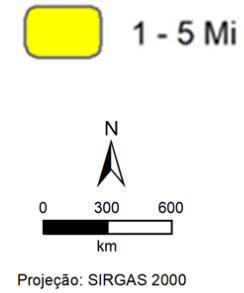


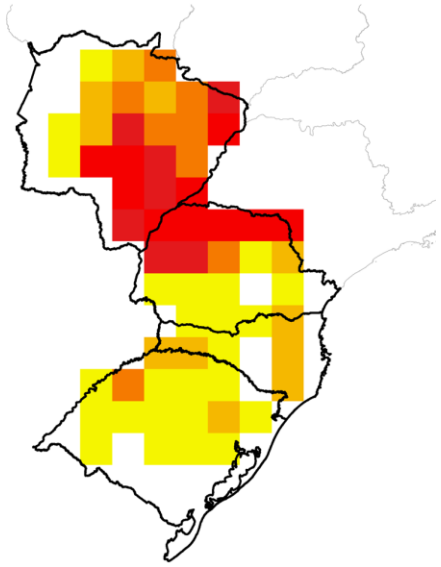
Crop failures:
4,4 million tons

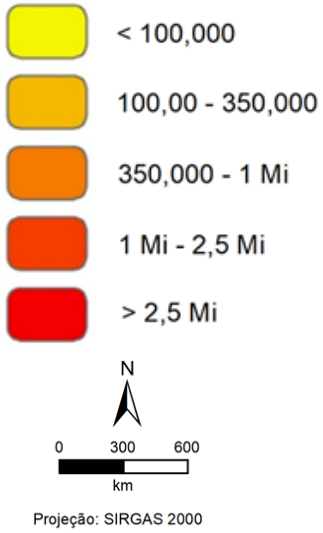
Crop failures - TRS:
615 thousands (14% total)

Sugarcane - Crop failures (tons) - 1991-2014 - Regions









Source: UNICA (Union of the Sugar Cane Agribusiness of São Paulo) - producers in Brazil are currently paid by the content of Total Recoverable Sugars (TRS)

State of Mato Grosso

Total production:
281 millions tons

Total Production - TRS (Total Recoverable Sugars):
35 millions

Crop failures:
18 million tons

Crop failures - TRS (Total Recoverable Sugars)
1,5 million (8% total)

South Region

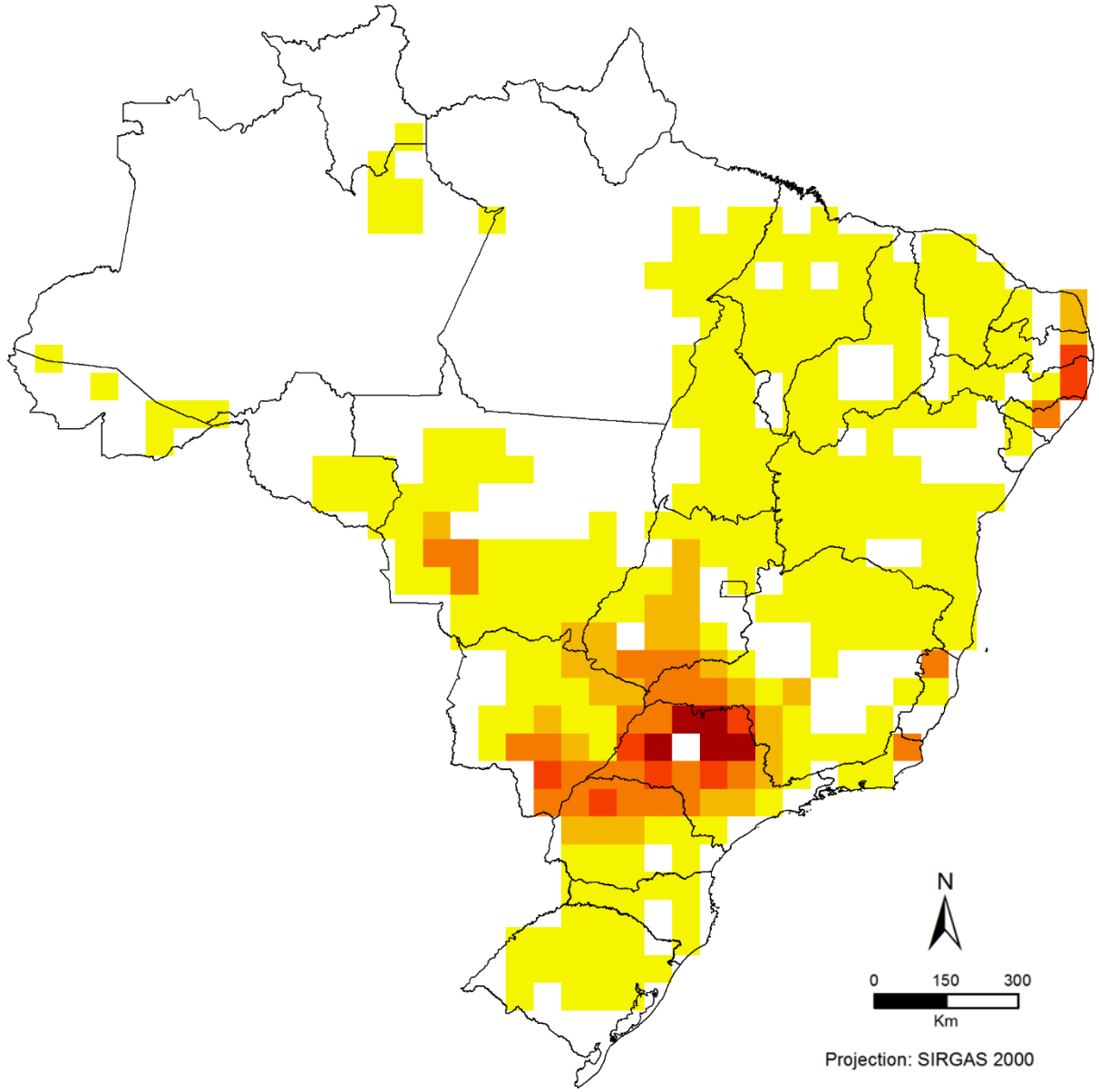
*Total production:
968 millions tons

*Total Production - TRS (Total Recoverable Sugars):
130 millions

Crop failures:
71 million tons

Crop failures - TRS (Total Recoverable Sugars)
6,1 million (9% total)

Sugarcane - Crop failures (US$) - 1995-2014 - Brazil

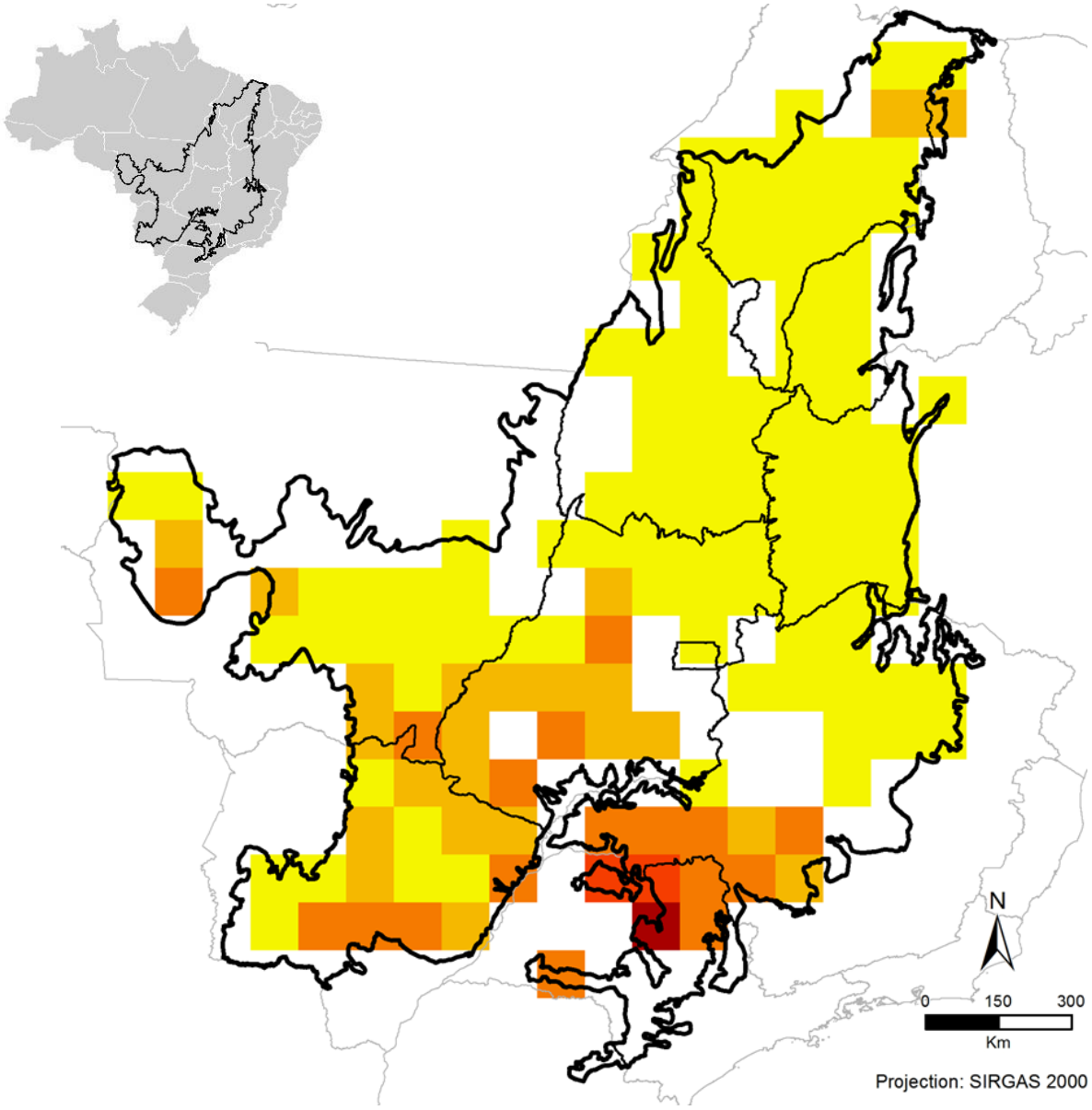


Crop failures:
US$ 9 bi

*Values to real:
BRL$ 30 bi

*Exchange rate (Dec / 2017): 3,29

Sugarcane - Crop failures (US$) - 1995-2014 - Cerrado Biome

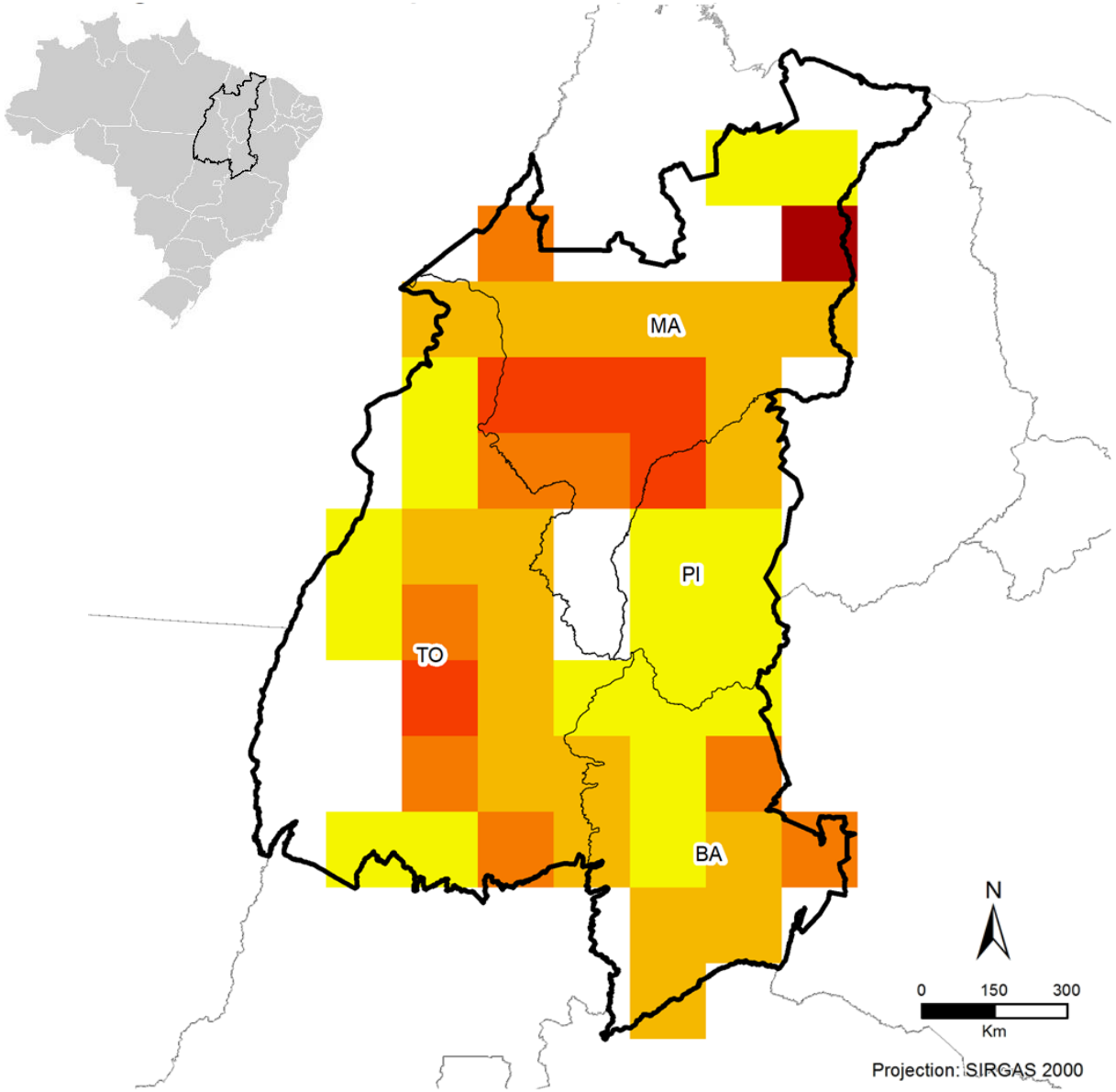


Crop failures:
US$ 4,5 bi

*Values to real:
BRL$ 15 bi

*Exchange rate (Dec / 2017): 3,29

Sugarcane - Crop failures (US$) - 1995-2014 - MATOPIBA



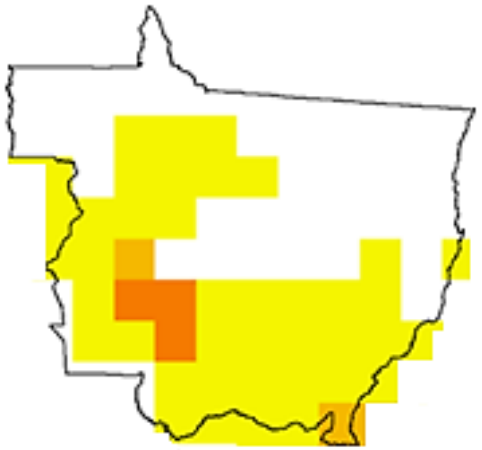
Crop failures:
US$ 97 mi

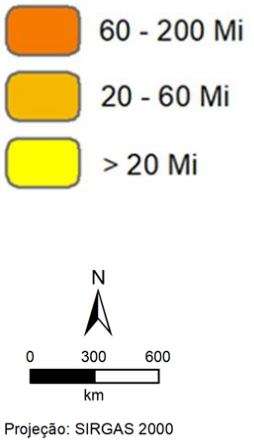
*Values to real:
BRL$ 320 mi

$12 Mi
$5 - 10 Mi
$2 - $5 Mi
$700,000 - $2 Mi
$20,000 - $700,00

*Exchange rate (Dec / 2017): 3,29

Sugarcane - Crop failures (US$) - 1995-2014 - Regions

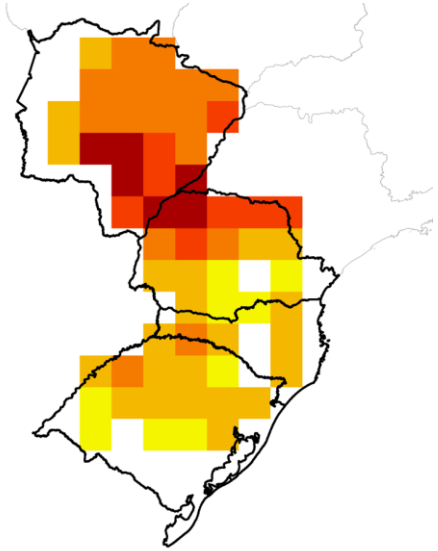




State of Mato Grosso

Crop failures:
US$ 410 mi

*Values to real:
BRL$ 1,4 bi



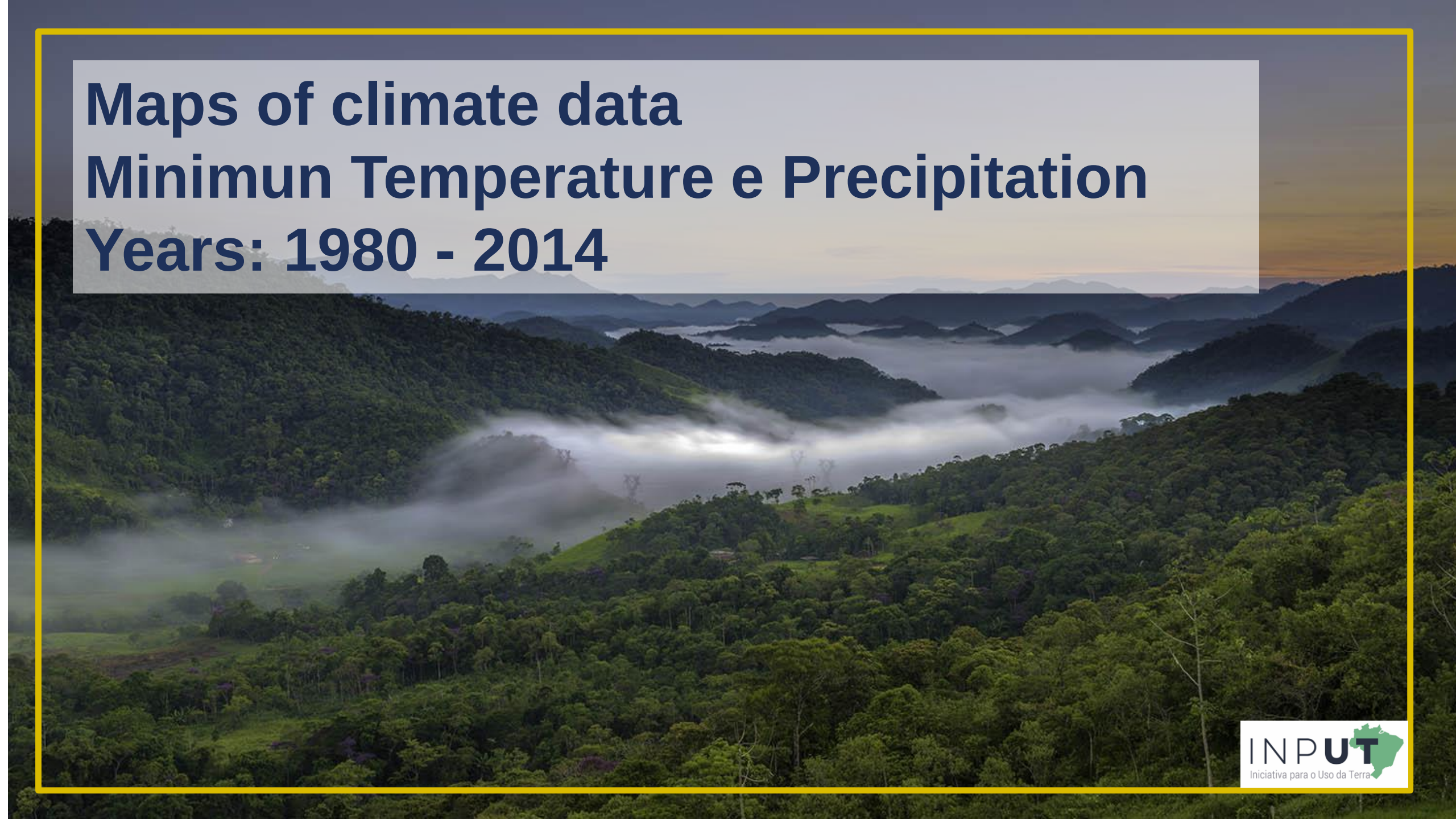
South Region

Crop failures:
US$ 2 bi

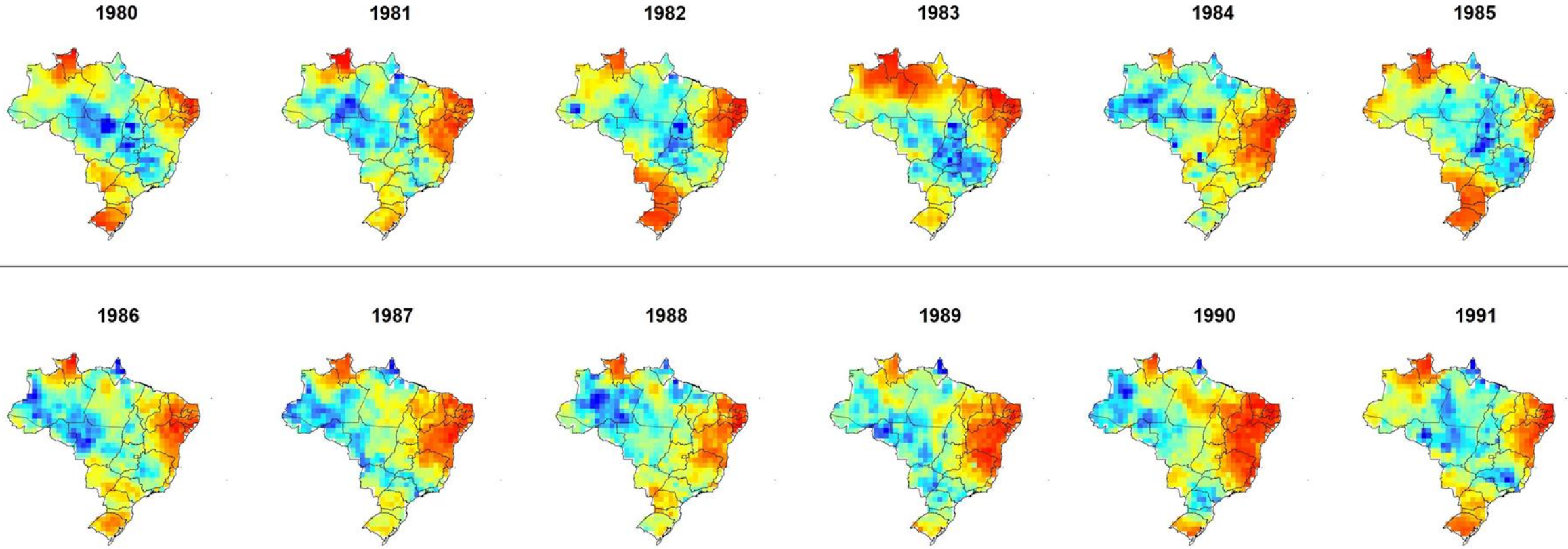
*Values to real:
BRL$ 6,5 bi

*Exchange rate (Dec / 2017): 3,29

Maps of climate data
Minimun Temperature e Precipitation
Years: 1980 - 2014

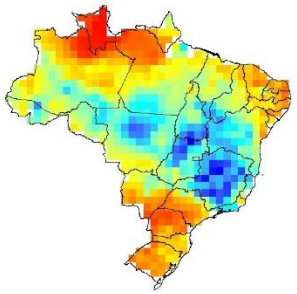


Precipitation Maps - 1980 until 1991

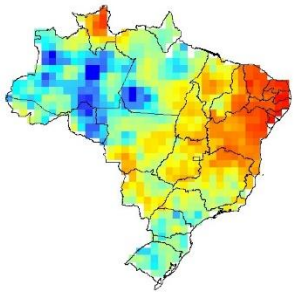


Precipitation Maps - 1992 until 2003

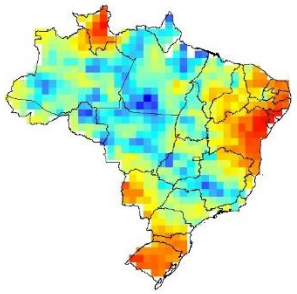
1992



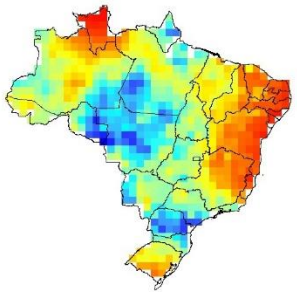
1993



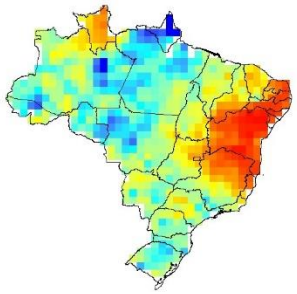
1994



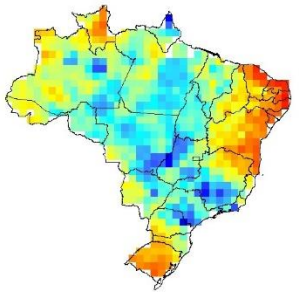
1995



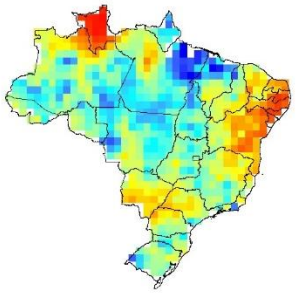
1996



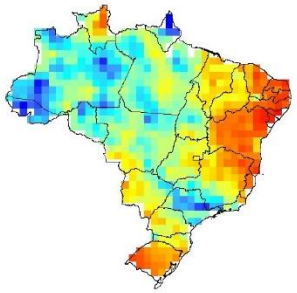
1997



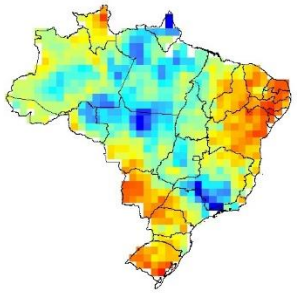
1998



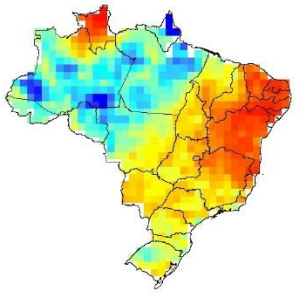
1999



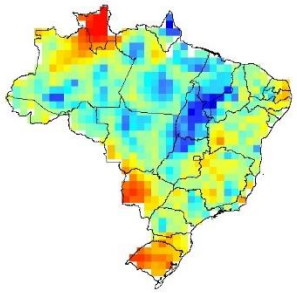
2000



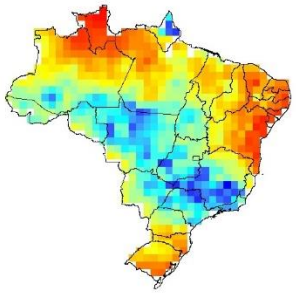
2001



2002

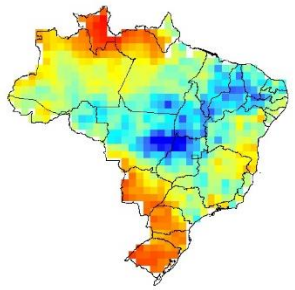


2003

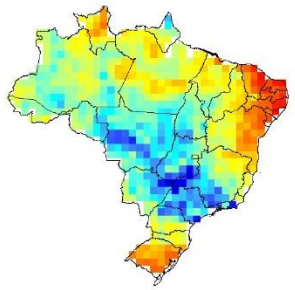


Precipitation Maps - 2004 until 2015

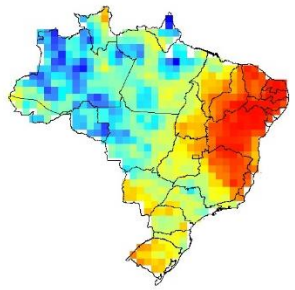
2004



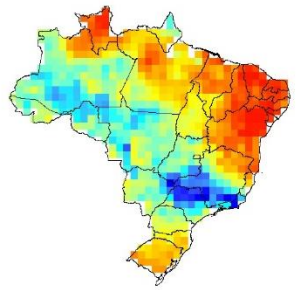
2005



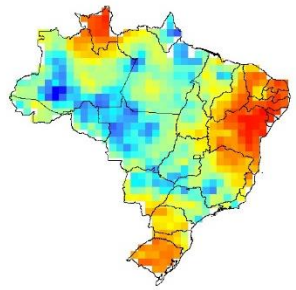
2006



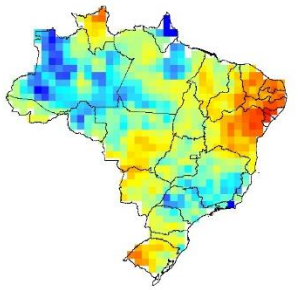
2007



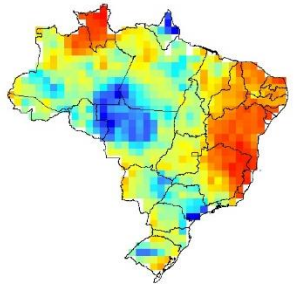
2008



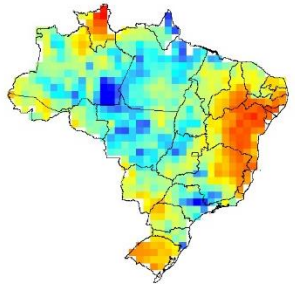
2009



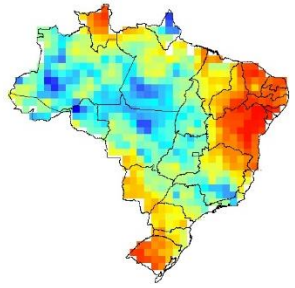
2010



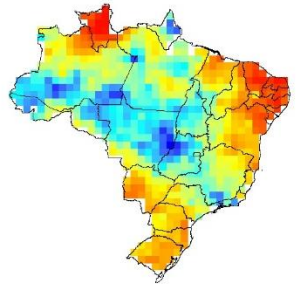
2011



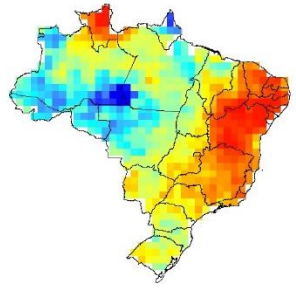
2012



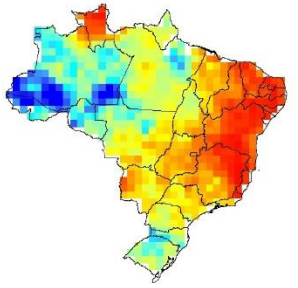
2013



2014

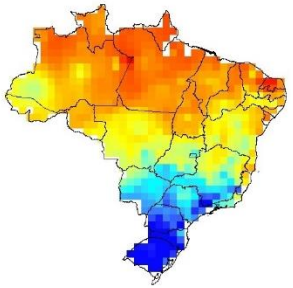


2015

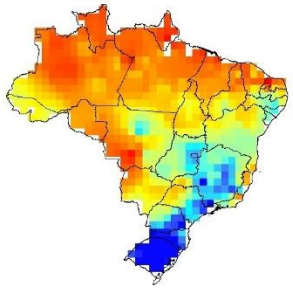


Temperature Maps - 1980 until 1991

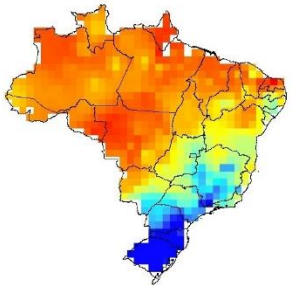
1980



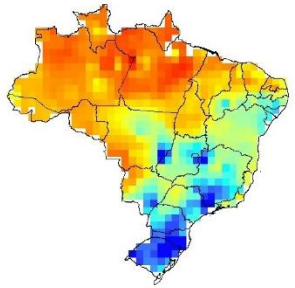
1981



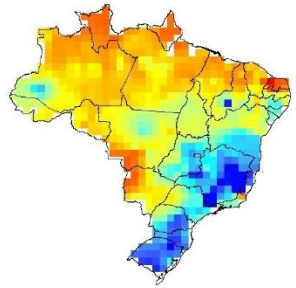
1982



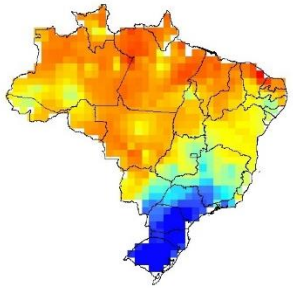
1983



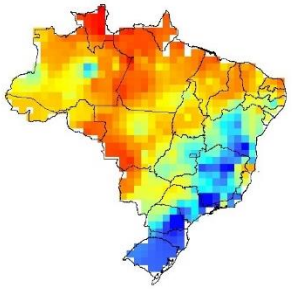
1984



1985



1986



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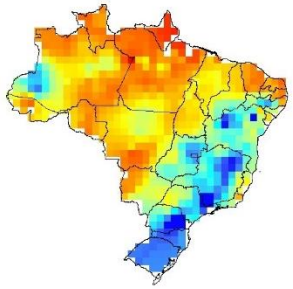

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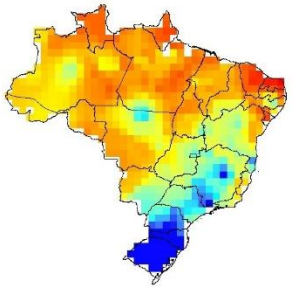

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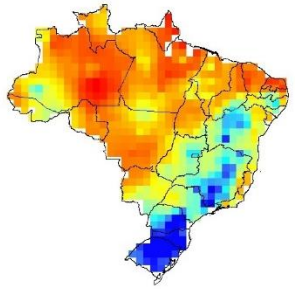

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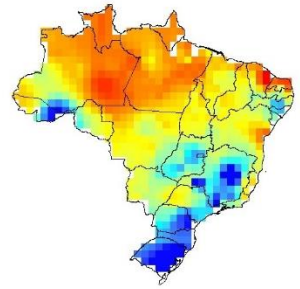

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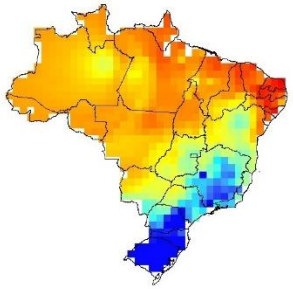
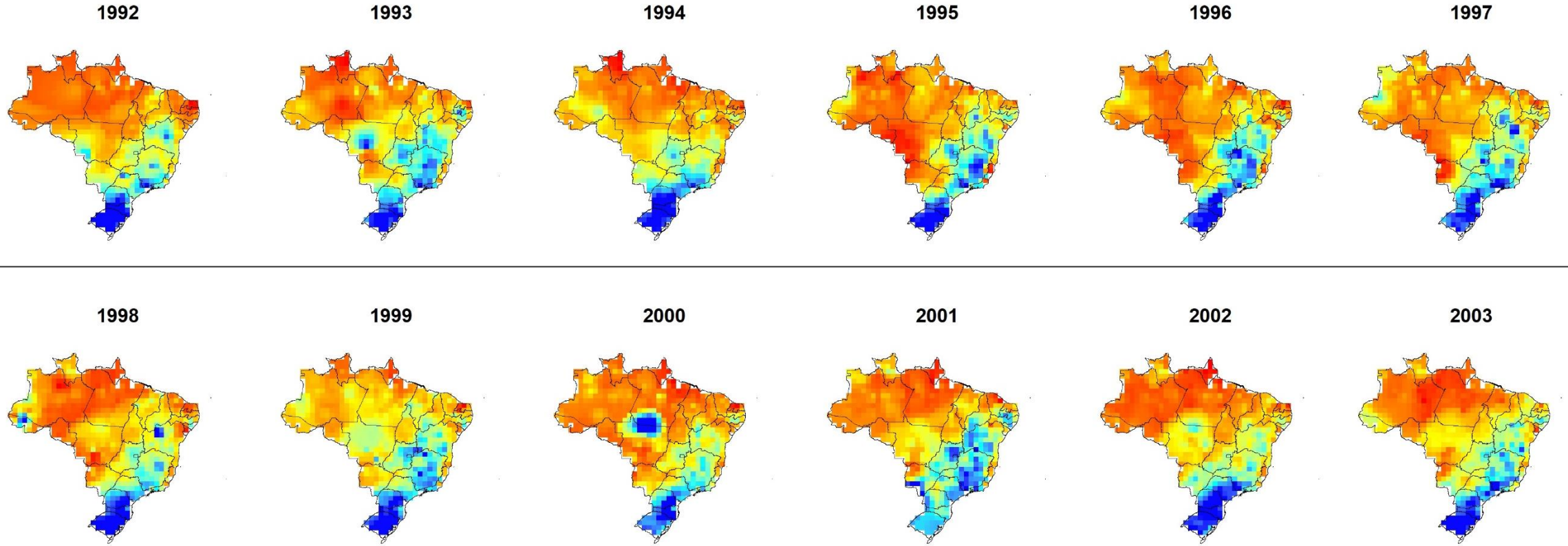
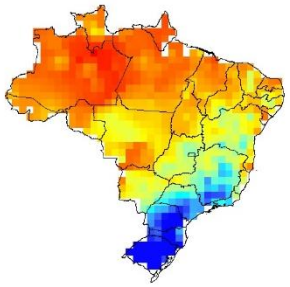


Temperature Maps - 1992 until 2003



Temperature Maps - 2004 until 2013

2004



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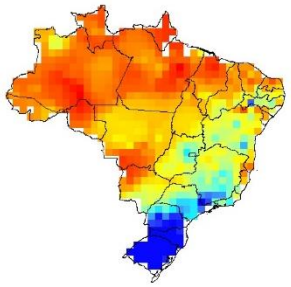

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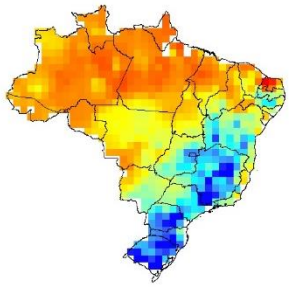

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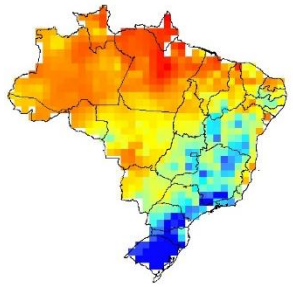

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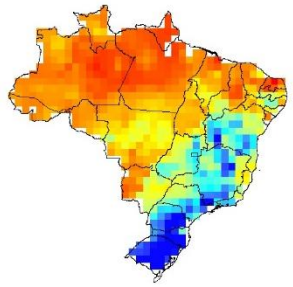

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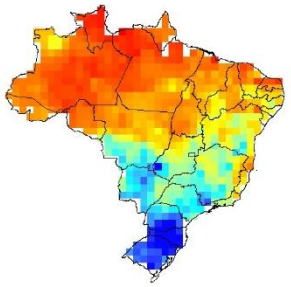

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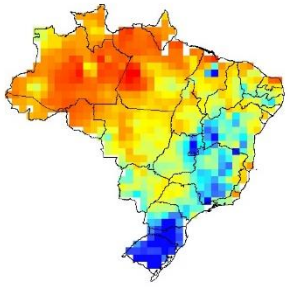

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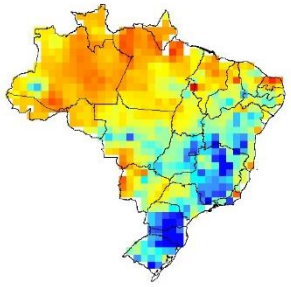

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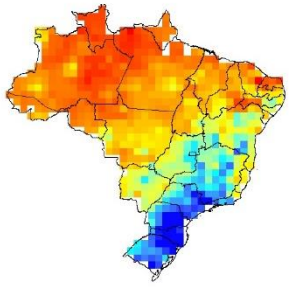

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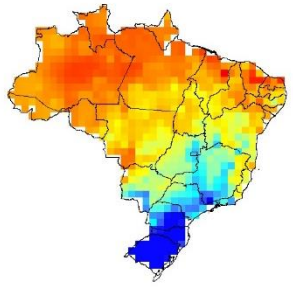


Thank you!

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