Nature and Cities:
Brazilians' relationship with climate changes

INTRODUCTION

The extreme climatic events are becoming more and more unpredictable and impactful, with heavy and more frequent rain concentrated in short amount of time, along with severe drought that can last for long periods.

The climate change is affecting the current life style of the society and the ecosystem operation, because it is suffering changes that impact not only the biodiversity but also the world economy.

The resilient development to climate is the one that combines mitigation and adaptation measures. However, this resilient development to climate becomes harder to achieve whenever there is a raise on global medium temperature.

Nature needs to be in the center of the solutions. The nature based solutions (NBS) are actions that use natural procedures and ecosystems to face the most pressing challenges of our time, such as the lack of water risk, with droughts and rain dearth, and the impact of extreme climate events, as floods and landslides. It is an approach of natural resources management that creates benefits for the biodiversity and at the same time promotes solutions for socioeconomic development and human well-being.

This inedited research quested to know how people from every region of this continental country understand the relation of nature in urban areas and the city resilience to extreme climate events, intensified by climate changes. In this publication, you are going to find the main data of the study showed in a visual way, in infographics that can be downloaded and shared.

The research is a realization of Boticário Group Foundation for Nature Protection, in cooperation with UNESCO in Brazil and has the support of ANAMMA (National Association of towns and environment) and Urban bio connection alliance.

Information is the first step for climate action!

MAIN GOAL

To know the opinion of the population about climate changes and environment
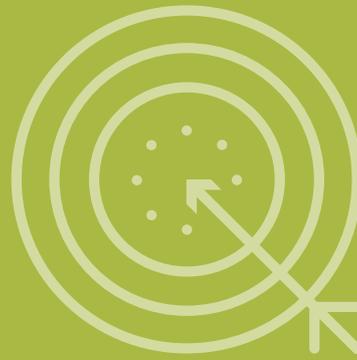
SPECIFIC OBJECTIVES

To understand the opinion of the population about nature in urban areas and how much they relate its existence to urban resilience and adaptability to extreme climate events;

To identify how people realize climate changes and how much they attribute to public power the responsibility for climate actions;

To understand if people already know the term Nature Based Solutions, if they relate the term with biodiversity conservation, and if they value the implantation of different solutions for the challenges cities are already facing.

METODOLOGY

QUANTITATIVE RESEARCH
The quantitative method is used to show the proportion of the inquired population that share opinion and behavior. It is designed to generate accurate and trustworthy measures.

The sample is composed by 2,000 interviewed, over eighteen years old, from 55 cities of the five Brazilian regions:

· 64% from affected areas*
· 36% from unaffected areas
· 50,5% from capitals
· 49,5% from the interior of the country

*People affected by disasters in the last five years – according to Talanoa Brazilian Institute (https://politicaporinteiro.org/desastres).
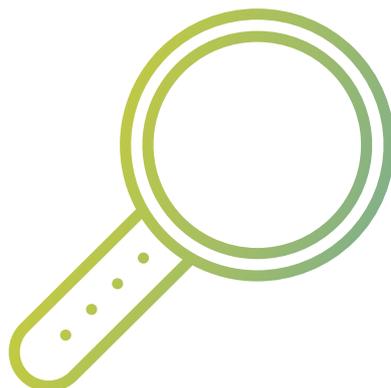
TARGET PUBLIC
Adult population from every region of Brazil.

SAMPLE
General sample: 2,000 interviews.

MARGIN OF ERROR
Total: 2,2% for a reliability level of 95%.

TECHNIQUE
Mixed – in person and by phone interviews.

TOOL
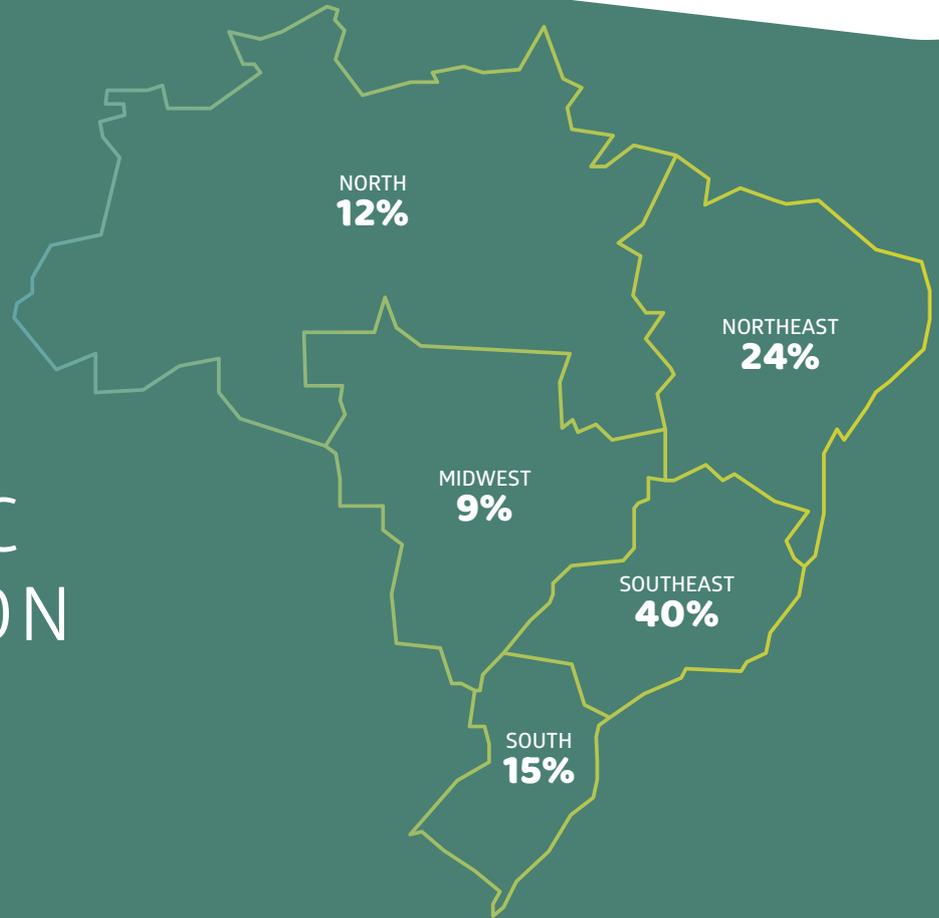Structured questionnaire with open and closed questions.

COLLECTION PERIOD
From July 13th to September 23rd, 2023.

HIRED INSTITUTE
Zoom Research Intelligence .

SAMPLE PROFILE

GEOGRAPHIC DISTRIBUTION

NORTH
12%

NORTHEAST
24%

MIDWEST
9%

SOUTHEAST
40%

SOUTH
15%

GENDER

51%

49%
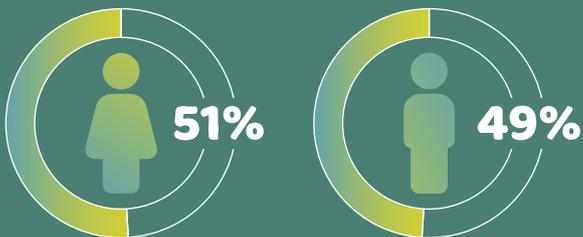
66% have children

AVERAGE INCOME
R$ 5,411
Per capita income: R$ 1,804

AGE RANGE

Average: **40 years old**

17%	**12%**	**21%**	**22%**	**17%**	**11%**
Up to 24 years old	25 to 29	30 to 39	40 to 49	50 to 59	60 years old or older

SCHOLARITY

28%	**53%**	**15%**	**4%**
Up to elementary school	High school	Higher education	Postgraduate or beyond

Single Answer | Base: 2000

Nature

What people remember when they think about nature:

Flowers
Trees
Preservation
Logging
Green
Waterfall
Global warming
Freedom
Parks
Forest
Relaxing
Take care
Beautiful
Free
Water
Fauna
Landscapes
Good
Beauty
Rivers
Atlantic Forest
Love
Clean, Cleaning
Don't deforest
Shore, Ocean
Vegetation
Health
Good
Fresh
Amazonas/Amazonia
Afforestation
Good air
Peace
Woods
Wonderful
Well-being
Animals
Destruction
Pantanal
Nature
Life Quality
Mountain range
Life
Plants
Conservation
Mangrove
Sustainability
God

SHARE

Words that most appeared:

- Natural elements
- Conservation and preservation
- Environment
- Life quality
- Beauty
- Spirituality
- Environment responsibility
- Nature diversity

When you think about nature what is the first word that comes in your mind? | Single and Spontaneous Answer | Base: 2000

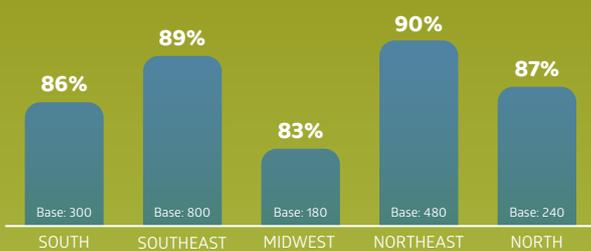# More than 80% of the interviewers relate to nature going to parks, beaches, gardens and other natural areas or look for physical and mental health balance in nature.
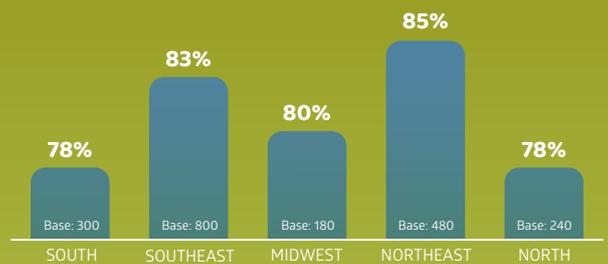
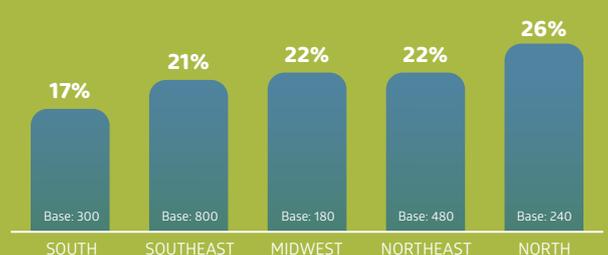## Ways to relate to nature

LEISURE AND TOURISM

SOUTH	SOUTHEAST	MIDWEST	NORTHEAST	NORTH
86%	89%	83%	90%	87%
Base: 300	Base: 800	Base: 180	Base: 480	Base: 240

BALANCE

SOUTH	SOUTHEAST	MIDWEST	NORTHEAST	NORTH
78%	83%	80%	85%	78%
Base: 300	Base: 800	Base: 180	Base: 480	Base: 240

HEALTH

SOUTH	SOUTHEAST	MIDWEST	NORTHEAST	NORTH
64%	68%	68%	75%	76%
Base: 300	Base: 800	Base: 180	Base: 480	Base: 240

INCOME GENERATION

SOUTH	SOUTHEAST	MIDWEST	NORTHEAST	NORTH
17%	21%	22%	22%	26%
Base: 300	Base: 800	Base: 180	Base: 480	Base: 240

Which of the options shows the way you relate with nature? | Multiple and Stimulated Answer | Base: 2000

How Brazilians see nature in cities

Tree-lined streets (native trees that help to reduce the heat waves and bring thermal, visual and acoustic comfort) — **77%**

Parks, forests or big public green areas (that allows water infiltration or to reduce the heat island) — **74%**

Green halls (natural areas along streets or rivers with vegetation) — **50%**

Ducted rivers (transformation to direct rivers in a controlled way) — **44%**

Community gardens (place where the community get together to produce food) — **37%**

Rain gardens (gardens designed to retain rain water and prevent floods) — **23%**

Green roofs (building with plants in the roof helping to reduce the temperature) — **16%**

77% of the people who answered live in regions with tree-lined trees.

Despite that, **86%** realized that the green areas are decreasing.

26% live in regions without parks, forests or green areas nearby.

In the city where you live, there are: | Multiple and Stimulated Answer | Base: 2000

EXPERIENCING THE CHANGES:
perception of the impact

I feel bigger heat sensation in parts of the city where there are no green areas

AGREE COMPLETELY	76%
AGREE PARTIALLY	14%
NEITHER AGREE, NOR DISAGREE	1%
DISAGREE PARTIALLY	4%
DISAGREE COMPLETELY	4%

90% feel bigger heat sensation in parts of the city where there are no green areas.

Emphasis: 95% Midwest

I realize that the green areas of my city are decreasing

AGREE COMPLETELY	61%
AGREE PARTIALLY	25%
NEITHER AGREE, NOR DISAGREE	1%
DISAGREE PARTIALLY	7%
DISAGREE COMPLETELY	5%

86% realize that the green areas of the city are decreasing.

Emphasis: 91% Northeast

Housing in risk areas for flood are increasing in the last years

AGREE COMPLETELY	60%
AGREE PARTIALLY	18%
NEITHER AGREE, NOR DISAGREE	3%
DISAGREE PARTIALLY	10%
DISAGREE COMPLETELY	10%

78% say that in their city, housing in risk areas for flood are increasing in the last years.

Emphasis: 83% Southeast

I fear when there is forecast of heavy rain in the region I live in

AGREE COMPLETELY	46%
AGREE PARTIALLY	18%
NEITHER AGREE, NOR DISAGREE	3%
DISAGREE PARTIALLY	13%
DISAGREE COMPLETELY	20%

64% fear when there is forecast of heavy rain in their region.

Emphasis: 66% Southeast

I have realized more time without rain in the last years, even facing lack of water

AGREE COMPLETELY	38%
AGREE PARTIALLY	22%
NEITHER AGREE, NOR DISAGREE	3%
DISAGREE PARTIALLY	18%
DISAGREE COMPLETELY	19%

60% realized more time without rain in the last years, even facing lack of water.

Emphasis: 75% Midwest

In my city there are clean rivers and lakes and people enjoy leisure time there

AGREE COMPLETELY	33%
AGREE PARTIALLY	17%
NEITHER AGREE, NOR DISAGREE	2%
DISAGREE PARTIALLY	11%
DISAGREE COMPLETELY	38%

50% say that in their cities there are clean rivers and lakes and people enjoy leisure time there.

Emphasis: 75% North

The structure of my city is ready for heavy rain, storm or flood

AGREE COMPLETELY	10%
AGREE PARTIALLY	11%
NEITHER AGREE, NOR DISAGREE	2%
DISAGREE PARTIALLY	19%
DISAGREE COMPLETELY	57%

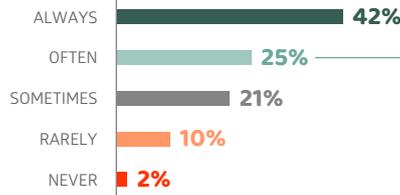**76%** believe that the structure of their cities is not ready for heavy rain, storm or flood.

Emphasis: 83% North

I am going to read some sentences and I would like you to give your level of agreement, if you agree completely, agree partially, neither disagree nor disagree, disagree partially or disagree completely. | Single and Stimulated Answer | Base: 2000

Climate at the radar:
climate events frequency in cities

Heat waves

ALWAYS	42%
OFTEN	25%
SOMETIMES	21%
RARELY	10%
NEVER	2%

67% of the people realize heat waves happening more often, emphasis in the North with 83%.

Drought

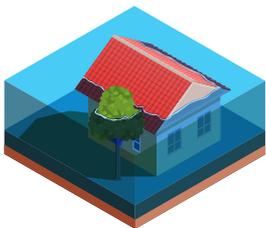|	
ALWAYS	17%
OFTEN	19%
SOMETIMES	34%
RARELY	23%
NEVER	6%
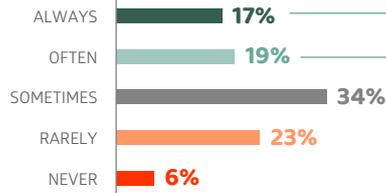
36% of the people realize drought or long periods without rain happening more often, emphasis in the Midwest with 55%.

Strong wind

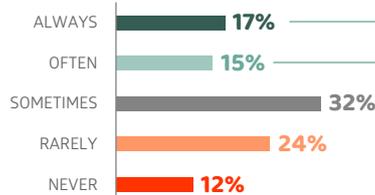|	
ALWAYS	18%
OFTEN	16%
SOMETIMES	35%
RARELY	26%
NEVER	5%
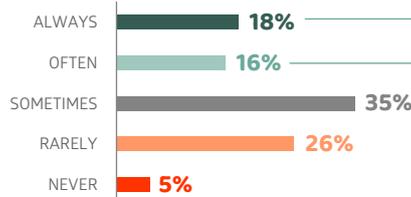
34% of the people realize windy weather happening more often, emphasis in the South with 44%.

Flood

ALWAYS	17%
OFTEN	15%
SOMETIMES	32%
RARELY	24%
NEVER	12%

32% of the people realize flood happening more often, emphasis in the Southeast with 40%.

Storm

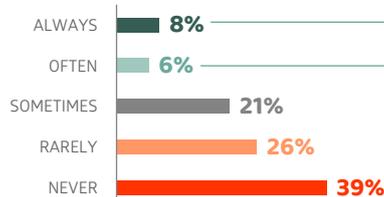|	
ALWAYS	11%
OFTEN	13%
SOMETIMES	45%
RARELY	27%
NEVER	4%
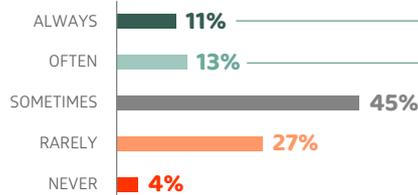
24% of the people realize heavy rain and storm happening more often, emphasis in the South with 30%.

Landslide

ALWAYS	8%
OFTEN	6%
SOMETIMES	21%
RARELY	26%
NEVER	39%

14% of the people realize landslide happening more often, emphasis in the Southeast and North east with 17%.

How often do these climate evens happen in your city: | Multiple and Stimulated Answer | Base: 2000

69% **102 millions of Brazilians**

Know someone or were already affected by the climate changes consequences

35% **52 millions of Brazilians**

Of the interviewed people were or had someone in their family affected by the extreme climate events consequences, such as:
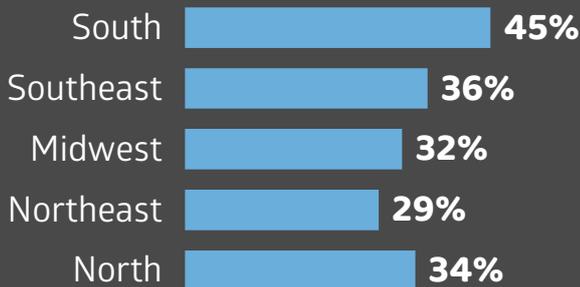
45% heavy rain or storm;

21% strong wind ;

21% flood;

20% heat wave;

7% long time of drought or without rain;

5% landslide.

Region	%
South	45%
Southeast	36%
Midwest	32%
Northeast	29%
North	34%

45% of the South region of the country were already affected by some extreme climate event, which
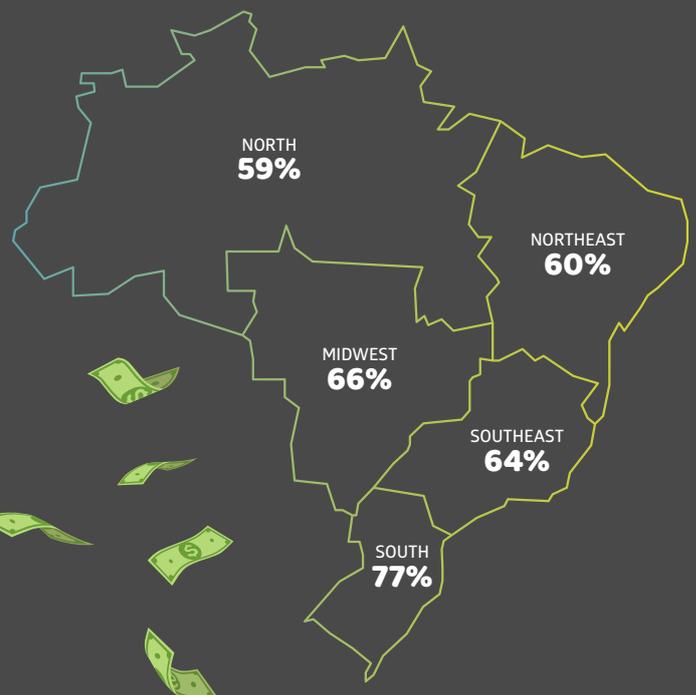
65% were impacted by flood

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Were you or someone in your family ever affected by any extreme climate event? | Single Answer | Base: 2000

Among the affected people **65%** had financial loss.

The average loss is **R$ 8,485.00**

NORTH
59%

NORTHEAST
60%

MIDWEST
66%

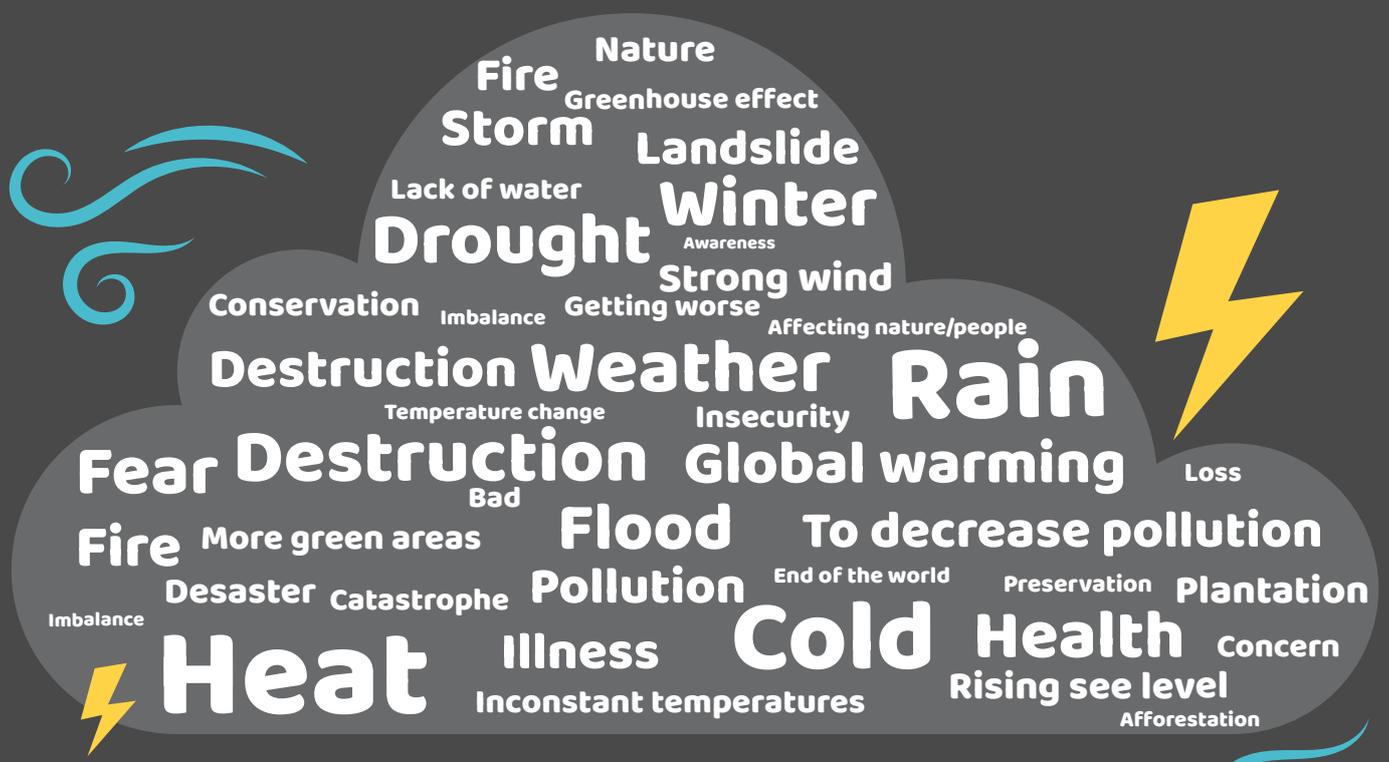SOUTHEAST
64%

SOUTH
77%

Did you have financial loss? How much was it? | Single Answer | Base: 702 - affected interviewed

A big challenge to talk about climate change is because most of the people relate it to negative emotions. It is about the biggest global challenge, however, the nature based solutions can help dealing with it, with part of the mitigation and adaptation strategies. Access the guide "Future cities: the nature based solutions helping facing the climate emergency".

ACCESS HERE

Climate Changes:
The weather has changed

Nature
Fire
Greenhouse effect
Storm
Landslide
Lack of water
Winter
Drought
Awareness
Strong wind
Conservation Imbalance Getting worse
Affecting nature/people
Destruction Weather Rain
Temperature change Insecurity
Fear Destruction Global warming Loss
Bad
Fire More green areas Flood To decrease pollution
Desaster Catastrophe Pollution End of the world Preservation Plantation
Imbalance
Heat Illness Cold Health Concern
Inconstant temperatures Rising see level
Afforestation

16% of people which is equivalent to 14 million of Brazilians*, claim not to know what comes in their mind when think about climate changes.

SHARE

Main subjects mentioned:

- Extreme climate phenomenon
- Environment conservation and preservation
- Illness
- Nature and people impact
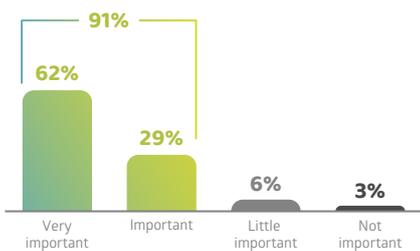- Feelings and emotions (negative)

What is the main idea or image that comes in your mind when you think about climate changes?
Single and Spontaneous Answer | Base: 2000
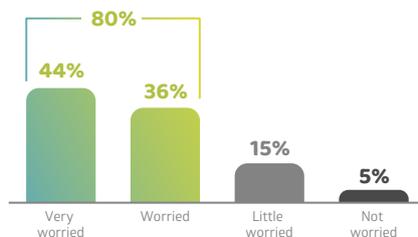*Extrapolating to adult population
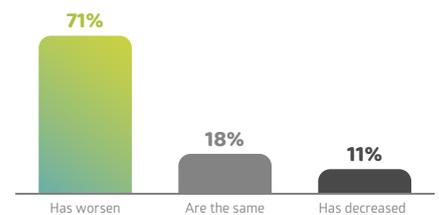
The Brazilians are worried about climate changes

91% of the people believe that events like storm, heat wave, cold wave, hurricane, etc. are becoming more intense in the world.

Very important	Important	Little important	Not important
62%	29%	6%	3%

91%

80% of Brazilians are worried about climate changes.

Very worried	Worried	Little worried	Not worried
44%	36%	15%	5%

80%

71% realize that the extreme climate events are happening more often in people's life and has worsen in frequency and intensity.

Has worsen	Are the same	Has decreased
71%	18%	11%

93% believe that events like storm, heat wave, cold wave, hurricane, etc. are becoming more intense in the world.

64% know the climate change is far beyond planet warming.

65% already know that climate change is different from weather forecast. However, in the capital's average the percentage falls to 59%.

92% agree that the climate changes affect the animals and the biodiversity.

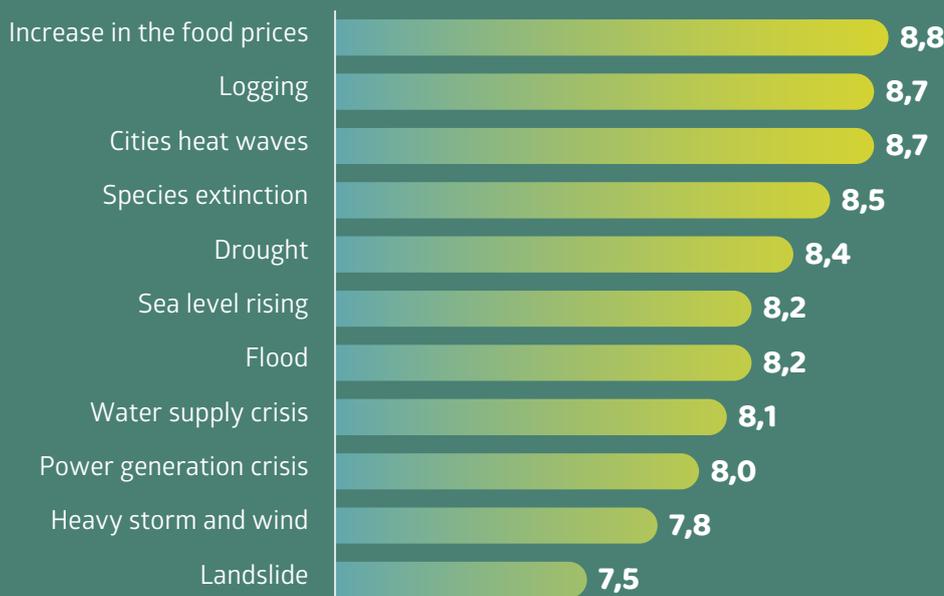**92%** feel that the climate changes compromise the future of the planet.

91% believe that the climate changes will have a big impact in future generations.

88% claim that the climate changes impact ocean and coastal areas.

There is a big concern about the climate changes impact on animals and biodiversity and also on future generations. The rate is even bigger among people with higher instruction level, such as post-graduation. However, the perception decreases significantly (10% fall) among people with education up to elementary school.
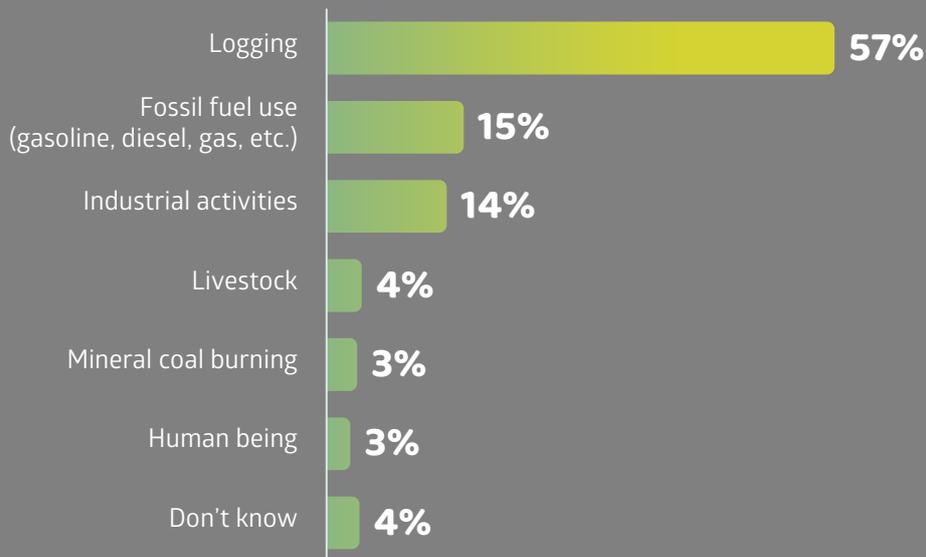
THE POPULATION CONNECTS BIG CHALLENGES TO CLIMATE CHANGE (FROM 0 TO 10)

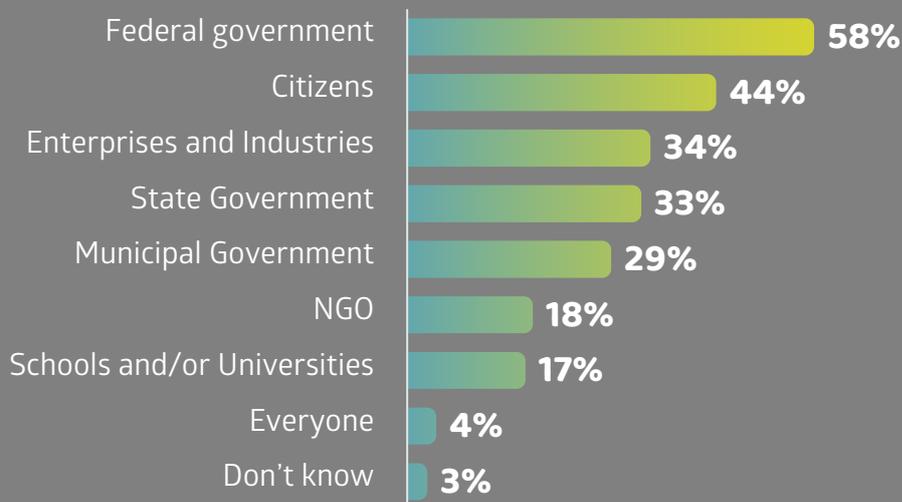| Challenge	Score
Increase in the food prices	8,8
Logging	8,7
Cities heat waves	8,7
Species extinction	8,5
Drought	8,4
Sea level rising	8,2
Flood	8,2
Water supply crisis	8,1
Power generation crisis	8,0
Heavy storm and wind	7,8
Landslide	7,5

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From 0 to 10 where 0 means there is no connection with climate changes and 10 means there is great connection, how much do you believe these situations are connected with climate changes: | Single and Stimulated Answer | Base: 2000

WHAT PEOPLE BELIEVE TO BE THE MAIN CAUSER OF CLIMATE CHANGES IN BRAZIL

Factor	Percentage
Logging	57%
Fossil fuel use (gasoline, diesel, gas, etc.)	15%
Industrial activities	14%
Livestock	4%
Mineral coal burning	3%
Human being	3%
Don't know	4%

In Brazil, which of the factors do you consider to be the responsible for climate changes? | Multiple and Stimulated Answer | Base: 2000

TO WHOM PEOPLE ATTRIBUTE THE RESPONSIBILITY FOR SOOTHING THE CLIMATE CHANGES

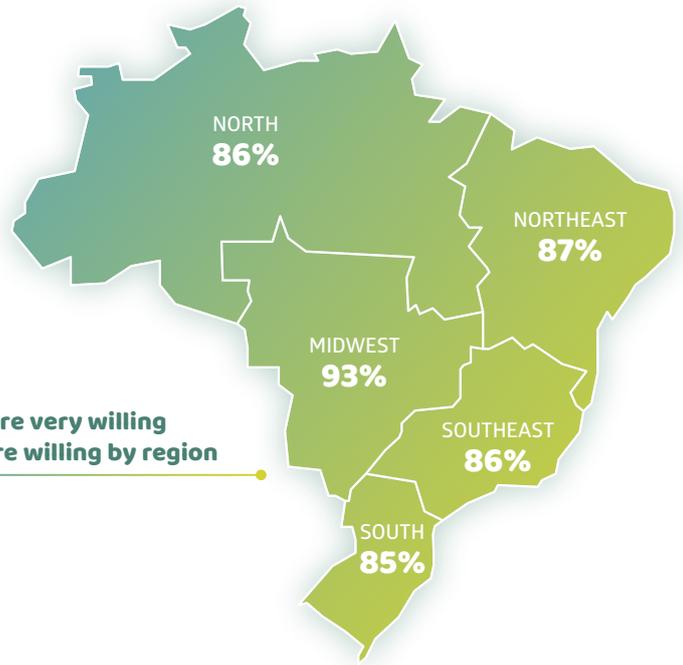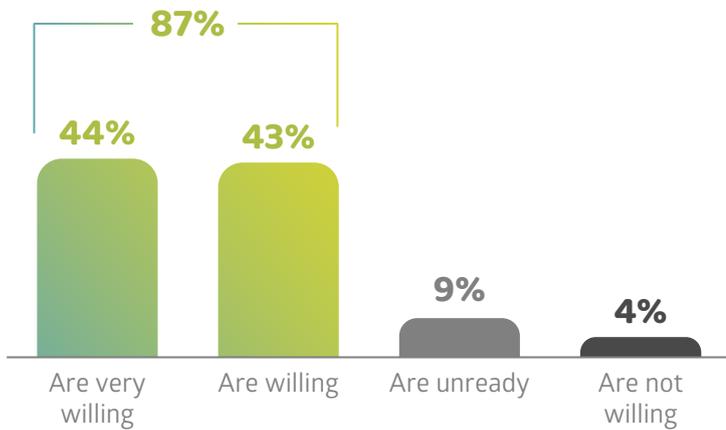| Responsible	Percentage
Federal government	58%
Citizens	44%
Enterprises and Industries	34%
State Government	33%
Municipal Government	29%
NGO	18%
Schools and/or Universities	17%
Everyone	4%
Don't know	3%

In Brazil, which of these factors do you consider to be the main responsible for climate changes? | Multiple and Stimulated Answer | Base: 2000

In relation to the causes of climate change and global warming, **57%** indicate the logging as the main responsible, followed by fossil fuel with **15%** and industries with **14%.**

76% think the cities can be adapted to reduce the climate change effects, protecting their population.

The majority of brazilians are ready to change their habits

87%

44% Are very willing

43% Are willing

9% Are unready

4% Are not willing

NORTH **86%**

NORTHEAST **87%**

MIDWEST **93%**

SOUTHEAST **86%**

SOUTH **85%**

% Are very willing + Are willing by region

How willing are you to change your habits to stop climate changes? | Single and Stimulated Answer | Base: 1967

Towards a positive transformation:

87% are willing or very willing to change their habits to soften the climate change effects. Among the mentioned actions are:

24% to recycle correctly;

15% to plant trees;

8% to avoid using plastic;

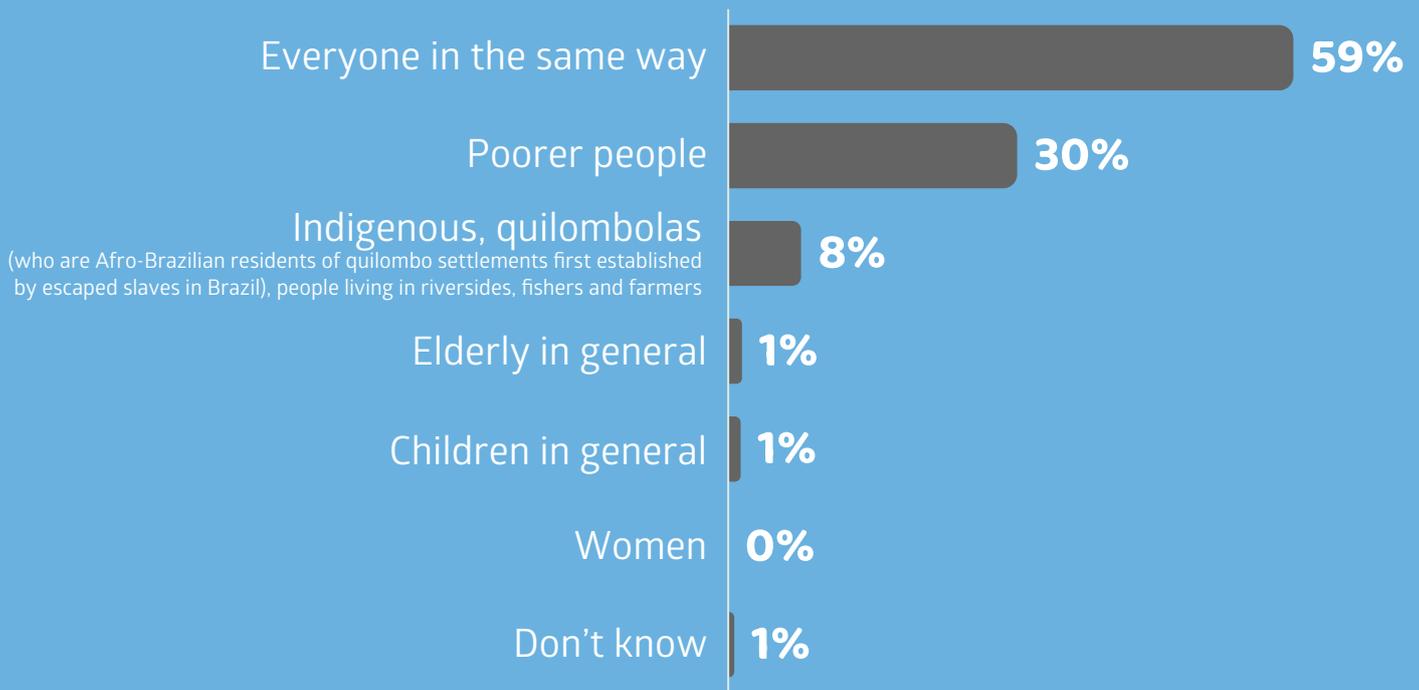**8%** to use less polluting transportation.

19% are willing to promote some habit changes, but don't know what can be done!

What kind of changes would you do? | Multiple and Spontaneous Answer | Base 1879 - interviewed willing to change their habits

Climate justice

HOW THE BRAZILIANS BELIEVE THE POPULATION
IS AFFECTED BY CLIMATE CHANGE:

Everyone in the same way — **59%**

Poorer people — **30%**

Indigenous, quilombolas
(who are Afro-Brazilian residents of quilombo settlements first established
by escaped slaves in Brazil), people living in riversides, fishers and farmers — **8%**

Elderly in general — **1%**

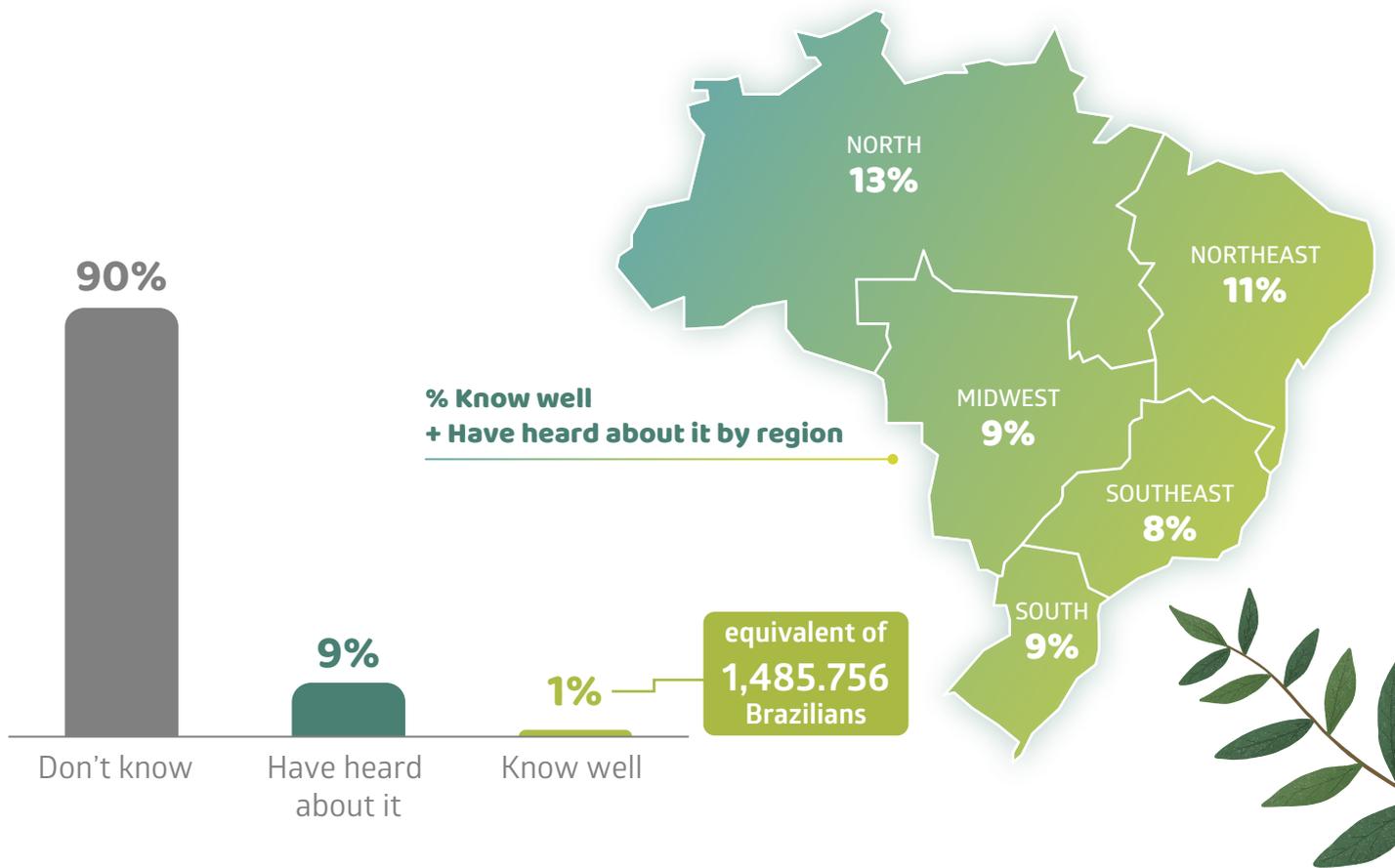Children in general — **1%**

Women — **0%**

Don't know — **1%**

In your opinion, what portion of the population is the most affected by climate change? | Single and Stimulated Answer | Base: 2000

59% believe that everyone feels the impact of climate change in the same way. This perception is bigger in the North (65%)

30% consider that the poorer people are the most affected, emphasis in the South (37%).

8% consider that the quilombolas, people living in riversides, fishers and farmers are the most affected.

Nature Based Solutions

90%
Don't know

9%
Have heard about it

1%
Know well

% Know well + Have heard about it by region

NORTH
13%

NORTHEAST
11%

MIDWEST
9%

SOUTHEAST
8%

SOUTH
9%

equivalent of
1,485.756
Brazilians

Do you know or have you ever heard about Nature Based Solutions? | Single Answer | Base: 2000

Only **1%** of the population know well the Nature Based Solutions and 9% have heard about it. Among those who know or have heard the knowledge is superficial.

At this point of the research the concept of NBS was introduced before proceeding the interview:

The Nature Based Solutions (NBS) are actions that use natural resources to solve human challenges, bringing environmental, social and economic benefits.

One of the challenges that NBS faces is the necessity to adapt the cities with green areas so they can be more resilient to climate changes.
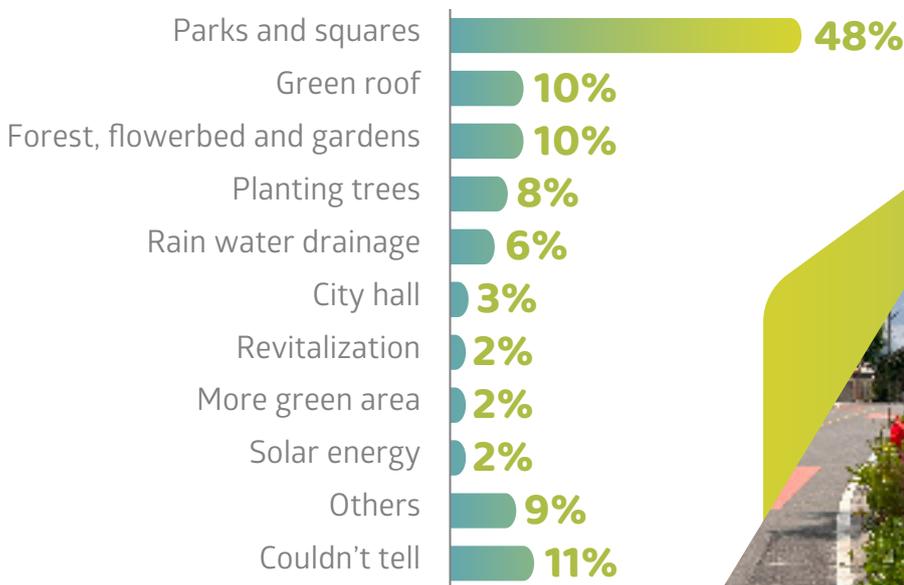
Some NBS examples are: parks or squares, rain gardens that help to absorb rain water avoiding flood, green roofs to reduce internal temperatures, among others.

After understanding the NBS, **14%** of the people could identify that already know some kind of NBS in their cities.

Do you know any kind of NBS in your city? | Single and Stimulated Answer | Base: 2000

THE INTERVIEWED MENTIONED SPONTANEOUSLY THAT THEY KNOW THE FOLLOWING NBS IN THEIR CITIES:

Parks and squares	**48%**
Green roof	**10%**
Forest, flowerbed and gardens	**10%**
Planting trees	**8%**
Rain water drainage	**6%**
City hall	**3%**
Revitalization	**2%**
More green area	**2%**
Solar energy	**2%**
Others	**9%**
Couldn't tell	**11%**

What NBS do you know?| Multiple and Spontaneous Answer
Base 280 - interviewed who claim to know some NBS in the city

Not all the actions mentioned are NBS, which indicate that the people didn't understand the term correctly yet.

MOST NBS RELATED BENEFITS:

45% claim the NBS guarantee better quality life and health for the population.

40% believe the NBS improve the environmental conditions of cities, as reduction of temperatures and pollutants.

I am going to mention a list of NBS benefits. Please, indicate 2 that are the most important for you. | Multiple and Stimulated Answer | Base 2000

More than 90% of the population want to see NBS in their cities!

The most desired NBS are:

98% Tree-lined streets
(native trees that help to reduce heat waves and bring thermal, visual and acoustic comfort) and parks, forest or big public green areas (which allow water infiltration when there is heavy rain, or to reduce heat island).

95% Filter gardens
(to treat polluted water through plants).

95% Green halls
(areas with vegetation along streets or rivers).

95% Rain gardens
(to retain rain water reducing flood).

95% Green preserved areas along rivers, lakes and slopes
(mangroves).

91% Rivers and lakes interconnected to urban environment
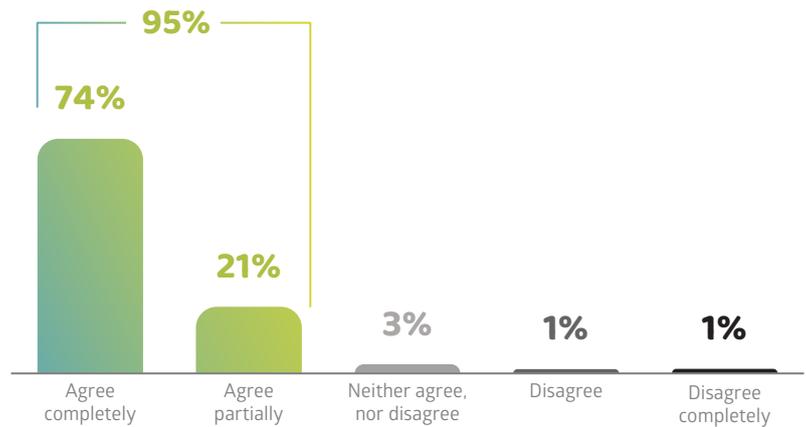(which help to retain water when there is heavy rain).

90% Green roofs
(building with plants in the roof helping to reduce the temperature).

What kind of NBS would you like to see in your city? | Multiple and Stimulated Answer | Base: 2000
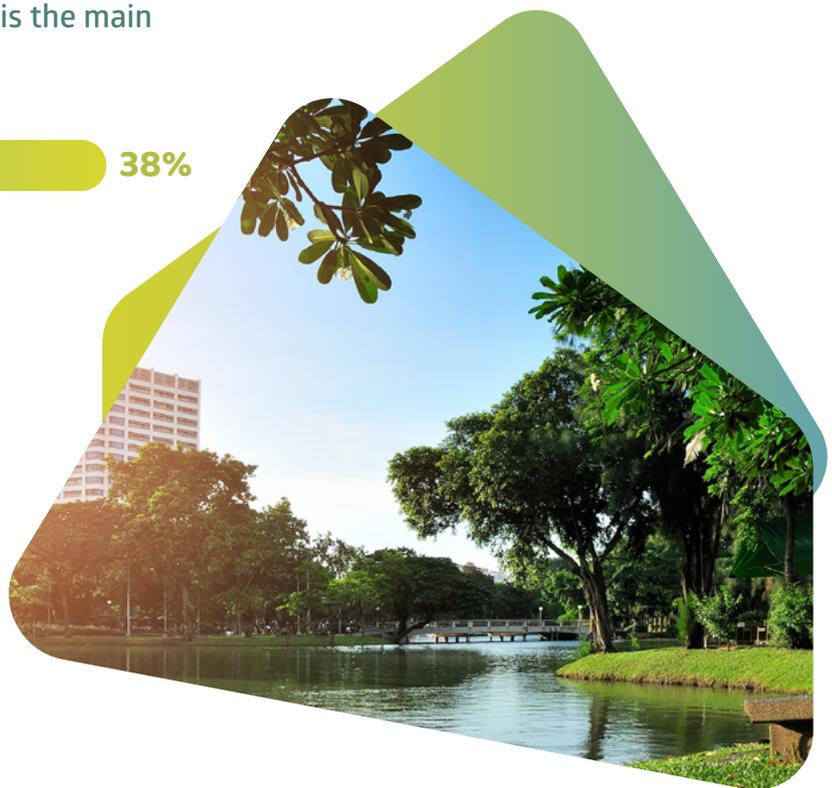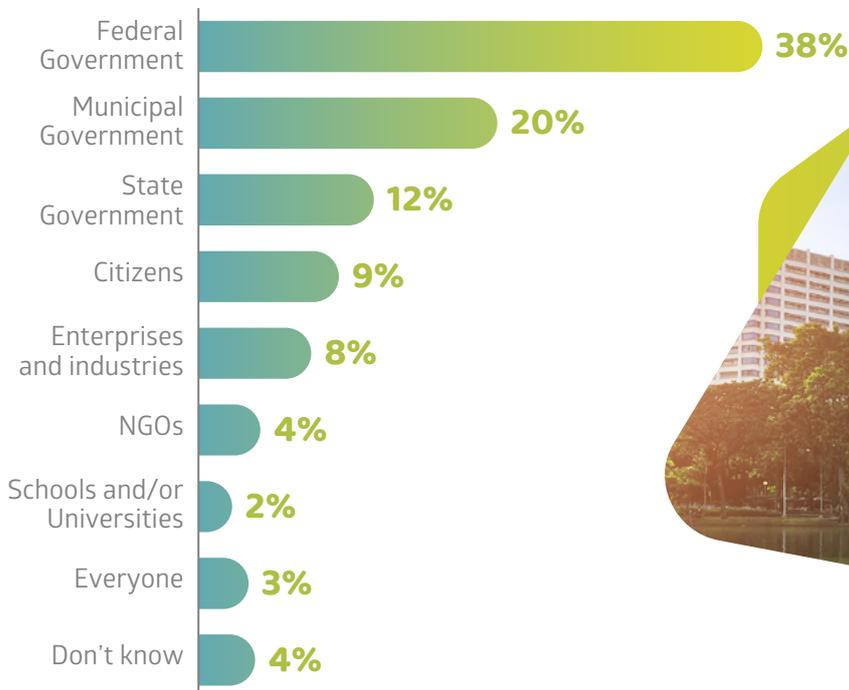
In general, every NBS mentioned would be welcome in cities, with more than 90% acceptance for every typology introduced.

More than 95%
of the population believe NBS can reduce the impact of climate changes!

95%

74% — Agree completely

21% — Agree partially

3% — Neither agree, nor disagree

1% — Disagree

1% — Disagree completely

How much do you agree the NBS can reduce the impact of climate changes? | Single and Stimulated Answer | Base: 1984

38% believe the Federal Government is the main responsible for NBS implementation

Category	Percentage
Federal Government	38%
Municipal Government	20%
State Government	12%
Citizens	9%
Enterprises and industries	8%
NGOs	4%
Schools and/or Universities	2%
Everyone	3%
Don't know	4%

In your opinion, who would be the responsible to adapt the cities to climate changes impacts? | Single and Stimulated Answer | Base: 2000

94% consider important for a **candidate to introduce NBS** related proposals.

Final Considerations

Most of the interviewed people relate to nature going to parks, beaches, gardens and other natural areas, besides searching physical and mental health balance there.

Most people realize the cities green areas are decreasing and this perception is even bigger in capitals affected by disasters.

The afforestation perception is three times bigger in cities that were not affected comparing to affected ones.
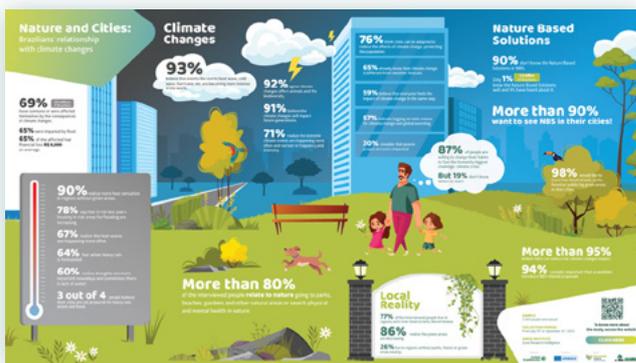
Most people realize that the extreme climate events are getting worse in the world. Among people with higher educational level the importance of the climate changes is bigger and its effects on biodiversity, people's life and future generations.

A little more than a third was affected or know someone who was affected by some kind of extreme climate event, mainly victims of heavy rain and flood. The great majority of the population disagree that their cities are ready for heavy rain, storm and flood.

Most people are willing to change their habits and among the most mentioned actions were: to recycle correctly (24%), to plant trees (15%), to avoid using plastic (8%) and to use less polluting means of transport (8%). 19% of people want to do something but don't know where to start!

Despite the population unfamiliarity about NBS, most people believe the cities can be adapted to climate changes and also that the NBS can contribute in this process.

Almost every interviewed people would like to see NBS in their cities. Moreover, most people think it is the government responsibility to implement such actions and almost the majority of the population consider important a candidate to introduce NBS related proposals, what indicates a population demand to include NBS in territorial management policies.

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