LEVERHULME WILDFIRES
SUMMER CONFERENCE

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LEVERHULME
Centre for Wildfires, Environment and Society

Fire Management Policies in Latin American and Caribbean: Controversies, Paradoxes and Opportunities in a Biologically and Culturally Megadiverse Continent






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cobracollective
for community owned solutions

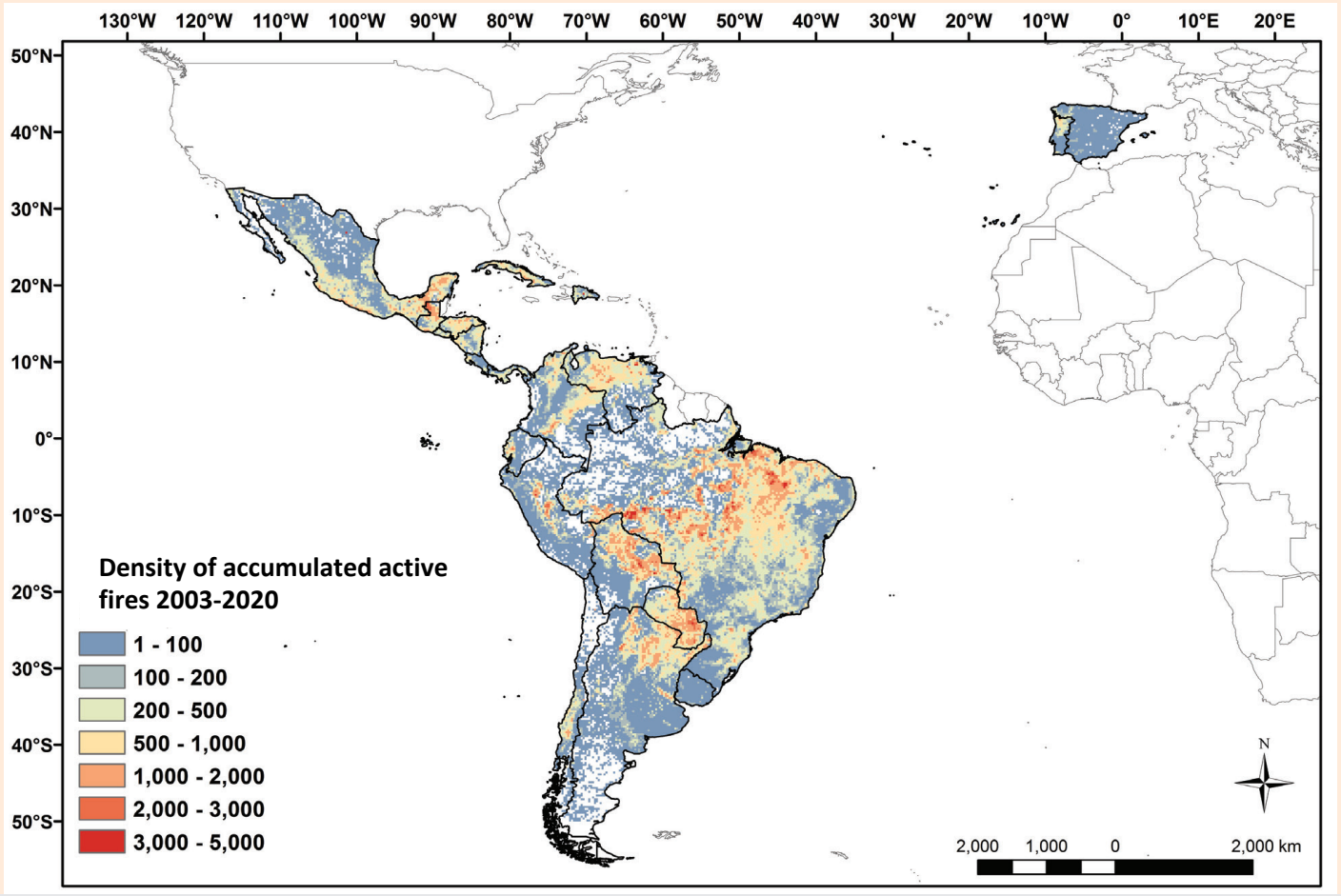
MAK!T
MONTPELLIER ADVANCED KNOWLEDGE INSTITUTE ON TRANSITIONS

LANDMARC

Latin America and the Caribbean is home to 40% of the world's biodiversity and 12% of the total arable land area. It contains 80% of the world's biomes, 22% of the world's forest cover and 30% of the world's available freshwater resources.

Brazil, Colombia, Ecuador, Mexico, Peru and Venezuela are among the seventeen "megadiverse" countries in the world, accounting for 70% of global biodiversity.

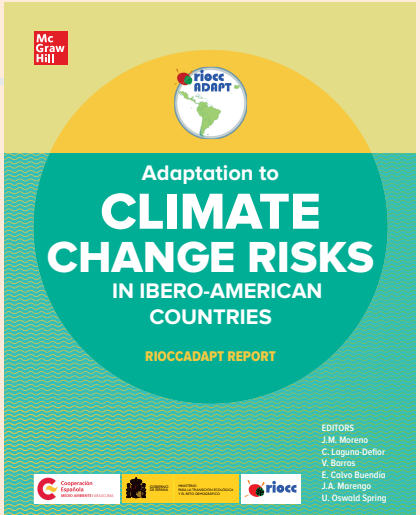
UNEP-WCMC (2016) The State of Biodiversity in Latin America and the Caribbean. UNEP-WCMC, Cambridge, UK.

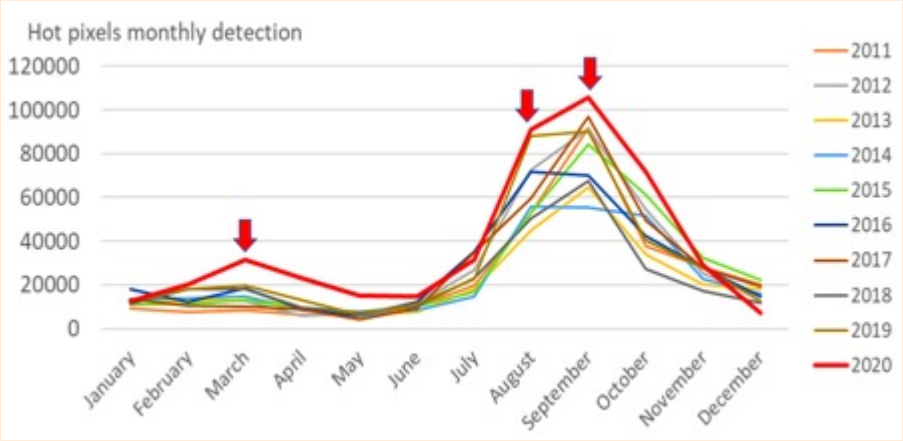


What are the current fire incidence in the Latin-American region?

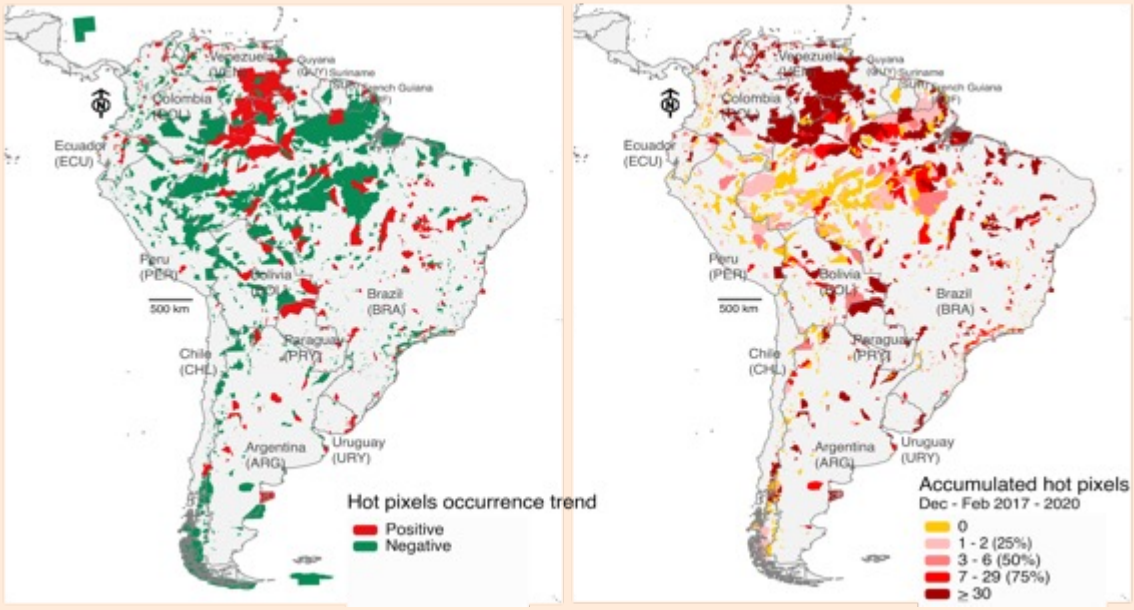
Current levels of fire incidence in the region are high to very high, with more than 40 million hectares burned annually, representing 7%-14% of the area burned worldwide.

Bilbao et al. 2020





Monthly count of hot spots of active fires for South America, from 2011 to 2020. Data source: INPE/Queimadas. The red arrows denote the months in which hot spots of active fires in 2020 peaked, relative to the time series since 2011.



Anderson et al. 2020

Trend of cumulative fires and hot spots in the period December-February 2017 to 2020 for South American Protected Areas

Anderson et al. 2020

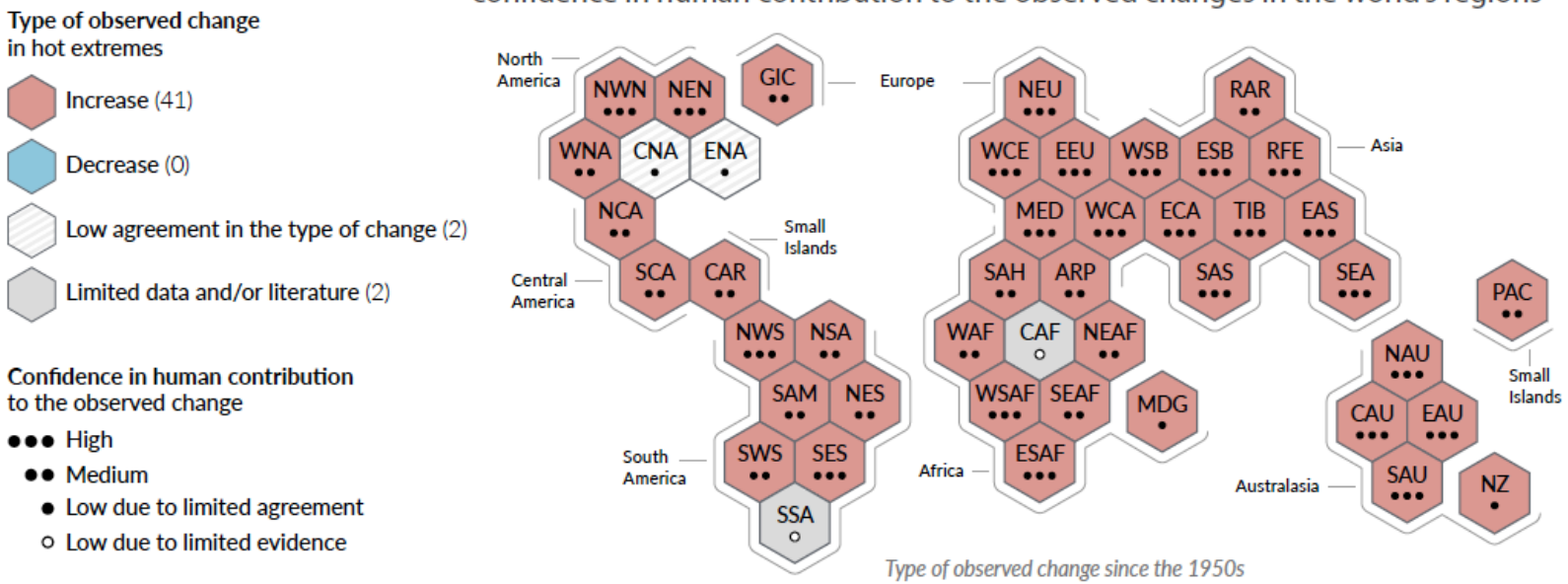
What is the effect of climate change in the region?

The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) published in 2013 and endorsed in the 6th edition 2021 (IPCC AR6 WGI), identified several climate trends that have the potential to influence the fire climate:

- **Global increases in average temperature.**
- **Global increases in the frequency, intensity and/or extent of heat waves.**
- **Regional increases in the frequency, duration and intensity of drought.**

Climate change is already affecting every inhabited region across the globe with human influence contributing to many observed changes in weather and climate extremes

a) Synthesis of assessment of observed change in **hot extremes** and confidence in human contribution to the observed changes in the world's regions



Land use changes, expansion of the agricultural-livestock frontier and climate change (main cause of mega-fires particularly in tropical and subtropical systems in LAC).

In response, most countries adopted ‘zero-fire’ policies intended to exclude and control virtually any fires

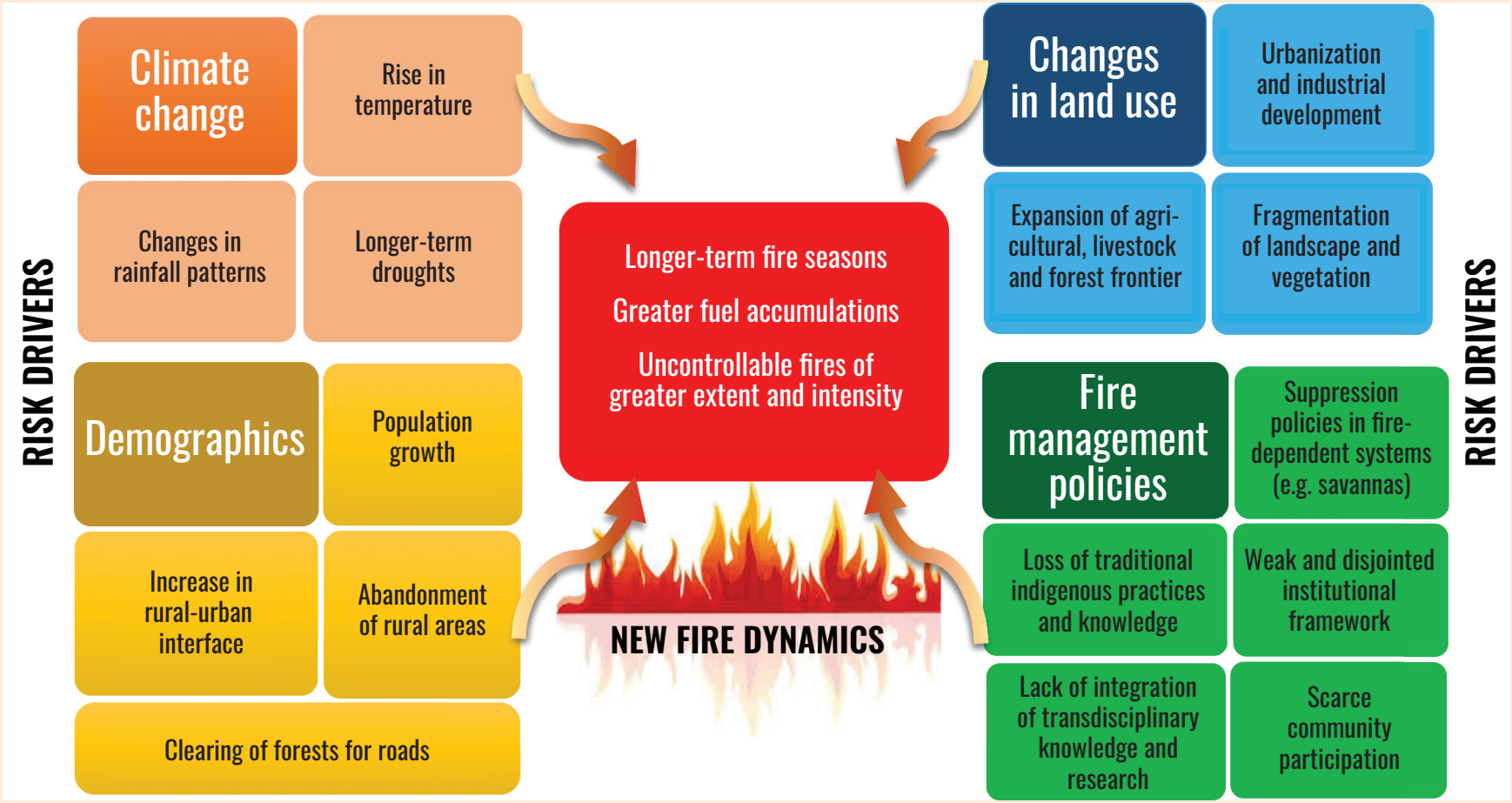


Figure 12.12. Risk drivers for the incidence of wildfires in RIOCC countries. Source: compiled by the authors.

Bilbao et al. 2020 Wildfires. In: Adaptation to Climate Change Risks in Ibero-American Countries- RIOCCADAPT Report.

A new fire governance based on adaptation measures is urgently needed to avoid a "state of no return" of affected natural and rural areas in the region and to reduce the large climatic migrations, morbidity and economic losses caused by catastrophic fires.

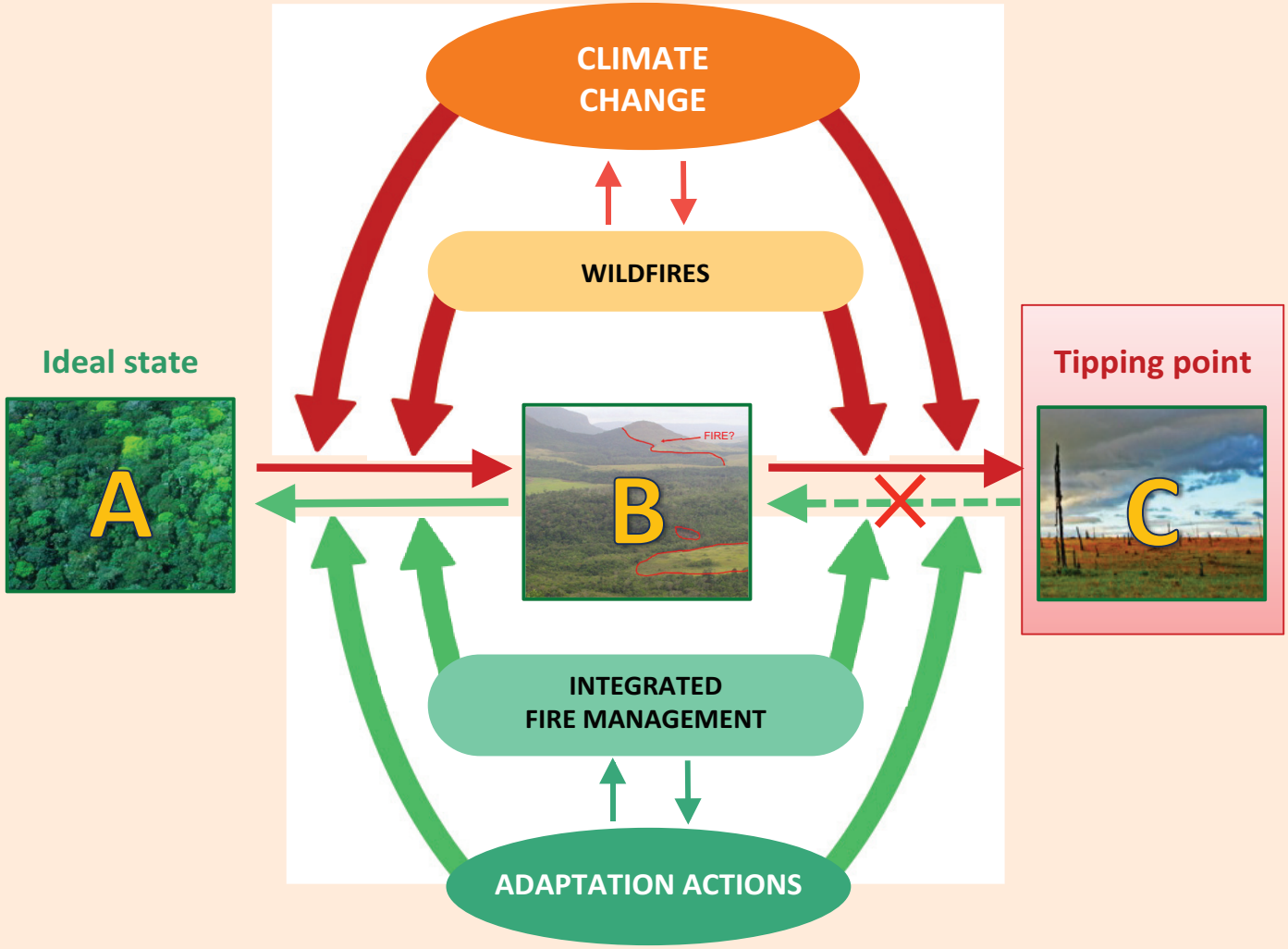


Figure 12.1. Conceptual framework of this chapter describing the transition states of ecosystems in natural and rural areas affected by wildfires and their interaction with climate change, as well as the effect of adaptation measures and comprehensive fire management. Source: compiled by the authors.

Bilbao et al. 2020 Wildfires. In: Adaptation to Climate Change Risks in Ibero-American Countries- RIOCCADAPT Report.

What can the alternative be?

Can catastrophic wildfires be avoided under climatic change conditions where fire-prone and fire-sensitive ecosystems coexist?

Can fire be managed in coexistence with local populations who rely on it for subsistence practices?

HOW CAN WE ACQUIRE THIS KNOWLEDGE?

In pre-Columbian America, fire enabled the domestication of plants and forests.

- Remnants of ash and charcoal fertilised the soil, producing the Terra Preta de Índio (TPI or dark earth) in the Amazon Basin.
- In tropical areas with nutrient-poor and heavily washed soils, fire improved the fertility of conucos (agricultural plots) used for a few years and then left to rest, forming fertile brown soils.
- Increasing the availability of light in the understorey (by reducing the abundance of competing plants) and promoting the growth of agriculturally useful light- and nutrient-demanding species (e.g. chillies and palms).
- Selection of fire-tolerant and adapted species,
- Changes in forest species composition.

Mann, 2002. Science 297: 920-922

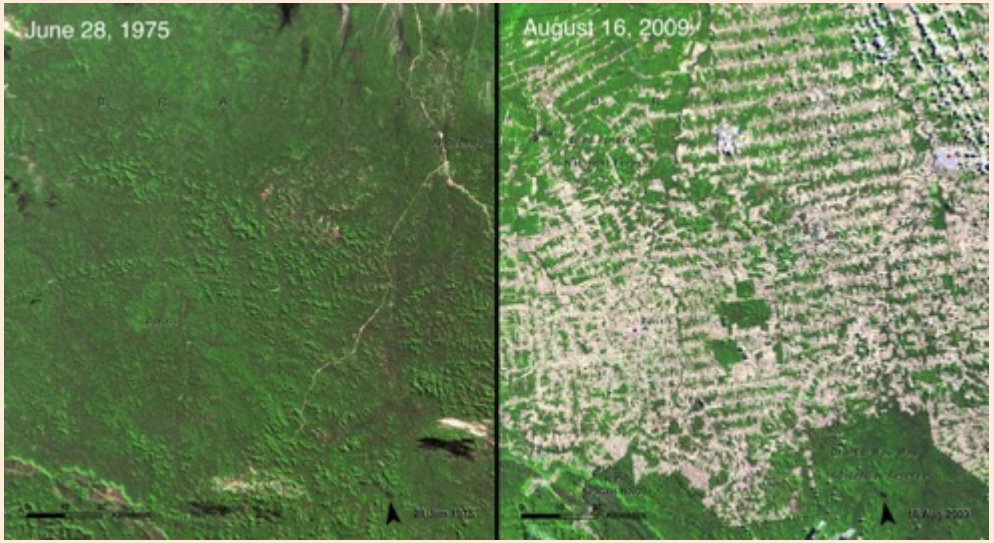

After the arrival of the Europeans in the Americas, some Indigenous practices of fire and land use were interrupted and replaced by those brought by the colonisers.
THE
NORTH
SEA
THE PERUVIANE
SEA
THE PACIFICKE
SEA
AMERICA

Today, Latin America is home to the largest diversity of Indigenous Peoples in the world, and their population is growing

830 peoples
45-60 M inhab
400 M ha

(CEPAL, 2014).

FAO y FILAC. 2021. *Los pueblos indígenas y tribales y la gobernanza de los bosques.*
WEF 2020, citado por Aldunce, P. et al. 2020: *Informe RIOCCADAPT.* [Moreno, J.M. et al., eds.].



Satellite images of Rondônia in western Brazil, taken in 1975 (left) and 2009 (right). NASA. Images of Change

estern Brazil,
erritory (top)
ging (bottom).
e Lemos, 2021.

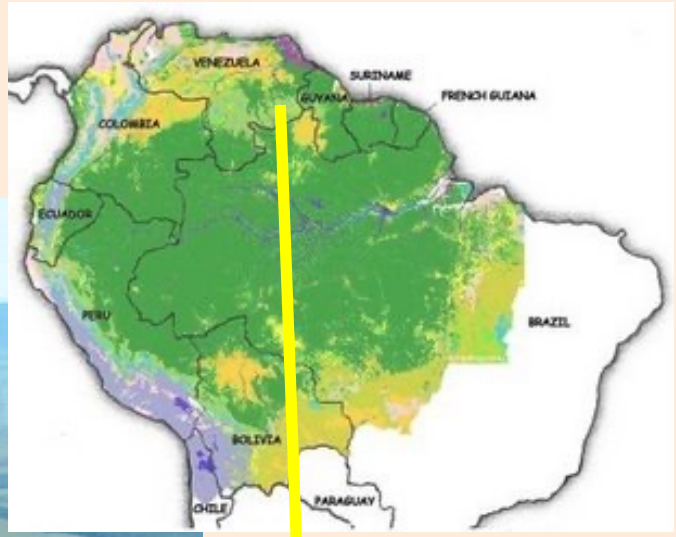
Variación en el stock de carbono en áreas de la Cuenca Amazónica entre 2003 y 2016 (Walker et al., 2020).

Área	Millones ton métricas CO2	
Territorios indígenas (TI)	-23,6	
Áreas protegidas con TI (solape)	-10,3	
Áreas protegidas	-96,4	-0,6
Otras áreas	-1159,6	-3,6
Total	-1289,9	-1,7

However, Indigenous peoples' participation in policymaking and management of their own territories is very limited.

Indigenous lands protect the environment

The experiences from Canaima National Park, Venezuela



The use of fire for shifting agriculture (conucos) and hunting is a common practice by Pemón Indigenous peoples and constitutes the main subsistence activities.

CONUCO –SWIDDEN AGRICULTURE (Forest)

HUNTING (savanna-forest borders) FISHING (forest-savanna/river)

"Todd Carlos Initial Attack Brigade", (CORPOELEC-EDELCA)

INPARQUES Forest Firefighters

MAIN OBJECTIVE:

TO PROTECT THE HIGH BASIN OF CARONI RIVER

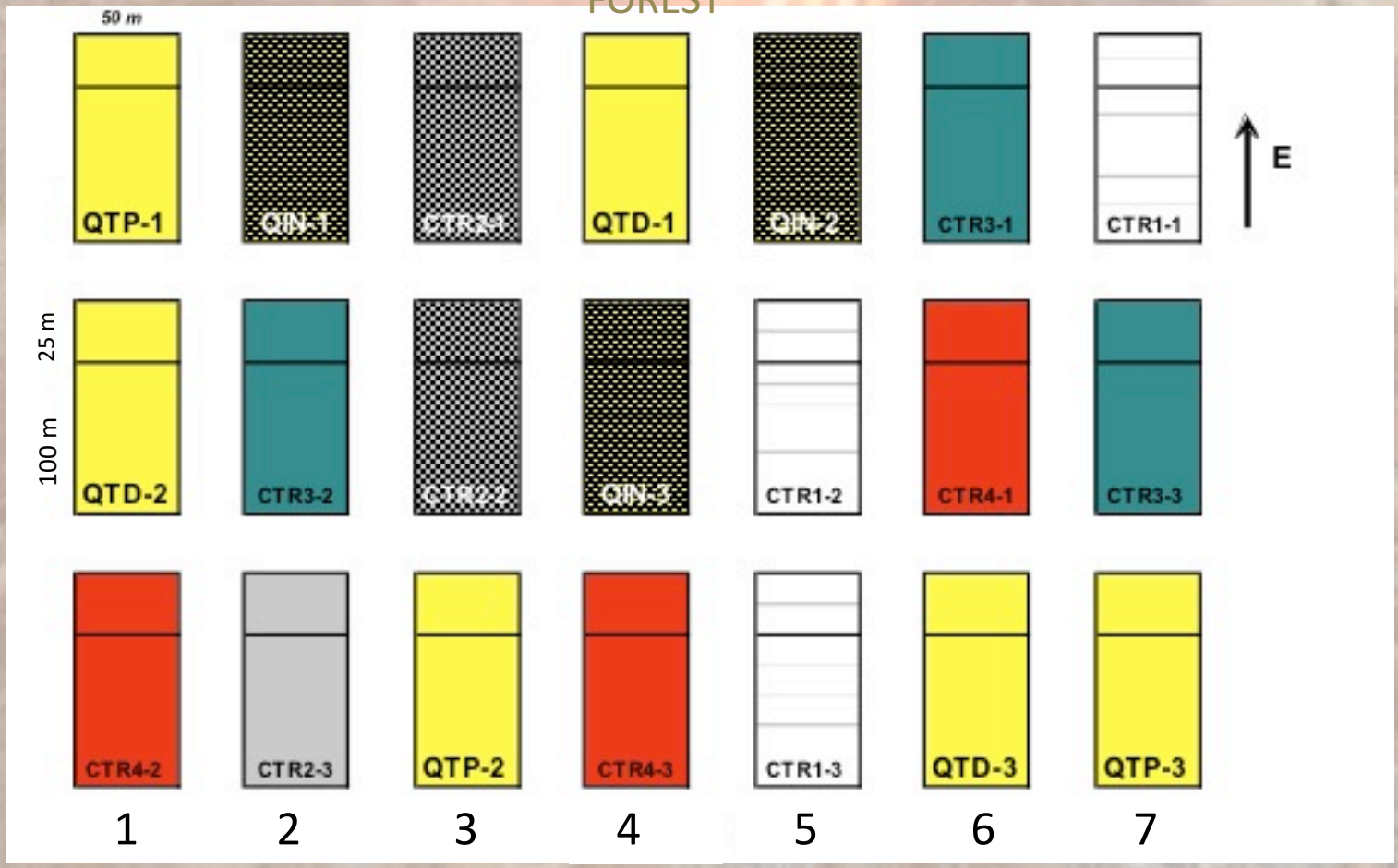
TO EXTINGUISH THE FIRE BEFORE TO ENTER THE FOREST

Fire exclusion has been the main fire management strategy adopted by government agencies and park administrators.

However, in spite of carrying out enormous fire suppression efforts, only 13% of total fires are extinguished, partly due to the great extension of the area and to the high number of fires (Gómez et al., 2000; EDELCA, 2004).

31 EXPERIMENTAL FIRES WERE SET UP IN 21 PLOTS OF 0.5 HA EACH, ARRANGED IN THREE BLOCKS IN A RANDOMIZED DESIGN

FOREST



1

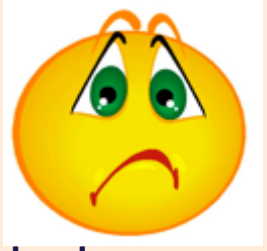
2

3

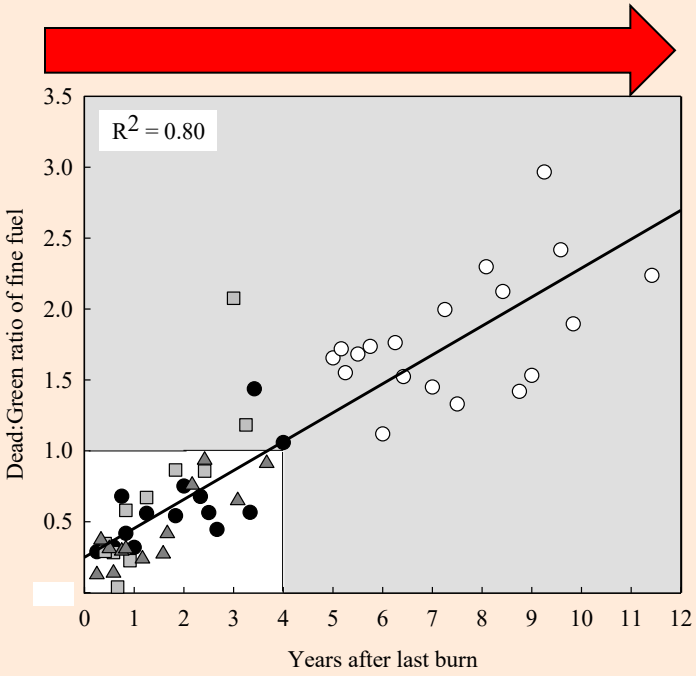
SAVANNA

SAVANNA – FOREST TRANSITION

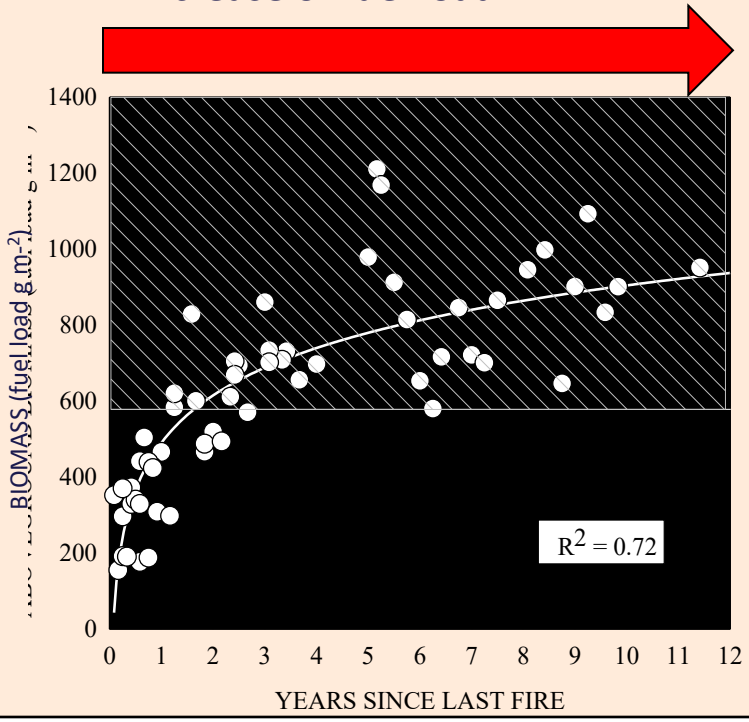
Fire suppression leads to an increase in dry fuel loading predisposing to high intensity fires!



Increase of dead fuel

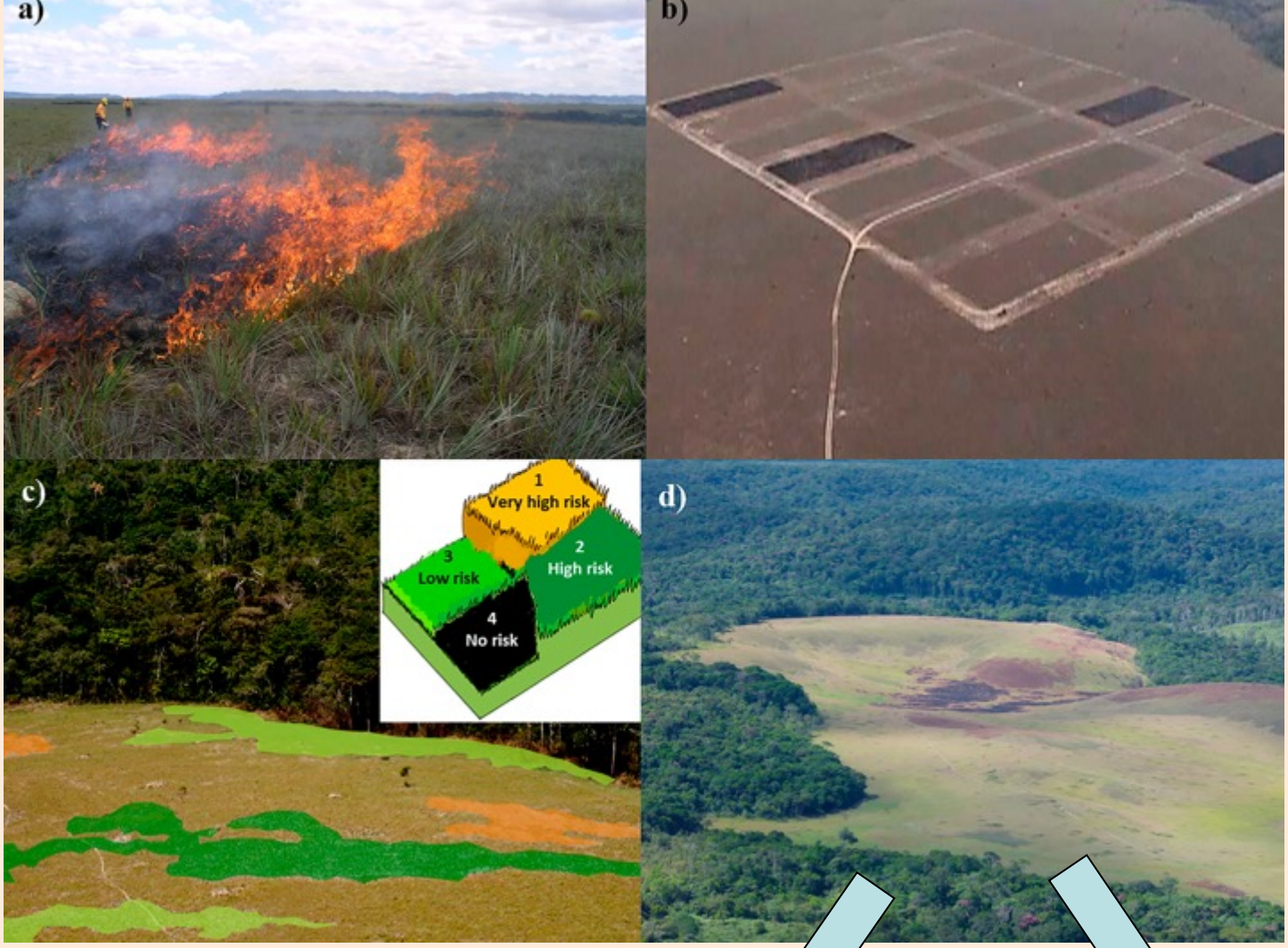


Increase of fuel load



To summarize, the heterogeneous conditions generated by fire behavior variability could lead to a variety of grassland environments as regards the amount of biomass (176-1271 g m^{-2}), live/dead ratios (0.36-3.60) and biodiversity (species abundance and composition, data not shown) produced by the exposure to burning over time in different areas.

Bilbao et al. 2009, 2010, 2019



Savanna vegetation could support the creation of a mosaic of patches with different fire histories that could be used as firewalls, reducing the risk of hazardous wildfires, mainly in the vulnerable and diverse savanna-forest transitions. This technique is referred to as patch mosaic burning (PMB).

This technique imitates ancient practices employed for centuries by the Pemon people through the cooperative burning of savannas in the use of fire for the sustainable management of the savanna–forest boundaries

Bilbao et al. 2009, 2010, 2021

CONCLUSION

These studies generated an alternative discourse about fire that allows us to see beyond the apparent forest-destructive behavior of the Pemon.

Our scientific knowledge supports ancestral knowledge of Pemon and opened possibilities for a new approach for fire management in the Canaima National Park where

"Traditional Pemón approach is to fight fire with fire"

This contrasts with fire exclusion strategy adopted by government agencies at CNP

Fire exclusion conducts to fuel accumulation so the risk of hazardous fires could increase!

TOWARDS A LEGITIMATE AND SUSTAINABLE ENVIRONMENTAL FIRE MANAGEMENT POLICY

ACTION-RESEARCH APPROACH

ADVANCES

- Dialogue between Indigenous communities, scientists and institutions.
- Greater respect and valorisation for Indigenous knowledge by scientists and institutions.
- Greater confidence and trust in institutions by Indigenous peoples.
- Commitment by institutions to include Indigenous knowledge and participation within fire management plans.

Fire fighting and suppression → **Integrated and participatory fire management**

The articulation of traditional and scientific knowledge is a promising strategy for the formulation of effective fire management policies in the CNP that could be more successfu for forest conservation and climate change mitigation as well as the conservation of Indigenous cultural integrity.










"… 'Look, son, do not go ahead of me.' Why did the old wise man say that? Because if on the journey one goes ahead, you are more likely to trip up. There could be an animal, there could be a snake or a spider that bites you. But don't go behind me either. If you do, you won't be able to see what I am seeing, as I am in front of you. So, one has to be very careful. That is why our grandparents said that we must walk together hand in hand. In that way we both can see what is ahead and we won't trip up. This is my advice to the institutions, academy and government - let's all hold on to grab each other to walk together, so no-one trips up…"

Valeriano Constati
President of the Council of Elders and natural leader of the Kavanayen Indigenous Community for more than 20 years.

Wakiperamán! Gracias!!

Workshop "Designing action plans on climate change: Integrating local indigenous perspectives with academia and institutions in Canaima National Park". IVIC, Caracas, Venezuela. January 2017.