OXFAM

BOLIVIA

CLIMATE CHANGE, INEQUALITY AND RESILIENCE.

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CONTENTS

PRESENTATION

In 2009, Oxfam in Bolivia published a report highlighting the challenges that Bolivia would face due to the impacts of climate variability and change, including: food security; glacial retreat and its effect on the availability of drinking water; the frequency and intensity of disasters resulting from human activity; and an increase in infectious diseases and the effects of droughts and forest fires.

A decade later, we have prepared a follow-up report ***"Bolivia – Climate Change, Inequality and Resilience"*** delving deeper into some points that were not covered in the 2009 report that, given the present climate, other actors and sectors in the country might use, especially when considering the need for an effective national policy to deal with the current challenges.

Present-day events reveal the magnitude of the crisis and the devastating effects it is having. More intense and frequent climate-related disasters are on the rise, and are difficult to predict or prevent; they are stretching the country's capacity to respond to the limit and exacerbate inequality and poverty in different areas of the country.

What comes up time and time again is that state actors have never concentrated on developing alternatives for resilience and capacities to adapt to and mitigate the climate crisis and its impact on communities, especially Indigenous and small-scale farming communities where the ramping up of the deforestation and the extraction model is putting their relationship with the land and one another at risk.

The implications of different climate events affect women, children and young people disproportionately as they are more vulnerable during the disasters and displacement that are on the rise because of global warming. All too frequently, older and disabled people do not have basic means of protection and their rights are violated when a crisis arises.

Likewise, Indigenous peoples are victims of this context, added to a long history of discrimination, deprivation and the arrival of policies that bolster the structures of domination dating back to when the region was colonised. The impacts reach far beyond the loss of security and livelihoods, and strike the very heart of the communities' cultural and ancestral connection with their territory and ways of life.

We here at Oxfam consider that climate change and the rapid increase in inequality are some of the main risk factors facing the world today. As an institution, we stand by our position that we need to roll out a

new development paradigm based on different relationships with the environment.

A better distribution of resources is a necessary condition for achieving indispensable agreements at the national and international levels, which will enable a shift towards a resilient development style that make social development and caring for the environment feasible and compatible, underpinning a process that contributes to creating territorial governance in a framework of fairer, more egalitarian societies.

The findings presented in sections 3, 4 and 5 of this report give us a snapshot of the incredibly complex reality of this country. For each of the case studies we have provided the background based on recent studies done by Oxfam and other NGOs (national and international) and supplemented by interviews with experts, government officials and grassroots organizations. The testimonies from small-scale farmers and Indigenous people describe the main issues threatening their communities. Section 6 gives perspectives from six organizations on climate change, the environment and inequality. Section 7 summarises some recommendations and implications for national policy and the negotiations Bolivia is working on at the international level.

Finally, Oxfam has worked on this report as a way of providing evidence and suggestions to feed into debates on public policy mechanisms and tackling the structural inequalities that are the main challenge facing Bolivia today.

Carlos Aguilar

Bolivia Country Director

ABBREVIATIONS

ABT	Autoridad Nacional de Bosques y Tierras
APMT	Autoridad Plurinacional de la Madre Tierra
CIDOB	Confederación de Pueblos Indígenas de Bolivia
CIJAP	La Central Indígena de Jóvenes Amazónicos de Pando
CIMAP	La Central Indígena de Mujeres de la Amazonía de Pando
CIPCA	Centro de Investigación y Promoción del Campesinado
CIPOAP	Central Indígena de Pueblos Originarios de la Amazonía de Pando
CNMCIOB-BS	La Confederación Nacional de Mujeres Campesinas Indígenas Originarias de Bolivia -Bartolina Sisa
CONAMAQ	Consejo Nacional de Ayllus y Markas del Qullasuyu
CONTIOCAP	Coordinadora Nacional de Defensa de los Territorios Indígenas Originarios Campesinos y Áreas Protegidas de #Bolivia
CPESC	Coordinadora de Pueblos Étnicos de Santa Cruz
CSCIB	Confederación Sindical de Comunidades Interculturales de Bolivia
CSUTCB	Confederación Sindical Única de Trabajadores Campesinos de Bolivia
FAN	Fundación Amigos de la Naturaleza
FCBC	Fundación para la Conservación del Bosque Chiquitano
FES	Función Económico-Social
FSTCP	La Federación Sindical de Trabajadores Campesinos de Pando
GISB	La Gestión Integral y Sustentable del Bosque
INRA	Instituto Nacional de Reforma Agraria
IPBES	The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	The Intergovernmental Panel on Climate Change
IPDRS	Instituto para el Desarrollo Rural de Suramérica
MAS	Movimiento al Socialismo
OCHA	Office for the Coordination of Humanitarian Affairs
PDES	Plan de Desarrollo Económico y Social
RCP	Representative Concentration Pathway
SAF	Sistemas Agroforestales
SENAMHI	Servicio Nacional de Meteorología e Hidrología
TCO	Tierras Comunitarias de Origen
TIOC	Territorios Indígena Originario Campesinos
TIPNIS	Territorio Indígena Parque Nacional Isiboro Sécure
UNFCCC	United Nations Framework Convention on Climate Change

Trinidad. Photography: Tony Suárez

1. INTRODUCTION

In 2009, a team of Oxfam researchers travelled around Bolivia, collecting information about the country's vulnerability to climate change and interviewing experts, government officials and NGOs, and most importantly, poor women and men, mostly from Indigenous communities, about their experiences of climate change and their efforts to adapt to it.

In the report that followed,[1] Oxfam stressed that Bolivia was particularly vulnerable to climate change due to widespread poverty, its variety of ecosystems, weather extremes, melting glaciers and high deforestation rates. It found that many producers and local farmers were already witnessing a changing climate, in terms of unpredictable rainfall, more disasters stemming from extreme weather events and higher temperatures, with negative impacts for their livelihoods. Women were often the hardest hit as they were usually left to tend families and small-scale farms, and had fewer alternative livelihoods when crops were lost.

The report outlined five main impacts that Bolivia could expect as a result of climate change: less food security; glacial retreat affecting water availability; more frequent and more intense 'natural' disasters; an increase in mosquito-borne diseases; and more forest fires.

A little over ten years later, a similar team of researchers travelled to different regions of Bolivia, in part to see what had changed and to delve deeper into some aspects that had not been covered previously. We revisited the small village of Khapi in the municipality of Palca, tucked under Mount Illimani in the department of La Paz, where villagers were feeling the effects of water insecurity partly because of receding glaciers.

The team also spent time examining the aftermath of the devastating forest fires, the worst in Bolivia's recent history, which affected the Chiquitania region in the east of the country in the second half of 2019. Here climate change played a role as a 'stress multiplier', creating weather conditions (less water availability and higher temperatures), which made the fires worse.

Finally, the researchers visited Bolivia's remotest department of Pando in the Northern Amazon, where several communities are pursuing a variety of alternatives to burning down or clearing forests. Such stories are an inspiring antidote to the general 'doom and gloom' narratives around climate change.

Many of the testimonies collected on this visit were familiar from the first visit in 2009. In

1 Oxfam International, 2009. Bolivia, Climate change, poverty and adaptation. https://www.oxfam.org/es/informes/bolivia-cambio-climatico-pobreza-y-adaptacion

particular, the repeated experiences of hotter temperatures, unpredictable or shorter periods of rainfall, sudden downpours, and more droughts were a common refrain in all three regions we visited.

Since 2009, Oxfam and its partners have continued to document the ways climate change has a much greater impact on women (particularly because they are usually in charge of agricultural production),[2] to give voice to their experiences of resisting hydroelectric schemes, oil companies and road building in different parts of the country,[3] and to assess progress in women's participation and decision-making powers in social organizations and other public bodies.[4]

However, many aspects have changed in the last ten years, the most important of which are sketched out in section 2. In 2009, the then president Evo Morales, supported by the social movement MAS, had only been in power for three years. In November 2019, after a period of political turmoil following contested elections, he was replaced by the interim government of Jeanine Añez.

Whatever the political colour of a new government, it will face a range of challenges including: gender inequality; access to land, particularly for lowland Indigenous communities; the tensions very apparent in the later years of the Morales government between an economic model based on extraction industries (mining, soya, cattle and timber) and the vision of many Indigenous and small-scale farming communities, particularly in the Amazonian territories and the Chaco, to live more harmoniously with nature and use natural resources in more sustainable ways. The latter is where Oxfam finds that 'the largest inequality gaps can be seen'.[5]

Oxfam research has stressed that at the global level too, there is a hugely unjust inequality gap in the climate emergency, as the least responsible are unfairly paying a much higher price.[6] There is a huge difference between the carbon footprint of the average person in the developed world compared to that of an average person in low income countries:

- The average British person emits more carbon dioxide in two weeks than a citizen of any one of seven African nations does in an entire year.
- A Spaniard every year emits six times as much carbon dioxide as a Guatemalan, and 16.5 times as much as a Nigerian.
- Within countries, the richer you are, the more you contaminate, and the less likely you are to suffer the most severe consequences of climate change.
- The most poor, and the least polluting, suffer, and will suffer, the worst impacts.

Of the ten countries most affected by extreme weather events between 1998 and 2017,

2 Plataforma Boliviana Frente al Cambio Climático, 2016. Sistematización De Experiencias Alternativas Frente Al Cambio Climático Al Modelo De Desarrollo, Desde Las Mujeres Y Sus Organizaciones.

3 CNAMIB, CONAMAQ, Plataforma Boliviana Frente al Cambio Climático, 2019. Informe Alternativo de la Alianza de Mujeres Indígenas Originarias de Bolivia para el EPU.

4 Soliz L. and Vos V., 2019. Medición experimental de indicadores de Objetivos de Desarrollo Sostenible en el Norte Amazónico de Bolivia. IPDRS/Oxfam, chapter 4.4.

5 Oxfam, 2018. Tensiones, Disputas y perspectivas en la implementación de modelos de desarrollo territorial: el caso de Puerto Gonzalo Moreno y Macharetí, p. 9.

6 Oxfam Intermón, 2019. Injusticia climática: Lo que contaminan los más ricos y pagan los más vulnerables. 10 December. UK figures from http://oxfamapps.org/media/y9rq7

eight were developing countries with low or medium to low income.[7] Bolivia came in 31st place, the worst affected in South America. In 2017, its greenhouse gas emissions amounted to 47 million metric tonnes of carbon dioxide equivalent ($MtCO_2e$), representing just 0.1% of world emissions.[8] This compares to 6,670 $MtCO_2e$ in the USA (15%) and 4,220 $MtCO_2e$ (9%) in Europe. One study suggested that in 2011 Bolivia was low down in 141st place, when ranked by p.c. emissions.[9]

The fundamental point remains as true in 2020 as in 2009, that in Bolivia – a country with very little historical and current responsibility for the causes – the changing climate is a threat multiplier. It adds an additional, potentially devastating layer of vulnerability and risk to hundreds of thousands of poor women and men, and particularly Indigenous communities, already exposed to poverty and environmental problems other than climate change.

This report aims to provide evidence and suggestions to feed into the policy debate in the new political environment in the country, in order to reduce these risks, improve the resilience of the most vulnerable sectors and lessen continuing inequalities.

7 German Watch, 2019. Global Climate Risk Index 2019.

8 Based on figures from the World Resources Institute, found at https://en.wikipedia.org/wiki/List_of_countries_by_greenhouse_gas_emissions
However, if land use changes and forestry are included, which Climate Watch calculates at 97 Mt for 2016, this would triple Bolivia's total emissions. https://www.climatewatchdata.org/countries/BOL

9 https://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions_per_capita

Poopó Lake. Photography: Juan Karita www.lavozdebolivia.com

2. OVERVIEW, 2009-2019

2.1 SOMETHING OLD, SOMETHING NEW

In its 2009 report, Oxfam quoted an article in the *Guardian* newspaper describing the fate of the Uru Chiripaya people, many of whom had been forced to abandon their traditional land in the southwestern *altiplano* (highland area) due to the drying up of the River Lauca, in part exacerbated by changing climatic conditions.

In January 2018, the same newspaper reported on the fate of the Uru-Murato people that live near Lake Poopó, once Bolivia's second largest lake, but now for most parts of the year, a dry expanse of salty earth.[10] Anthropologists expressed fears that with barely 800 Urus-Muratos left living around Lake Poopó and whose culture is based around fishing, one of the oldest societies in the Americas could vanish.

The disappearance of the lake also meant the destruction of an entire ecosystem, and the loss of around 200 species of fish, birds, reptiles, and mammals. The lake is famous as the home to three types of flamingos.[11]

The causes of the lake drying up were partly tied to historically higher temperatures, changing rainfall patterns and longer drought periods. Less water available from glaciers to supply rivers and lakes may have played a role, but the lake drying up was also linked to the nearby mining industry and the large amounts of water it uses, and the contamination that flowed into the lake.

The global boom in demand for quinoa during the 2000s also put additional pressure on local lakes for irrigation. Observers fear that a changing climate, pollution and the build-up of sediments, and more demands on water could lead to a similar fate for other highland lakes, including nearby Lake Uru Uru.

Two successive years of drought in 2015 and 2016, linked to the El Niño weather cycle and rising temperatures, caused one community, known as Santiago K near the Chilean border, to become a ghost town as the local river dried up, halting quinoa production.[12]

Such dramatic stories illustrate the role that climate change plays as a stress or threat

10 https://www.theguardian.com/world/2018/jan/04/the-ecological-catastrophe-that-turned-a-vast-bolivian-lake-to-a-salt-desert

11 Linda Farthing, 2017. Bolivia's disappearing lake. Earth Island Journal. 1 February. https://www.earthisland.org/journal/index.php/articles/entry/bolivias_disappearing_lake/

12 Inside Climate News, 25 August 2017. Climate Change is Making this Bolivian Village a Ghost Town.

multiplier to many Indigenous communities, in this case in the *altiplano*, forcing many members to migrate to urban areas in search of an income.

Internal migration has long been considered one of the consequences of 'slow-onset' climate change, such as droughts and lower agricultural productivity. For example, the World Bank has suggested that between 6 million and 17 million people in Latin America could be forced to move by climate impacts before 2050, depending on the level of greenhouse emissions and development responses.[13] Oxfam calculates that around the world, climate-related disasters are now the biggest driver of internal migration, forcing one person from their home every two seconds.[14]

The world's leading body on climate science, the Intergovernmental Panel on Climate Change (IPCC), has produced a number of reports in the last decade, mapping previous trends and suggesting ranges for future impacts in Latin America:

- Warming has been detected throughout Latin America with an increase of 0.7°C to 1°C since the mid-1970s. In addition, changes in climate variability and extreme events have severely affected the region. Projections of warming suggest a range of +1.7°C to +6.7°C in South America by 2100.[15]

- By increasing stresses on land, climate change worsens existing risks to livelihoods, biodiversity, human and ecosystem health, infrastructure and food systems. In the Andes, people are beginning to experience changes in the timing, severity and patterns of the annual weather cycle. Climate change is affecting crop yields in Colomi, Bolivia, where it is causing farmers to alter the timing of planting, their soil management strategies, and the use and spatial distribution of crop varieties.[16]

- In regions with mostly smaller glaciers and relatively little ice cover (including the tropical Andes), glaciers will lose more than 80% of their current mass by 2100 under RCP8.5 (a high emissions scenario), and many glaciers will disappear regardless of the emission scenario.[17] (See Box 3.1 on Glacial Melt in the Andes)

- Changes in weather and climate patterns in Latin America are impacting human health by increasing morbidity, mortality and disabilities, and through the emergence of diseases in previously non-endemic areas; climate-related drivers are associated with respiratory and cardiovascular diseases, and vector- and water-borne diseases (such as malaria, dengue, and yellow fever).[18]

The IPCC reports provide a general picture for Latin America but Bolivia shows similar patterns to those described above. Official figures from SENAMHI meteorological stations in different parts of the country show little variation in average temperatures between 2010 and 2016/2017.[19] However, longer periods

13 World Bank. 2018. Groundswell: Preparing for internal climate migration.

14 Oxfam International, 2019. Forced from home: climate-fueled displacement. https://www.oxfam.org/es/informes/obligadas-abandonar-sus-hogares-desplazamientos-provocados-por-el-clima

15 IPCC, 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Central and South America, chapter 27.

16 IPCC, 2019, Climate Change and Land, Summary for Policy Makers, Section A.5, and Chapter 5, pp. 5-25, summarised by CDKN, 2019. The IPCC's Special Report on Climate Change and Land: What's in it for Latin America?

17 IPCC, 2019. IPCC Special Report on the Ocean and Cryosphere in a Changing Climate.

18 IPCC, 2014. Ibid.

19 http://senamhi.gob.bo/index.php/sismet

give a more reliable picture of trends. For example, in El Alto (altitude 4,071 msl) the average temperature from 1990 to 1997 ranged between 7.2°C and 8.1°C, which rose slightly to between 7.2°C and 8.4°C in the period between 2010 and 2017. However, in four of the years in the latter period the average temperature was 8.0°C or more, compared to just once in the former period.

In the communities in the foothills of Illimani, average temperatures increased by about 2°C between 1976-1980 and 2005-2009. (See section 3.3) In parts of the department of Santa Cruz, the annual temperature increased by around 0.5°C for the period 2001-2018 compared to 1981-2000, but in some months of the year (for example, September) the increase has been more than twice that amount (1.1°C). (See Section 4.2)

Annual precipitation trends are highly variable because they depend on location and are influenced by El Niño events. However, it is known that for the Central Andes, including Bolivia, snow cover has seen an overall decreasing trend in the past two decades, in line with rising temperatures.[20]

As mentioned above, local testimonies bear witness to the changing climate context. One of Oxfam's partners, CIPCA-Santa Cruz, during recent visits to various municipalities in the department, found that the negative impacts of climate change could be seen in the changing water cycle – in the summer months, short stretches of abundant rainfall were followed by hot temperatures which dried up the water and did not allow the natural aquifers to fill; the winter months were characterised by periods of little or no rain.

The Oxfam 2009 report documented the increasing number of extreme weather events, such as floods, heavy rainfall, droughts, strong winds and violent hailstorms; the rise in the number of national disaster emergencies; and the greatest impact falling on the poorest, particularly in the department of Beni, and the rural parts of Oruro and Chuquisaca.[21] The types of events varied considerably in the different regions of the country.

It is difficult to be sure whether the number of such extreme weather events has increased across the country in the last ten years, or the extent to which climate change has played a role in making them more frequent or more intense. However, we do know that there have been several stand-out events, such as extensive flooding in La Paz, Beni and Pando in early 2014, the drought in over half the country in 2016 (see section 3.3), the forest fires in Chiquitania in 2019 (see section 4) and two bad flooding events in Pando (see section 5) that caused extensive suffering, particularly for the poorer sectors of society.

The EM-DAT database on international disasters shows that from 2000 to 2019 Bolivia suffered 45 disasters, including droughts, cold spells, flash floods, river and other floods, landslides and storms/cyclones causing the deaths of over 8,000 people, mostly from river floods and landslides.[22] The same database suggests that 25 of these disasters, mostly floods and droughts, occurred between 2010 and 2019.

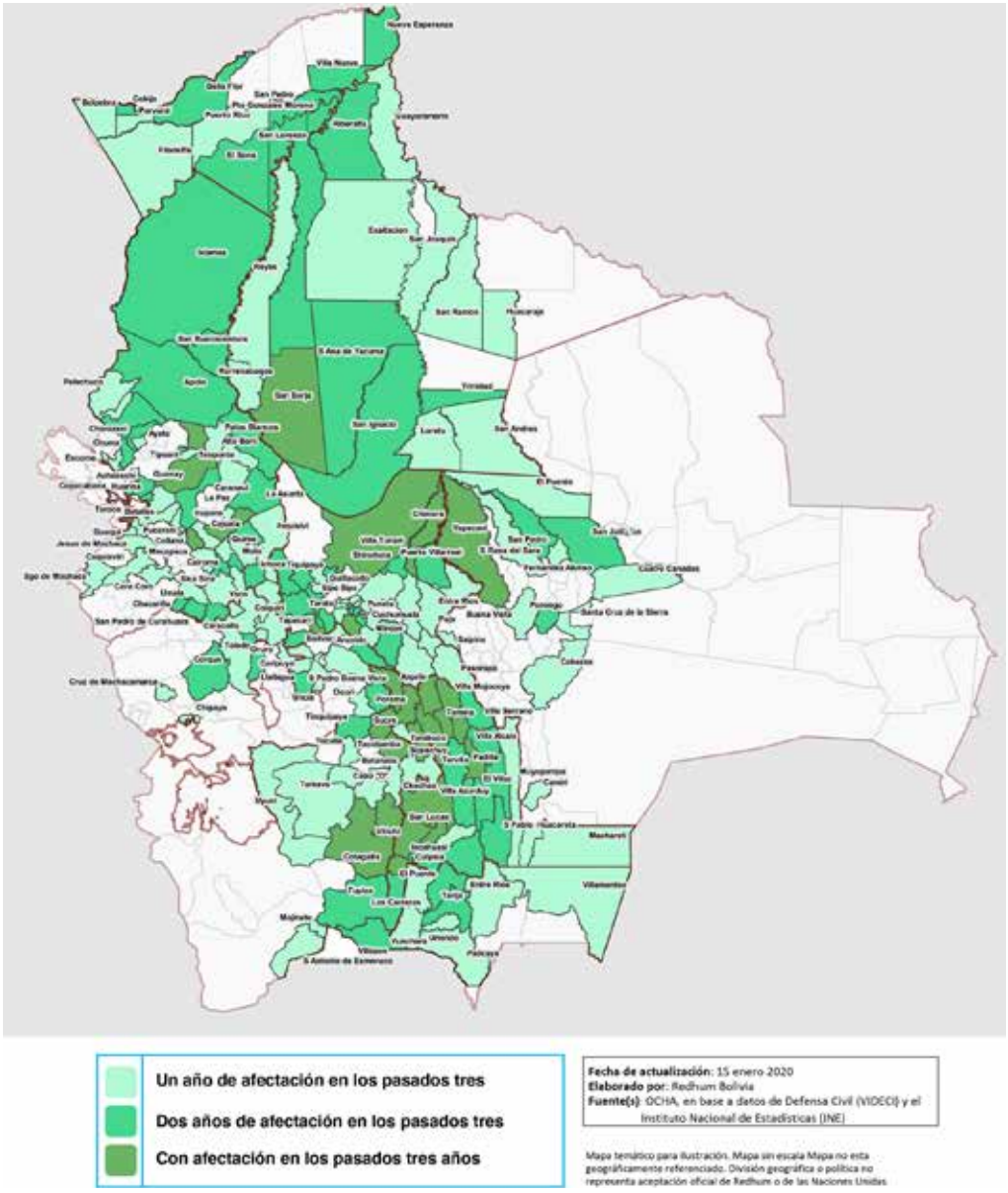
According to the UN Office for the Coordination of Humanitarian Affairs (OCHA), flooding in the last three years has particularly affected a central belt of the country running north from

20 UNESCO, 2018. The Andean glacier and water atlas: the impact of glacier retreat on water resources. Paris: UNESCO, GRID-Arendal.

21 Oxfam 2009, pp. 20-21.

22 UNESCO, 2018, quoting D. Guha-Sapir, R. Below, Ph. Hoyois. EM-DAT: International Disaster Database (**WWW.EMDAT.BE**), Université Catholique de Louvain, Brussels, Belgium.

MAP 2.1 AREAS OF BOLIVIA AFFECTED BY FLOODING 2017-2019



Source: OCHA

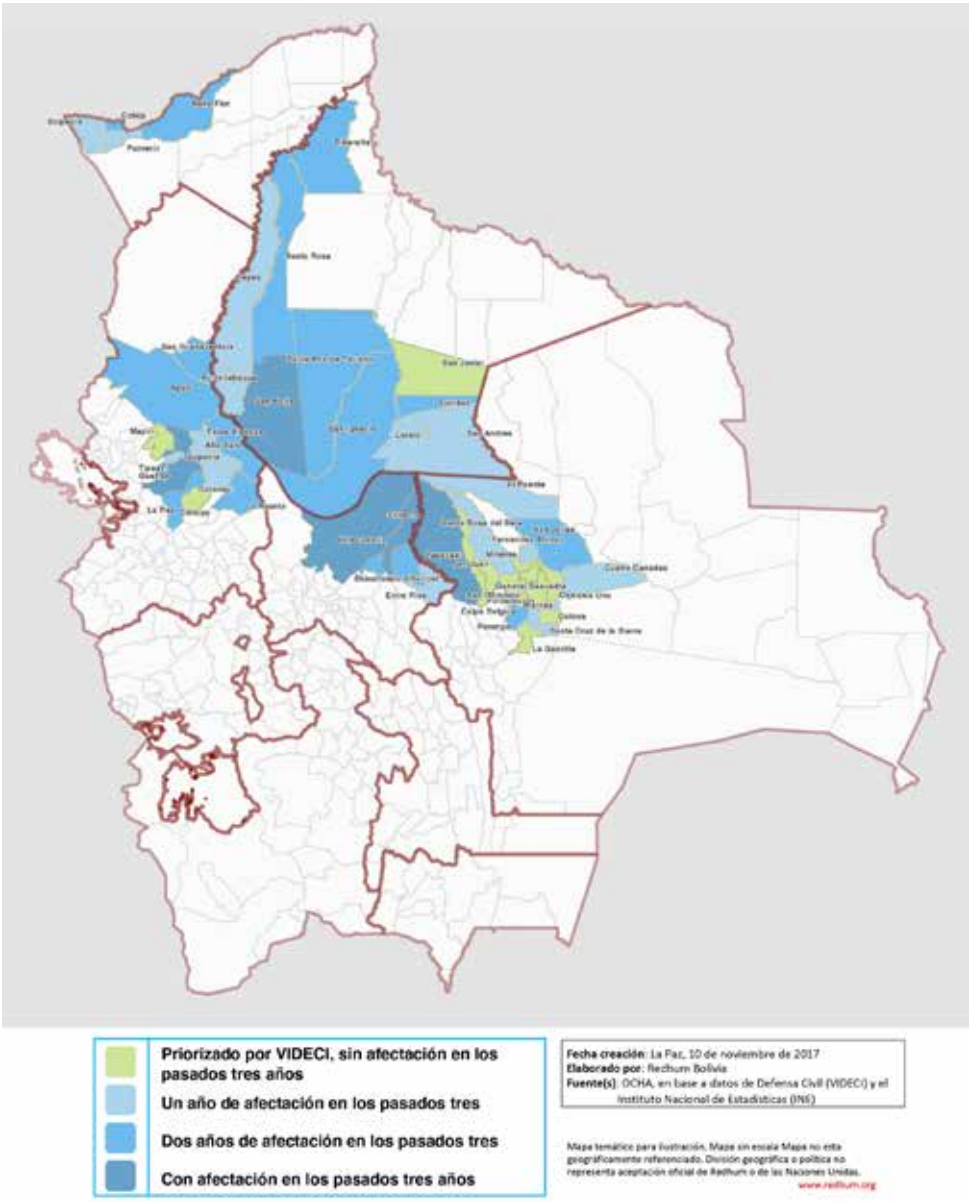
Pando and Beni, down through Cochabamba and on to Chuquisaca. [23] (See Map 2.1) In several municipalities, over 1,500 families have been affected. Map 2.2 shows the large area of the country vulnerable to flooding and therefore given priority in National Emergency Plans.

The outlook is bleak. Government calculations suggest that by 2030 as much as 24% of Bolivian territory could be affected by frequently occurring floods, while slightly more than that (27%) could be affected by persistent droughts.[24] Taking into account the rise in extreme weather events and many other factors such as water availability, yields and adaptation, the Inter-American Development Bank (IDB) calculated that climate change would cause a loss of more than US$100 bn

23 OCHA, 2020. Escenarios inundaciones, 2019-2020.

24 Plurinational State of Bolivia, 2015. Intended Nationally Determined Contributions from the Plurinational State of Bolivia.

MAP 2.2 AREAS GIVEN PRIORITY IN THE NATIONAL EMERGENCY PLAN



Source: OCHA

to Bolivia's agricultural sector in the period to 2100, equivalent to a loss of 16% of the sector's GDP, or 2.1% of total GDP.[25]

The 2009 Oxfam report also highlighted three other areas of concern. The first was the real and potential impact of melting glaciers on those farmers dependent on meltwater and runoff for irrigation, and on urban consumption, electricity generation and ecosystem sustainability. This will be addressed in Section 3.

The second was food security, put at risk by unpredictable rainfall and other extreme weather events. This caused particular stress to small producers who could lose income from their produce or experience lower yields,

25 IDB/CEPAL, 2014. La economía del cambio climático en Bolivia: Impactos en el sector agropecuario.

and to low-income consumers affected by rising prices for basic food goods during times of shortage. A 2013 study by IFAD/UNEP projected that Bolivia would be one of the countries in the world to suffer the highest decrease of between 15% and 50% in agricultural production by 2080 due to climate change.[26] The higher temperatures affecting families growing lettuce in communities in the foothills of Illimani is just one example of lower yields, as more pests invade the heads of the lettuces. (See Section 3.4)

Thirdly, the 2009 report pointed to the problem of mosquitos carrying diseases such as malaria and dengue being able to survive at higher altitudes due to rising temperatures. Dengue is considered particularly sensitive to climate change, as climate is one important driver of the current distribution and incidence of the disease around the world.[27] It affects poorer sectors as they find it more difficult to afford the treatment and medicines necessary to treat and cure it.

Bolivia suffered an outbreak of dengue in the first half of 2020 and by early May, 7,500 people had been infected and eight had died (seven under the age of 12), mainly in Santa Cruz, Beni and Pando. The number of people infected was one of the highest recorded in recent years. According to Roberto Tórrez, head of Epidemiology for the department of Santa Cruz, climate change was one of the main drivers of the epidemic, along with migration and lack of proper sanitation methods, because 'the mosquito that transmits the disease – *aedes aegypti* – can adapt to different altitudes. Before, it could survive at 1,400 msl, but because of temperature increases in recent years it has adapted to living at 2,300 msl'.[28] This led to the disease spreading to other departments, such as Cochabamba and Chuquisaca.

Absent from the 2009 report were details of how climate change can affect urban residents, which now accounts for nearly 70% of the Bolivian population, with half the population living in the metropolitan areas of La Paz-El Alto, greater Cochabamba and Santa Cruz. A 2018 study of the urban area of Cochabamba showed that *islas de calor* (heat islands) doubled in surface area between 2000 and 2017, from 60 to 118 km^2.[29] (See Chart 2.1) Heat islands are defined as urban zones or areas where the temperatures rise due to urban expansion, concentration of cement buildings and tarmacked roads, and low vegetation. The effects are felt as an intense sensation of high temperatures and sudden changes in rainfall, which is shorter but heavier.

Also absent were more details of the complex links between climate change and other environmental problems, and their impact on poorer sectors. Water and air pollution, soil erosion, natural disasters not linked to climate change, and deforestation all affect women and Indigenous groups disproportionately, as for example, they have the least capacity to cope with health problems caused by pollution, and with the economic fall-out of losing crop production because of poor soil quality.

In May 2019, a comprehensive report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)

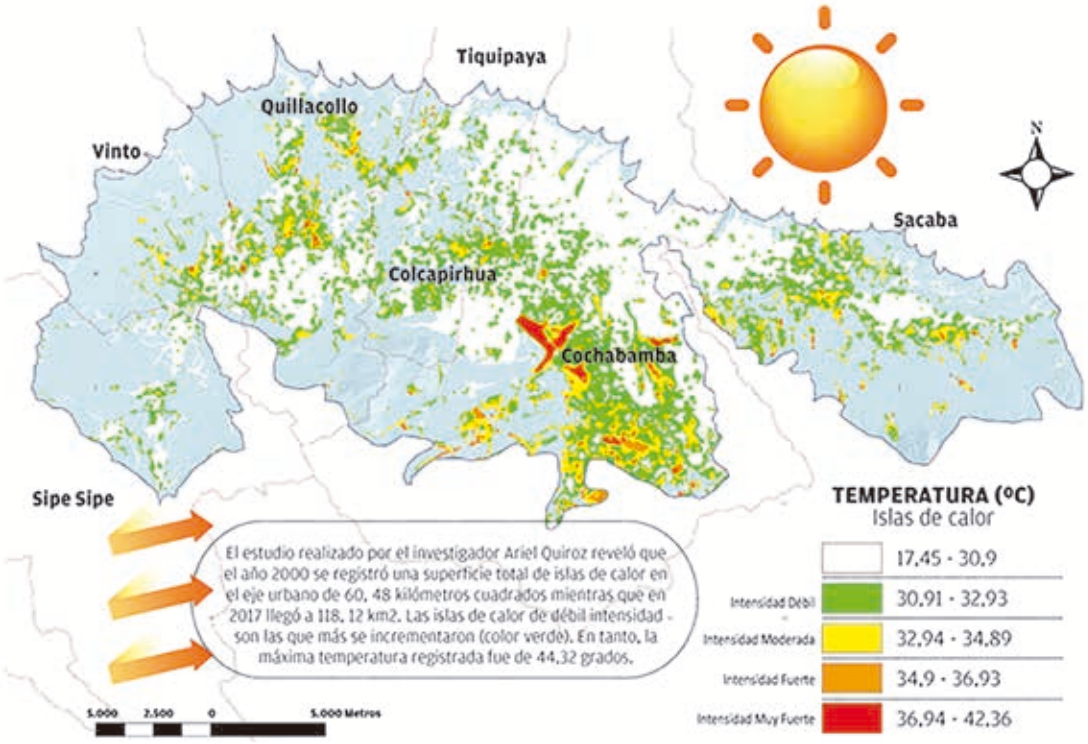
26 IFAD/UNEP, 2013. Smallholders, food security, and the environment, p.20

27 Ebi K.L and Nealon J., 2016. Dengue in a changing climate. *Environmental Research*, 151, pp. 115 - 123.

28 Página Siete, 2 February 2020. Migración, cambio climático y dejadez: las 3 causas de la explosión del dengue.

29 Quiroz Romero A., 2018. Islas de calor en el eje metropolitano de Cochabamba y su variación en el periodo 2000 -2017. Universidad Mayor de San Simón https://www.lostiempos.com/actualidad/cochabamba/20181202/estudio-revela-que-islas-calor-se-duplicaron-eje-urbano

CHART 2.1 COCHABAMBA AND HEAT ISLANDS, 2000-2017



Source: Los Tiempos, 2 December 2018

found that nature (biodiversity) is being eroded at rates unprecedented in human history.[30] One million species are currently threatened with extinction, including many in South America.

The IPBES report showed the strong interrelationship between climate change, the loss of biodiversity and human wellbeing. Climate change is a primary driver of biodiversity loss, worsening the impact of habitat degradation, pollution, invasive species and the overexploitation of natural resources. In turn, the loss of biodiversity contributes to climate change, for example, when destroyed forests emit more carbon dioxide.

Bolivia is among the 15 most biodiverse countries in the world,[31] and contributes on a per capita basis one of the highest rates of ecosystem services, valued at more than US$10,000/hectare a year.[32] As outlined in section 4, the destruction of its forests not only causes a substantial increase in carbon dioxide emissions but also destroys biodiversity and natural resources. The clearing of the forest may provide more revenue for the country or food security for some families but it is in conflict with other environmental and climate change objectives. More environment-friendly, income-generating approaches, like the ones outlined in section 5 and discussed more in Section 6, are needed to reduce this conflict.

2.2 THE CHANGING ECONOMIC AND POLITICAL CONTEXT

As outlined in Oxfam's 2009 report, after its election in December 2005 the government

30 IPBES, 2019. The IPBES Global Assessment Report on Biodiversity and Ecosystem Services.
31 https://www.cbd.int/countries/profile/?country=bo
32 IPBES, 2018. The regional assessment report on biodiversity and ecosystem services for the Americas, p. 130.

of Evo Morales launched a series of policies designed to improve the income, health and education of the majority Indigenous population. These were largely financed by increased taxes on the oil and gas sector, and corporations.

In the period 2010-2018, growth rates remained at one of the highest in South America, never dropping below 4% annually. Inflation remained low. The fiscal balance even stood in surplus from 2010-2013 (helped by the boom in hydrocarbon prices) but turned negative in 2014, and has increased substantially since. During the MAS years, tax revenue increased from 18.5% of GDP in 2005 to 23.2% in 2015.[33]

More importantly, Bolivia registered impressive improvements according to several indicators:

- Overall poverty levels (extremely poor or poor) fell from 67% of the population in 2002 to 36% in 2017.[34]
- The Gini coefficient (which provides a measure of income inequality) fell from 0.612 in 2002 to 0.438 in 2018.[35]
- Per capita incomes more than tripled between 2005 and 2017 from US$1,037 to US$3,390.[36]

The IMF called the poverty and inequality reductions 'dramatic', even compared to peers in Latin-America. [37] However, despite these impressive achievements, Bolivia remains one of Latin America's poorest countries. In 2018, 15% of the population, mainly in rural areas, lived in extreme poverty.

Expressed simply, the end of the commodities price boom put pressure on the dominant economic model of taxing the hydrocarbon sector to fund social spending and state-led development. In the early years, the Morales government broadly adopted a supportive hands-off approach towards private business in key strategic areas (including export-oriented agribusiness) but a rapprochement with key business sectors became a more pressing economic and political priority.[38]

Large-scale agricultural producers (mostly in the department of Santa Cruz) play a central role both in generating revenue from exports (of soya and beef in particular) and the production of key domestic foodstuffs, so cooperation with them made sense for macroeconomic stability. At the political level, it helped to reduce the strength of the oppositional autonomy movement in the lowland departments, and particularly Santa Cruz.

In 2014, the Morales government announced that it intended to expand farming lands from 5 million to 13 million hectares by 2025. Such an expansion aimed to triple agricultural production to 45 million tonnes, of which 21 million tonnes would be for export – a ten-fold increase on export volumes at the time.[39]

33 CEPAL, 2018b. CEPALSTAT: Databases and statistical publications. Retrieved from http://estadisticas.cepal.org/cepalstat/Portada.html.

34 Economic Commission for Latin America and the Caribbean (ECLAC), 2019. *Social Panorama of Latin America*. Santiago de Chile: ECLAC, January 2019.

35 Ibid.

36 Ministerio de Economía, 2017. *Memoria de la Economía Boliviana.* MEFP.

37 IMF Working Paper, 2015. Explaining Inequality and Poverty Reduction in Bolivia.

38 Wolf J., 2019. The political economy of Bolivia's post-neoliberalism: Policies, elites and the MAS government. *European Review of Latin American and Caribbean Studies*, 108, pp. 109-129.

39 https://news.mongabay.com/2014/09/bolivian-vice-president-proposes-unprecedented-agricultural-expansion-part-1/

The policy of expanding the agricultural frontier and increasing agricultural production was enshrined in the *Agenda Patriótica* 2025, which was ratified by the MAS government and key representatives of the economic elite from Santa Cruz in December 2013, and given legal force in early 2015. In essence, it amounted to a private-public partnership to heavily increase investment in infrastructure in order to achieve its aims of boosting production and exports of certain crops.[40] It included an Economic and Social Development Plan (PDES) designed to orientate the actions of public, private and communitarian organizations to fulfil its objectives.

However, Oxfam's concern was that such an emphasis on the agro-extraction industries, the expansion of cleared lands, and other elements such as mining and oil and gas exploration is generating 'huge pressure' on Indigenous lands and protected areas in the Amazon and Chaco regions.[41] In addition, this negatively affects internationally recognised Indigenous rights, and the principle of self-determination.

As Oxfam's partner, IPDRS summarised the situation of land conflicts and Indigenous populations, 'Bolivia has 22 national parks and over 60 protected areas. More than 30% of the protected areas suffer threats and interventions without previous consultation with the Indigenous peoples who live there, from megaprojects, encroachments by colonising small-scale farmers, mining companies and cooperatives, and oil and gas companies; and in addition they suffer from clandestine hunting and the extraction of wood products.' [42]

2.3 CLIMATE CHANGE, MOTHER EARTH AND LIVING WELL ('VIVIR BIEN')

In the early years of the Morales government, many Bolivian and international NGOs, including Oxfam, supported various initiatives and new legislation designed to tackle the impacts of climate change, promote adaptation as appropriate, protect the environment and respect Indigenous rights.

Amongst the key pieces of legislation were the 2009 new Constitution, the 2010 Law on the Rights of Mother Earth (see Box 2.2), followed by the Framework Law on Mother Earth and Integral Development for Living Well in 2012. This stressed the importance of implementing holistic measures for biodiversity and cultural conservation to 'live well'. A new entity, the Plurinational Authority of Mother Earth (APMT), was set up in 2013, whose role was to coordinate and manage different actors with the common aim of mitigating and adapting to climate change, the sustainable management of forests, and the reduction of deforestation.

Many analysts point to the 'TIPNIS' conflict in 2011-12 both as a turning point in the Morales government's relationship with some social organizations and sectors of the Indigenous movement, and as confirmation of its belief in the primacy of an economic model based on extraction industries over the ideology enshrined in the stipulations of the Mother Earth law safeguarding the environment, the plurinational notion of Indigenous autonomies and the concept of 'living well'.

40 Wolf. Ibid., p. 118.

41 Oxfam, 2018. Un nuevo paradigma de desarrollo: desafío de una Bolivia plurinacional y equitativa para el 2020.

42 IPDRS, 2019. Informe 2018: Acceso a la tierra y territorio en Sudamérica, p. 80. Authors' translation.

BOX 2.2 THE RIGHTS OF MOTHER EARTH

The rights of Mother Earth emerge from a cosmovision that, unlike the predominant anthropocentric western vision, perceives mankind and nature as one indivisible being. Bolivia and Ecuador are two examples of countries in the region that have affirmed these rights in their national legislations. For instance, in Bolivia, key components of their legislation include the:

1. a) Right to life and the diversity of life;
2. b) Right to stabilize concentrations of greenhouse gases in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, and in sufficient time to allow the components of Mother Earth to adapt naturally to climate change;
3. c) Non-commodification of the environmental functions of Mother Earth;
4. d) Right to support the restoration and regeneration capabilities of all its components that enable the continuity of life cycles;
5. e) Right to clean air and live without contamination (Pacheco, 2014).

The concept of *vivir bien* – living well with oneself, living well with the community and living well with nature - is an essential piece in this cosmovision and set of rights.

Sources: IPBES, 2018. The regional assessment report on biodiversity and ecosystem services for the Americas, p. 547. Based on Pacheco, D. (2014). Living-Well in Harmony and Balance with Mother Earth. La Paz: Universidad de la Cordillera.

The conflict centred on government proposals to build a road through an Indigenous territory, the Isiboro Sécure National Park and Indigenous Territory (TIPNIS). The government wanted to increase the presence of the state in an isolated part of the country in the Amazon region, where large landholders had concentrated economic and political power, and foreign companies were illegally exploiting the region's natural resources. In addition, the road would have linked the Pando and Beni departments with the rest of the country, facilitating commerce, work and access to health.

However, the plan was opposed by lowland Indigenous peoples, organized under CIDOB, who set out on a protest march from Beni to La Paz, but were cut short in Chaparina when members of the armed forces violently dispersed the marchers.[43] Subsequently, a law was passed in 2011 banning building any road through the TIPNIS; however, this was overturned in 2017.

The TIPNIS incident exacerbated existing tensions between several Indigenous and social organizations supporting the government, resulting in some of them (CIDOB

43 Delgado A.C., 2017. The Tipnis Conflict in Bolivia. Scielo, Contexto 39(2).

and CONAMAQ) withdrawing from the Unity Pact, which had brought the MAS to power, while others (such as CSUTCB, CSCIB[44] and Bartolina Sisa) maintained their organic support for the MAS process. Some analysts saw the divisions as in part reflecting different perceptions of land ownership by Indigenous populations in the highlands and lowlands: the former defined more by individual ownership and exploitation of land, and the latter who see land as being held and managed collectively, and providing the key to their collective identity from a communal perspective.[45]

Critics of the Morales government argued that after TIPNIS, the government gave priority to some sectors of its support base (highland farmers, coca farmers and *interculturales*) to the detriment of more marginalised, lowland Indigenous communities. Organizations operating in parallel to Indigenous organizations like CIDOB and CONAMAQ were formed that were supportive of the government.[46] Critics also say that the government's former commitment to climate change, environmental protection and Indigenous rights became subordinate to national development plans.

Typical of criticism from environmentalists was the response to a speech by Evo Morales to the UN General Assembly on 24 September 2019, in which he called for action to combat climate change and to protect Mother Earth.[47] The environmentalists listed ten government actions and policies in recent years that they said destroy nature, including:

- the building of roads through protected areas like TIPNIS
- the expansion of the agricultural frontier, laws allowing forest clearance, and settlements in protected territories (see section 4)
- mining and hydrocarbon exploration in protected areas
- hydroelectric projects such as el Bala, Chepete and Rositas
- the approval of ethanol, biodiesel and GM soya projects without proper studies.

Many of these concerns are shared by Oxfam's partner, the Platform of Social Organizations against Climate Change, and are described in the Oxfam 2009 report.[48] They speak of a 'double narrative' on climate change and the environment; one aimed at the international community and the other rooted in the reality of its policies inside the country.

Their concerns also include the lack of legal protection for lowland Indigenous communities.

Data from INRA show that by 2016, the widespread land titling programme pursued by the MAS government had resulted both in a shift towards benefitting small-scale farming communities and small property holders, but also in a growth in the amount of Indigenous lands known as TCOs (Original Community Lands, now known as TIOCS) to 23 million

44 44 The CSCIB represented the 'interculturales', who are defined as Aymaras, Quechuas, Chimanes and other original peoples, who have emigrated from the highlands of the Andes to subtropical areas to seek a better life. Many travelled to urban areas in search of work.

45 Crabtree J. and Chaplin A., 2013. *Bolivia: Processes of Change,* London: Zed Books, pp. 16-35.

46 Delgado. Ibid.

47 https://www.lostiempos.com/actualidad/pais/20190925/evo-pide-defender-madre-tierra-pero-impulsa-10-acciones-que-destruyen

48 Oxfam, 2009. Ibid, pp. 53-55.

hectares (13 million in the highlands and 10 million in the lowlands).

However, despite these advances, of 33 claims for territorial self-government by lowland Indigenous groups made between 2009 and 2019, only three were approved by the Morales government.[49] Studies suggest that despite these claims being started several years ago, the new laws enacted by the government made the process complex and cumbersome. The Monkoxi, for example, have been waiting since 2009.[50]

Many of the lowland Indigenous groups supported the MAS government in its early years but lost faith, particularly after TIPNIS. Leaders of the Guarayos, an Indigenous group of about 20,000 people who live in the Santa Cruz department on the border with Beni, were some of these. A study of the Guarayos concluded that 'Despite its promises on protecting nature and the Indigenous peoples, the government weakened the Guarayos' (...) governance capacity through failure of forest law enforcement, prioritization of extraction industries and export-oriented agriculture, and support for land titling of external entities.'[51]

Oxfam's priority is to work with organizations like the Coordinating Body of the Ethnic Peoples of Santa Cruz (CPESC) and other sectors of civil society to ensure that Indigenous land rights remain high up the political agenda, and that they find or recover effective ways to organize to put pressure on new local, regional and national authorities to pursue policies that do not threaten their livelihoods and environment. (See Section 7)

49 Inturias M., et al. (editores), 2019. Territorios, justicias y autonomías: un diálogo desde los gobiernos autónomos indígenas de Bolivia. Instituto de Investigación Científica Social (IICS), la Universidad NUR, p. 15.

50 https://theconversation.com/bolivia-contribution-of-indigenous-people-to-fighting-climate-change-is-hanging-by-a-thread-129399

51 He Y. et al, 2017. Guardians of the Forests: How Should an Indigenous Community in Eastern Bolivia Defend Their Land and Forests under Increasing Political and Economic Pressures? *Case Studies in the Environment,* November. University of California Press.

3.
THE HIGHLANDS, 'WATER IS LIFE'

3.1 INTRODUCTION

In Oxfam International's 2009 report, the fate of Bolivia's glaciers loomed large. As the report emphasised, Bolivia is home to around 20% of the world's tropical glaciers, which were, and are, retreating at an alarming rate due mainly to warmer near-surface air temperatures. The iconic Chacaltaya glacier near La Paz, which for several years was a famous high-altitude ski run attracting extreme skiers from all around the world, disappeared in 2009. But more importantly, cities like La Paz and El Alto were seen as being particularly vulnerable to glacial retreat, as a significant amount of their drinking water comes from glaciers in the Tuni-Condoriri basin, which lost between 44% and 55% of their surface area between 1956 and 2006. Moreover, thousands of poor Andean farmers are dependent on glacial melt for some of their water supply to irrigate their crops.

At international fora, Evo Morales and his government representatives at the time were quick to highlight the fate of the glaciers as an illustration of Bolivia's climate vulnerability and the need for urgent international action. For example, Morales told thousands of delegates assembled at the World People's Conference on Climate Change and the Rights of Mother Earth in Cochabamba in April 2010, that a 2°C target for increased global temperatures was too high as it would mean 'the end of the Andean glaciers'.

In July 2009, a team of Oxfam researchers visited the small Aymara community of Khapi about 50 km from La Paz, tucked under the imposing Illimani, at an altitude of over 3,300 msl. There, the villagers spoke of the unpredictability of the rainfall, the warmer temperatures and the retreating Illimani glacier, which they feared would disrupt the water supply for their crops in the long term. Some of the villagers, including Alivio Aruquipa pictured below, later took their case to international fora, accusing the high CO2-producing industrial nations of violating their human rights.

So what has happened since 2009?

- First, a number of comprehensive studies, many reliant on high resolution satellite imagery, have been published giving a much more detailed understanding of many aspects of the extent of glacial melt and its impacts on poor Bolivians, the economy and the environment, although important uncertainties remain.

- Secondly, from November 2016 to January 2017 Bolivia suffered what was widely described as its worst drought in 25 years, affecting seven of the country's major cities and forcing the government to declare a state of emergency. There were multiple causes of the drought, but climate change – and specifically the

lack of glacial run-off into the reservoirs feeding La Paz – was cited as being a stress multiplier, i.e. worsening the effect of the drought.

- Thirdly, the situation for the villagers of Khapi has remained arduous and, according to testimonies from some of the villagers, has worsened over the last ten years. They speak of the higher temperatures causing plagues and diseases to affect their crops and prompting the greater use of strong, chemical pesticides; unpredictable rainfall and water availability; more migration away from their villages; and their own eyewitness accounts of the further retreat of the Illimani and Mururata glaciers.

3.2 WATER STRESS

Box 3.1 summarises the recent reports from international organizations and from Bolivian and international scientists published in academic journals, which have highlighted the continuing glacial retreat. This represents an array of current and potential threats for large numbers of (poor) Bolivians.

Bolivia is one of Latin America's hotspots of water stress because of its semiarid climate and marked seasonality. Traditionally, the dry season extends for five to six months from May to October, and the rainy season from November to April, although these divisions are becoming more variable. With limited water storage capacity in the small upland catchment flows, glacier meltwater has so far acted as an important buffer mechanism during the dry season for many poor Andean communities.[52]

The contribution of glacial melt to human water use is particularly important to La Paz and El Alto, which have a combined population of well over 2 million. In a normal year, the annual average contribution from glaciers is around 15% of the total water supply to these cities but this can rise to a monthly maximum of over 60%. In a drought year, the annual average contribution rises by a small amount to 16% whereas the monthly maximum rises to 86%. Only Huaraz in Peru has a higher dependence on glacial melt (Quito and Lima are much lower). [53]

It is estimated that in a normal year around 230,000 Bolivians living at high altitude, either in cities or rural areas receive over 25% of their water for domestic use from glacial melt in an average month; this rises to 1.5 million in the maximum month. The poor in the rural highlands are particularly vulnerable to glacial melt, because of the arid climate, the frequent occurrence of droughts, low water storage capacity and low groundwater availability.

Around 100,000 rural Bolivians consume surface water with over 50% glacial melt for at least one month a year, in a normal year, and rely partly on such water for agricultural production. They are typically small low-income communities, with limited capacity for adaptation.[54] The importance of glacial loss on the cultural-spiritual values of local Andean communities is also significant.[55]

Population growth (estimated to be around 1.5% annually), urbanisation and demands for water from agriculture, mining, energy and electricity are likely to put more pressure on water supplies than climate-induced changes.

52 UNESCO, 2018. Ibid.

53 Soruco et al., 2015, Buytaert et al., 2017.

54 Buytaert et al., 2017; Buytaert, personal communication with author; figures are all estimates with ranges of uncertainty.

55 Kaenzig R., 2015. Can glacial retreat lead to migration? A critical discussion of the impact of glacier shrinkage upon population mobility in the Bolivian Andes. Population and Environment 36:480–496.

BOX 3.1 GLACIAL MELT IN THE ANDES

In general, glaciers throughout the Andes are among the fastest shrinking in the world, and among the largest contributors to sea level rise. The Outer Tropics, where the Bolivian glaciers are located, have one of the fastest rates of loss in the Andes at about 42 metres water equivalent every year between 2000 and 2018. This is roughly equivalent to about one gigatonne (Gt) a year – which is one billion (1,000,000,000) tonnes of water, about the weight of over 100 million African elephants.[1] The total surface area of the Bolivian Andes covered by glaciers decreased from about 530 km^2 in 1986 to around 300 km^2 in 2014 – a reduction of 43%.[2]

As the glaciers retreat, there is a temporary increase in melt runoff that eventually reaches a maximum, referred to as 'peak water'. This point is followed by ever-decreasing annual runoff volumes as the glacier continues to lose mass. Downstream, this results in falling river levels and potential drought (if not compensated for by increasing precipitation). Peak water occurs earlier in basins with small glaciers and lower ice cover. Most studies suggest peak water for the Andean glaciers has already occurred or will occur during the next two decades.[3]

Figure 3.1 shows the dependency of many river basins in the (Peruvian and) Bolivian Andes on the contribution from glacial melt. The areas marked in red illustrate the various areas where maximum glacial contribution to river runoff is over 50%:

As glaciers recede, they leave behind lakes typically dammed by debris. Avalanches, rock falls or earthquakes can breach these dams, or cause water to overflow them, resulting in catastrophic floods known as glacial lake outburst floods (GLOFs). 25 glacial lakes across the Bolivian Andes have been identified as potentially dangerous to communities and infrastructure as they could cause devastating floods. If the smallest of these 25 lakes were to drain completely, it would yield a flood with a peak discharge of 600 m^3 per second. The largest could result in a discharge of over 125,000 m^3 of water, about 50 times the volume of an Olympic swimming pool, in a second.[4]

Other research has highlighted the threat higher temperatures may represent for the crucial role that *bofedales* or *páramos* (wetland areas) play as natural water

1 Dussaillant el al., 2019. Two decades of glacier mass loss along the Andes. Nature Geoscience, 12, 802-808.

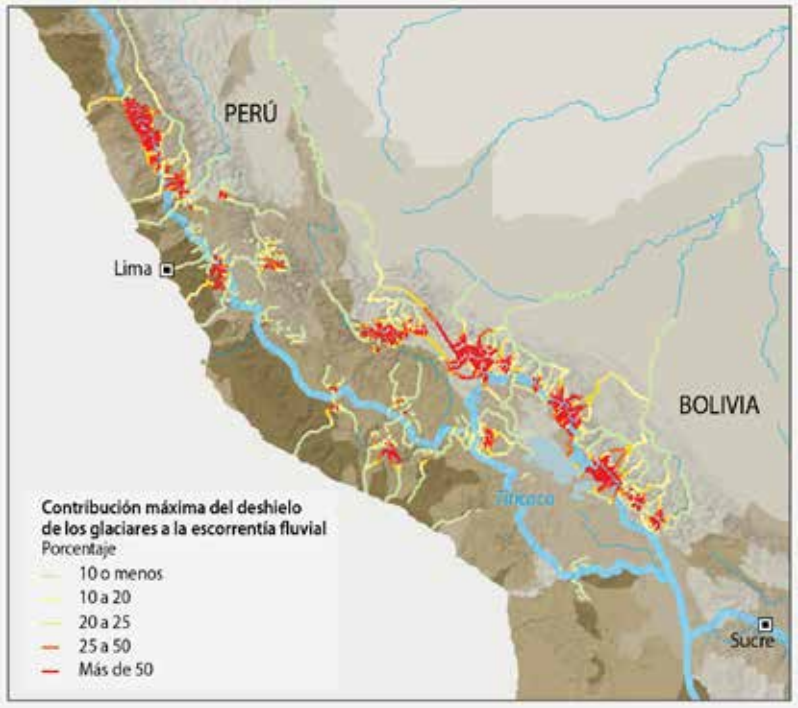
2 Cook, S. J., Kougkoulos, I., Edwards, L. A., Dortch, J. & Hofmann, D., 2016. Glacier change and glacial lake outburst food risk in the Bolivian Andes. Cryosphere 10, pp. 2399–2413.

3 UNESCO, 2018. Ibid.

4 Cook et al., 2016.

storage and regulation systems;[5] the importance of glacial run-off for supplying hydropower schemes such as the Zongo system;[6] and the role that water threats have played in contributing to emigration from some glacial-fed valleys.[7] (See section 3.4)

FIGURE 3.1 MAXIMUM GLACIER MELT CONTRIBUTION TO RIVER RUNOFF IN THE PERUVIAN AND BOLIVIAN ANDES



Source: UNESCO, 2018

Most scenarios predict further glacial mass and surface loss in future decades, with several smaller or lower-lying glaciers very likely to disappear completely. However, precipitation levels in different parts of the Andes are difficult to predict accurately. Higher temperatures may bring a higher volume of rainfall or snowfall in some areas, which would compensate for the loss of water from glacial melt. One projection suggests that should the glaciers disappear completely and there be no changes in precipitation, the total water production for La Paz would decrease by 12% at an annual scale and by 24% during the dry season.[8]

5 UNESCO, 2018. Ibid.

6 Buytaert et al., 2017.

7 Brandt, R., R. Kaenzig and S. Lachmuth, 2016. Migration as a risk management strategy in the context of climate change: Evidence from the Bolivian Andes. In: Global Migration Issues, IOMS (6) [Milan, A., B. Schraven, K. Warner and N. Cascone (eds.)]. Springer International Publishing Ag, Cham, pp. 43-61.

8 Soruco et al., 2015.

Studies have found that projected warming could result in the loss of 95% of the current permafrost in Bolivia by 2050 and 99% by 2099. These predictions include the loss of almost all Bolivian rock glaciers (masses of ice, rock, snow or mud with little visibility of ice on the surface) by 2099, resulting in a significant impact on water security in the country.[9]

Despite the advances in satellite imagery, hydrological modelling and mapping of water use, some uncertainties do persist. Other than future precipitation levels, they include the way cloud cover affects glacier energy balance, the role of aerosols and in particular black carbon deposits on the glaciers, and the role of groundwater and aquifers interacting with glacier meltwater.[10]

9 UNESCO, 2018, quoting Rangecroft, S., Suggitt, A.J., Anderson, K. et al. 2016. Future climate warming and changes to mountain permafrost in the Bolivian Andes. Climatic Change 137, pp. 231–243.

10 Vuille et al., 2018.

However, it is clear that climate change adds urgency to the need for effective adaptation strategies to address water stress and scarcity for thousands of poor Bolivians living in rural communities dependent on glacial run-off for part of their water supplies, and for poor Bolivians living in El Alto and La Paz.[56]

3.3 THE DROUGHT OF 2016–17 AND THE POOR

Bolivia's worst drought for 25 years took place between November 2016 and February 2017. A state of emergency was declared on 21 November after over half of Bolivia's 339 municipalities declared their own emergencies related to the drought. Official estimates suggested that the drought affected 125,000 families, 290,000 hectares of agricultural land and 360,000 heads of cattle. Water rationing was used in La Paz, which affected 80,000 people. In all, seven of the country's major cities were affected. The drought sparked conflicts between miners and farmers over the use of aquifers in rural areas.

Media reports suggest that the causes of the drought were multiple, including the El Niño weather cycle and climate change.[57] In particular, the drought was exacerbated by the rapid retreat of Bolivia's glaciers and historically warmer temperatures at high altitudes. For example, at the height of the drought, the three main dams (Inkachaka, Ajunkota and Hampaturi) that supply drinking water to over 30% of the population in the city of La Paz had almost run dry. The Inkachaka dam was operating at 5% of its capacity in November, and the Ajunkota dam at just 1%.

According to Monica Ayala, a water specialist in La Paz, the impact of the drought was aggravated by poor water management (corruption and mismanagement in the water

56 Vuille et al., 2018; IPCC, 2019.

57 https://www.theguardian.com/global-development/2016/nov/25/bolivia-drought-water-rationing-crops; https://phys.org/news/2019-09-snowcaps-world-highest-capital.html

distribution companies and cooperatives, leaking pipes, and illegal connections).[58] Rapid population growth in urban areas, and the impact of large-scale agriculture and mining projects, which environmental groups said diverted water supplies and contaminated lakes and other water sources, also put pressure on water supplies.[59]

Lower income groups living in urban areas were among the worst affected. Even though La Paz's better-off neighbourhoods in the south of the city also suffered shortages, poorer sectors could not afford bottled water and were dependent on queuing for long periods for water from trucks. Taps ran dry for three weeks in the poorer neighbourhoods of southern Sucre.

The drought hit the poor in rural areas the most. Many small holders growing quinoa in southern highland areas were especially affected as half of the 2016 crop was lost. Indigenous communities were particularly hard hit from as far apart as Oruro, where highland Indians lost their potatoes, quinoa crops, and llamas to the drought; Santa Cruz, where the Chiquitano people saw the loss of rice, maize, and cassava crops; and Chuquisaca, where in some Guarani communities, hundreds of cattle died from hunger and thirst.[60]

According to EPSAS, the water company in charge of eight municipalities in the La Paz department, the government has spent over US$60 million on constructing four water reservoirs and supply systems from the

View of the Ajuankota water reserve, which supplies water to La Paz, during the drought of 2016 at 1% capacity. Photo: Aizar Raldes / AFP

58 http://www.academicstar.us/UploadFile/Picture/2020-2/202022115857201.pdf; https://www.theguardian.com/global-development/2016/nov/25/bolivia-drought-water-rationing-crops

59 https://uk.reuters.com/article/uk-bolivia-drought/mining-projects-big-plantations-mean-bolivias-drought-hurts-more-campaigners-idUKKBN13N26S

60 https://news.mongabay.com/2016/10/strongest-drought-in-25-years-hits-bolivia/

Photo: Courtesy of *La Palabra de Beni (reproduced in mongabay.com)*

lagoons of the surrounding Andean highlands to reduce the risk of further adverse impacts from droughts in the future.

However, some experts are sceptical as to whether such measures are sufficient. Patricia Urquieta, an urban planning specialist at the Universidad Mayor de San Andres, told the AFP news agency that despite the hardships it brought, the drought did not lead to an increased collective awareness of the need to manage water resources.[61] Urquieta said that once water restrictions were lifted, the awareness of the need to preserve water fizzled out.

3.4 KHAPI AND SURROUNDING COMMUNITIES

Since the visit by Oxfam's researchers in 2009, more is now known about Khapi and other communities in the upper basin of the River Sajhuaja, tucked under Illimani and the Mururata glacier in the town of Palca. This is largely due to research carried out by Oxfam's then partner, Agua Sustentable. According to a detailed study published by them in 2013,[62] the (then) 1,500 inhabitants of the nine communities in this area (including Khapi, Cebollullo and Tahuapalca) were suffering from climate stress due to warmer temperatures of about 2°C between 1976-1980 and 2005-2009; the reduction in the surface area of Mururata and Illimani glaciers by about 20% in the 50 years leading up to 2009; changes in the temporal distribution of rainfall; stronger winds and more extreme cold spells and hail storms; and an increase in the presence of blights affecting crops.

According to the same study, members of the community were particularly vulnerable due to their low adaptive capacity shaped by their lack or low levels of economic resources, technology, information, appropriate skills, infrastructure and equity. In particular, the researchers pointed to the (then) average income levels of around US$650 per capita a year with around half of the communities in the municipality of Palca living in extreme poverty.

61 https://phys.org/news/2019-09-snowcaps-world-highest-capital.html

62 Agua Sustentable, 2013. Estrategia de adaptación a los efectos del cambio climático y global en comunidades de la microcuenca del Rio Sajhuaya. La Paz.

Gender inequality in the communities was particularly relevant to understanding why women, and particularly Indigenous women, were historically very vulnerable to climate change and restricted in their capacity for adaptation. This was in part due to women's close connection with water in many of their daily agricultural activities (planting, irrigating and selling crops) and their daily household chores such as washing, cooking and cleaning. Differences in levels of education (according to one study published in 2010,[63] only around 8% of women in the communities finished secondary education, compared to 27% for men), access to information and resources, and property rights were also important. Table 3.1 summarises the different types of vulnerability of women, although in some categories the situation has improved in recent years. For example, the 2006 Law 3545 on the community redirection of the Agrarian Reform guaranteed women's participation in land distribution and titling. According to INRA, in 1993 around 10% of land titles were issued to women, and 90% to men; by 2016, the figure for women had risen to 46% of all titles.

Agua Sustentable's 2013 study also pointed out how the rising temperatures had partly facilitated the increase in small-scale commercial agricultural activity in some communities, as it facilitated the production of crops, such as lettuces, tomatoes, maize and potatoes, to be sold in markets in La Paz. Lettuce was the most profitable crop at that time.

Studies done in the communities around Illimani have mapped in detail the perceptions

TABLE 3.1 MATRIX SHOWING WOMEN'S VULNERABILITY TO CLIMATE EVENTS

Exposure (climate events)	Local sensitivities	Capacity for Adaptation	Capacity for Adaptation	Capacity for Adaptation
		Rights: recognised and executed	Collective Vulnerability	Individual Vulnerability
Heatwaves and plagues of insects	Women as main guarantors of food security within the family	Land distribution rights privileging men	Little presence of women in community decisions	Limitations in educational opportunities; high levels of school absence; little capacity to manage technical knowledge
Changes in rainy season; drought	High dependence for food security on natural resources, particularly water	Little capacity for decision-making	Little understanding of climate change	High incidence of premature pregnancy; risky births
Hailstorms, frosts, land evaporation	Work load of women (productive and reproductive activities)	Rights subordinated to established general roles	Little capacity to think through strategies of adaptation to climate change	Domestic violence

Source: Agua Sustentable, 2013, quoting Ríos F., 'Informe Proyecto Illimani', 2010.

63 Garcia M., y Taboada C., 2010. Informe Proyecto Illimani, 'Vulnerabilidad y adaptación al cambio climático en comunidades de la cuenca del río Sajhuaya.' La Paz, Bolivia.

of villagers as to the main drivers of migration away from these communities. As one study concluded, based on over 50 interviews with villagers and experts, 'climate' (often seen as the unpredictability of extreme events) and 'water availability' were two of the four perceived factors found to be predominant in the decision to migrate. The other two were 'farming plot size' and 'education' (the desire of the younger generation to undertake longer and more specialised studies).[64]

Another study[65] concluded, on the basis of interviews with 68 respondents in the municipality of Palca, that migration was a 'traditional strategy to increase income and manage livelihood risks under rising economic pressures, scarcity of land, insufficient local off-farm work opportunities, and low agricultural productivity'. However, climatic variability and water scarcity, which have increased because of climate change, have played roles as additional stress factors for agricultural production. In general, the researchers concluded, environmental factors (such as climate change) were not independent drivers of migration, but combined with other social and economic factors. In other words, climate change exacerbates existing pressures that push or pull poor Bolivians from their homes.

During Oxfam's visit in early 2020, testimonies from villagers in Tahuapalca, Cebollullo and Khapi strongly suggest that the difficulties caused by the changing weather and unpredictable rainfall, extreme events like hailstorms, hotter temperatures and crop blights, were indeed among the factors that had led to more migration since our last visit. For example, community leader Bernabe Bilvao from Khapi estimated that in the early 1990s about 70 families lived in Khapi, but over half had left and the number had dwindled to 25 families. He said that the crops just do not produce in the same way, prices are low, and more expensive pesticides are needed to kill the bugs.

It seemed indicative of the trend that of the four villagers from Khapi to appear in photographs in the Oxfam 2009 report, only one still lived in Khapi (at an old age) - the three others had left the village for La Paz or El Alto. A similar story was related by Alivio Aruquipa, who added that young people in particular had left his community in Khapi. (See testimony)

More migration, in part caused by changing weather, was one of two newer observations made by our interviewees in 2020 compared to 2009. The other was the greater need to use more (expensive) chemical pesticides to combat pests more prevalent in their crops because of higher temperatures. As Hortensia Márquez, a community leader from Cebollullo explained, the bugs got into the lettuces and stopped them from forming a good head. (See testimony)

Alivio Aruquipa pointed out that the warmer temperatures meant that peaches could now be grown at higher altitudes, including in his village of Khapi, whereas previously it was only possible in lower-lying communities. 15 years ago when he started being able to grow peach trees, the fruit was often bitter, but now it was sweeter due to the higher temperatures. However, more insects have arrived with the warmer weather and eat the fruit.

However, it is important to stress that many of the villagers also spoke of similar developments to those described in 2009, and in some cases their becoming worse. Faustino

64 Kaenzig, 2015. Ibid.

65 Brandt et al., 2016. Ibid.

Cochi from Tahuapalca said the weather was 'even hotter' than ten years ago, while Hortensia Márquez said she no longer had to sleep under a blanket on some nights. All of the interviewees spoke too of the continuing unpredictability of the rains in terms of timing and volume, and talked about various water storage options and irrigation channels either completed or initiated by their communities as a way of countering this.

Finally, the villagers had the impression that the Illimani glacier, which they recognise as their practical and spiritual source of support, had retreated further up the mountain in the last ten years, leaving more of the mountain sides *pelado* or 'pealed' of its whiteness. Hortensia Márquez spoke of her community's shock at the gradual disappearance of the glacier. Alivio Aruquipa described movingly how his teacher used to take him up to the nearby glacier to collect chunks of ice, and then sledge down the glacier. 'Now, children cannot do that,' he says, 'It's too far up the mountain to reach the glacier, and it's all rock and holes. It's too dangerous.'

TESTIMONY OF ALIVIO ARUQUIPA, RESIDENT OF KHAPI

CHANGES IN THE WEATHER IN THE LAST TEN YEARS

Actually nothing has changed in these last 10 years. If anything it's got worse. For example, there are sudden hailstorms and frost. Frost that always used to come in June, July, suddenly comes in November, at New Year, in February, and when there's a lot of rain; in the rainy season, we're getting unusual frosts. The climate is changing.

There are times when it pours down. It didn't use to rain like this. There are landslides, rivers bursting their banks, all these types of problems, as well as plagues of insects.

In the past, it would begin to rain at the end of the year, January, February, March, until the end of April more or less. Now, it rains any month. This year, for example, it began to rain in August, June perhaps, but not continually. And now in the rainy season it's dry with only small amounts of rain and brief cloudy periods. There are some days when it's completely sunny, which we would normally expect in winter.

Alivio Aruquipa with his peach trees. Credit: Paula Pacheco M.

It just rains at any time of the year. There used to be a rainy season, the winter season, now that's not the case.

FUMIGATION OF CROPS

We have to constantly fumigate the crops. There isn't any crop that doesn't need fumigating. We have to fumigate constantly, lettuce, all the vegetables, using chemical pesticides.

This is due to global warming. The temperature has increased and with this, plagues of insects have arrived. High up here it used to be a bit colder and so we didn't use pesticides, we didn't have infestations. Just like that, infestations have arrived, the climate has changed and plagues have arrived. Now we have to learn from the communities living at lower altitudes, how they fumigate all the time.

Before, it wasn't necessary to fumigate. We planted seeds and grew healthy products. Now everything is affected by bugs.

We have to fumigate the potato crop constantly, and the maize as well; now there are little worms and insects that climb up the stalks. We have to fumigate the maize to get a good yield.

ILLIMANI

About 10 or 20 years ago Illimani's glaciers used to melt in the months of August, September, October – but now the melt happens in this season, in February and March. It seems that it's warmer and you can see water, a lot of water, coming down off the mountain. Before, this seasonal melt happened in August; a considerable amount of water came down in August, September and October. And as we didn't have well-made drainage ditches, we couldn't collect this water, so we used to lose a lot of water. It would run off and we would lose it. Now we have good ditches so we can collect and use the water. We're making the most of this. This has also changed. Before it was only from August we would collect water, now in any season, even the rainy season, it's warmer and so there's glacier meltwater we can use.

Illimani is losing more ice all the time, the ice is retreating higher up the mountain. For example, when I was a boy, there was a lot of ice much lower down. When we were children, our teacher would take us up high to the glacier and we would break off a few pieces of ice.

Before, as children we would go up with our sledges. Now children can't go up because the ice recedes every year and instead of ice, it's mainly rock and it's dangerous to play on. Now you can't go up. But we used to do this, take pieces of ice, come back down with the ice, play on our sledges. But now it's impossible.

It's really clear to see; before it was full of ice, now it's just rock, Illimani is just earth and rocks, it didn't used to be like that. What can I say? It used to be all wrapped up, like in a coat of ice.

MIGRATION TO LA PAZ/EL ALTO

Recently a lot of people have been migrating to the city, mainly because of a lack of water here. And also because of the plagues of insects that have appeared recently. People in the countryside have to buy insecticides and these are expensive. It doesn't work out economically. The cheap products we need are in the city as well and it doesn't make economic sense to grow crops, for example last year's crops, like maize, were very cheap.

More or less 30 people are left in this community; no one else comes back to the community. There were around 60 of us, but more than half have migrated to the city.

More than anything, the young people haven't returned, the things they want aren't really in the countryside. It doesn't suit them to live here.

TESTIMONY OF HORTENSIA MÁRQUEZ, RESIDENT OF CEBOLLULLO

Question: Have things got very difficult due to the plague of insects?
Answer: Yes, the plagues have been arriving in the last few days. It's worse, yes.

Q: Why are they coming now?
A: Because of the changing climate.

Q: You can tell that the climate is changing?
A: You can tell that it's hotter now. It wasn't as hot before.

Q: When you say 'before', how many years ago do you mean?
A: Five years ago. Yes, before we would produce big lettuces, big cabbages and now we don't produce these. We don't grow lettuces here anymore, not even one because of the insects. We don't grow lettuces because the plagues of insects eat them. They were beginning to rot. There isn't any point because they were going bad.

Q: They were going bad because of the lack of rain or because of the plagues of insects?
A: No, because of the heat and the plagues – those little bugs get in the crops and the roots begin to rot. So the lettuce heads don't grow and they turn yellow.


Hortensia Márquez on her plot. Credit: Paula Pacheco M.

Q: They turn yellow?
A: Yes, the roots rot, they leave little holes and the lettuces fall over

Q: What do you have to do to control the plagues that arrive? What can you do?
A: We grow chives. They are more resistant.

Q: To the insects?
A: Yes, the insects and the heat affected the lettuces as well, one by one they were dying. Look here!

Q: Do you have to use pesticides?
A: Yes, and ever stronger pesticides as well.

Q: Where did you get them from?
A: There are some technical people who arrived from *Samaritano* and they are teaching us how to make homemade pesticides.

Q: And in general, is it getting hotter here?
A: Yes, it's hotter, you can tell. At night it's much hotter. Before we had to sleep with lots of blankets and now we don't.

Q: Can you see Illimani from here?
A: Yes, we are neighbours with Illimani.

Q: Have you noticed any changes in Illimani? What type of changes?
A: Yes, before it was full of vegetation, now it's... if it wasn't covered in cloud, it would look bare. Before it wasn't like this.

Q: Can you tell that in the last ten years it's lost a lot of white from the mountain or was it always like that?
A: Yes, it used to be whiter. Those clear areas weren't there, now they are becoming clearer, and that scares us as well. All the water around here is from Illimani. If there is running water around here, it's from Illimani, all of it. All of us here are made from the waters of Illimani.

Q: What's the relationship between the community and Illimani? Do you have a special relationship with the mountain?
A: Culturally, yes. We carry out ceremonies so that the water comes down. So that Pachamama (Mother Earth) sends us water.

Q: When do you do this?
A: In August we have ceremonies.

Q: How do you see the future if the ice from Illimani is slowly disappearing?
A: It makes me sad for our children. I don't know what we're going to do. We are going to have to dig water catchments.

Q: To contain the water?
A: Yes, to store water. I don't know. That's what we're thinking. There isn't another way. If there isn't any water, how can we live?

Foto: Observatorio Bosque Seco Chiquitano

4. THE LOWLANDS, LOSING UNIQUE FORESTS

4.1 INTRODUCTION

The 2009 Oxfam report highlighted Bolivia's increasing rates of deforestation, largely caused by the expansion of soya and cattle production and timber extraction in the departments of Santa Cruz and Beni. The report pointed out that deforestation was not only Bolivia's highest contribution to greenhouse gas emissions (at around 80% of the country's total[66]) but also increased the devastation caused by flooding in some parts of the country as natural forms of protection were being removed.

The report warned that forest fires could become more extensive and indeed, the situation has worsened since 2009. Bolivia has experienced its two worst years of forest fires ever – in 2010 it lost 2.9 million hectares, and 3.9 million hectares in 2019 in the department of Santa Cruz alone. (See Figure 4.1)

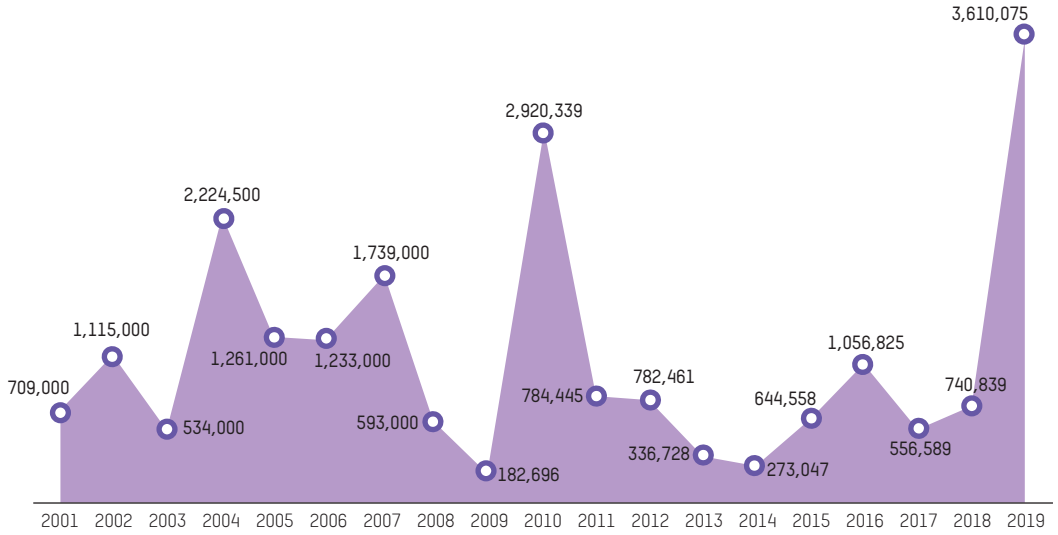
The widespread fires which occurred mostly in the Santa Cruz and Beni department between August and September 2019 attracted considerable national and international attention and political controversy as to their causes. Detailed reports by various NGOs and Oxfam partners (particularly FCBC, CIPCA and Fundación Tierra) have documented and analysed the widespread destruction. We now know that:[67]

- A total of over 5 million hectares of forested areas were burnt. (See Map 4.1) 10% of Bolivia's total forested area was destroyed in just two months.
- Although direct loss of life as a result of the fires was low (due to low population density), mostly affecting volunteer firefighters, the level of human and animal suffering and material loss was widespread and sustained. (See Box 4.1) In particular, many communities were affected by smoke-related illnesses and water shortages.
- In the municipality of San Ignacio de Velasco alone, 132 communities were affected (equivalent to about 35,000 people). In its relief work, Oxfam found that in more remote areas, it was often the women who had been left to look after their properties as the men were volunteering as fire fighters.

66 This figure does not include forest regeneration. Andersen LE et al., 2016. Net Carbon Emissions from Deforestation in Bolivia during 1990-2000 and 2000-2010: Results from a Carbon Bookkeeping Model. PLoS One, 11(3): e0151241.

67 Sources: Anívarro R. et al. (2019), Diagnóstico por teledetección de áreas quemadas en la Chiquitania. Informe técnico del Observatorio Bosque Seco Chiquitano, Fundación para la Conservación del Bosque Chiquitano, Santa Cruz; Tierra (2019) Fuego en Santa Cruz: balance de los incendios forestales 2019 y su relación con la tenencia de la tierra, La Paz; Science (2019), 'Fires scorching Bolivia's Chiquitano forest', 36 (6469), 29 November; researcher interviews; various reports in mongabay.com

FIGURE 4.1 FOREST FIRES AND THEIR EFFECTS – AREA LOST (IN HECTARES), 2001-2019 (SANTA CRUZ DEPARTMENT)



Source: Observatorio, Bosque Seco Chiquitano; FCBC; ECCOS

- An estimated 4,000 plant species and 1,600 animal species were affected by the fires. Estimates vary hugely, but between 2 million and 18 million wild animals may have been killed, including several hundred jaguars.
- One of the worst affected regions was Chiquitania in the Santa Cruz department, considered to be the world's best-preserved tropical dry forest and one that is very rich in biodiversity.[68] It lost 1.4 million hectares, about 12% of its forest area before the fires.
- The Chiquitano Dry Forest is estimated to contain 36 different ecosystems, with a wide variety of forests, savanna, vegetation and wetlands. 1.3 million hectares in 33 of these 36 ecosystems were affected, some burnt for the first time since records began.
- Nearly 3 million hectares of potential habitat of the jaguar (*panthera onca*), the largest predator in the region, were affected by the fires, as were 800,000 hectares of corridors between protected areas that help to protect panther populations.
- The fire in Chiquitania showed the characteristics of a mega-fire or 'sixth generation fire' which is characterised by the formation of pirocumulonimbus, a special type of cloud formation above a wildfire, which can generate fire storms that can easily surpass 100,000 kilowatts of energy. Only two had been observed in South America previously (one in Chile and one in Argentina).

4.2 THE FIRES, PUBLIC POLICY AND CLIMATE CHANGE

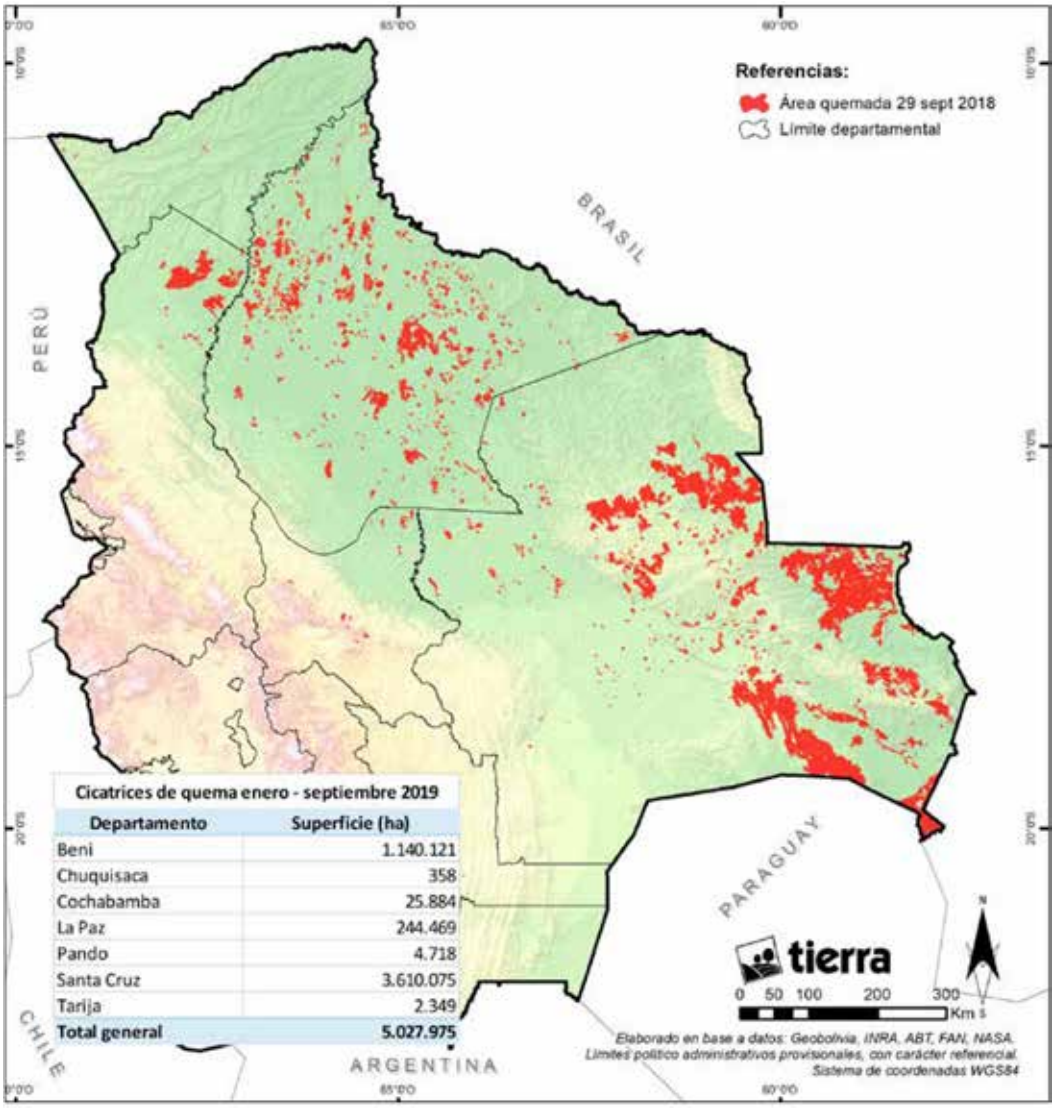
In recent years, Bolivia has been subject to increased levels of deforestation at the national level, even before the mega-fires

68 Vides-Almonacid R., and Justiniano H., Adapting to Change: the State of Conservation of World Heritage Forests in 2011 (UNESCO, 2011), pp. 91-96.

of 2019. The country is considered to be among the top ten countries in the world for tropical forest cover but also ranks amongst those with the highest deforestation rates.[69] Estimates vary due to different methodologies but forest loss every year has been in the range of 290,000 hectares to 450,000 hectares in recent years. One study suggests the rate doubled from 150,000 hectares in 2000 to 300,000 hectares in 2018.[70]

Historically, the main cause of the fires behind much of the deforestation has been the practice of land clearances, known as *chaqueo*. Farmers clear the land in the dry season to grow crops or raise cattle in preparation for the arrival of the rainy season. However, this practice had never led to such extensive burning before. The 2019 mega-fires were doubtlessly exacerbated by exceedingly dry conditions and strong winds fanning the flames. Observers also point to the initially

MAP 4.1 EXTENT OF FOREST FIRES IN BOLIVIA, 2019



Cicatrices de quema enero - septiembre 2019

Departamento	Superficie (ha)
Beni	1.140.121
Chuquisaca	358
Cochabamba	25.884
La Paz	244.469
Pando	4.718
Santa Cruz	3.610.075
Tarija	2.349
Total general	**5.027.975**

Source: Fundación Tierra

69 Science, 2019. Ibid.

70 https://www.sdsnbolivia.org/en/deforestacion-e-incendios-forestales-en-bolivia/

slow response of the Morales government, including the rejection of foreign help and the lack of coordination on the ground with local communities, which contributed to the extent of the destruction. The presence of extensive forest fires in neighbouring Brazil, and the slow response of the Bolsonaro government there, may also have played a role.

However, several experts interviewed by Oxfam in early 2020 were unanimous that another essential element for understanding the 2019 fires was a series of political decisions and new legislation to promote exports and the change of land use especially in the lowland areas.

According to CIPCA researchers, some of the key pieces of legislations were:

- 2013-2015: Laws 337/13, 502/14 and 739/15 authorising pardons for illegal deforestation and an extension of the period to remedy any breach.
- 2015: Law 741 expanding from 5 to 20 hectares the area small landowners may deforest for agriculture.
- 2018: Law 1098 allowing the increase of biofuel production and the expansion of land for this purpose.
- 2019 (July): Supreme Decree 3973 permitting more land clearances in the departments of Beni and Santa Cruz for more livestock and agro-export production, and controlling fires by managing fire in those areas.

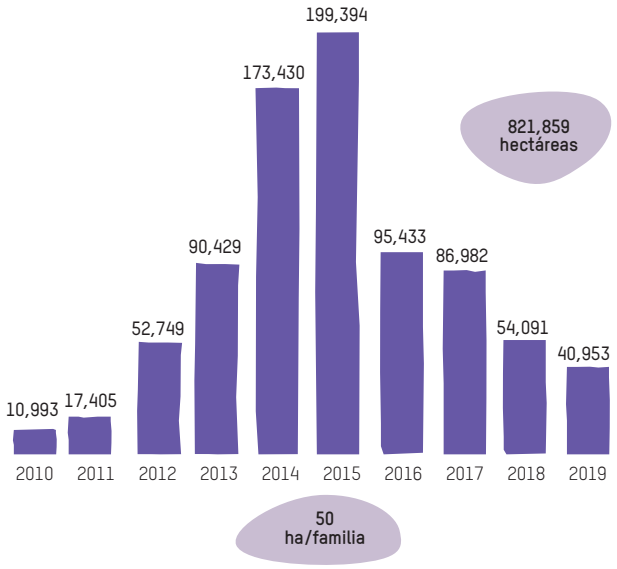
As described in Section 2, some of these laws were seen as being prompted by a desire by the Morales government to provide legal support to increase agro-exports, such as soy and beef, to help diversify the country's production structure concentrated on the export of natural gas, and to gain the political support of some economic sectors in Santa Cruz – historically a source of strong opposition to the government. The agro-export sector undoubtedly benefitted from such legislation but it is also worth bearing in mind that both Law 337 and Law 741 included various elements designed to help smaller producers and communities. Law 741 for example, by increasing the amount of land that could be cleared without financial penalty, was designed to help them with the high costs of clearing land and obtaining the appropriate authorisation from the ABT (which was the same for any size of property).

FCBC researcher Javier Coímbra was one of several interviewees to stress the 'perverse logic' of the current legal incentives to burn down forest areas. To acquire or consolidate property rights, land owners have to show that their property is fulfilling a 'socio-economic function' (known as FES), which is typically proven by the productive activity that is generated on the property such as the presence of crops, livestock, infrastructure and/or forest management via its management plan. The cheapest and easiest way of doing this is to burn down the forested area they want to own, rather than leaving it intact and farming it in a sustainable way.

Another factor, according to some observers interviewed by Oxfam, was the policy of the Morales government to provide land to low-income rural communities and families usually from highland areas outside the Santa Cruz department *(interculturales*). Statistics from the NGO Fundación Tierra show that from 2010 to 2019, more than 700 communities, consisting of over 16,000 people, received parcels of state-owned land in Chiquitania, equivalent to 820,000 hectares, with the authorisation of INRA. (See Figure 4.2)

FIGURE 4.2 THE HANDING OUT OF STATE LAND TO 'INTERCULTURAL COMMUNITIES' IN CHIQUITANIA, 2010-2019

Año	Nº comunidades	Nº beneficiarios
2010	3	140
2011	6	374
2012	30	1,037
2013	31	1,806
2014	65	3,454
2015	98	4,013
2016	65	1,864
2017	80	1,736
2018	40	1,108
2019	31	846
Sin datos	252	0
TOTAL	701	16,378



Source: Tierra/CIPCA

Calculations made by Fundación Tierra based on the identity cards of the beneficiaries suggest that 43% came from the Santa Cruz department (either born there or migrants from other regions registered there), 29% from Cochabamba, and 9% from Potosí.[71]

Critics of the Morales government assert that some of these *interculturales* were responsible for many of the forest fires, as in the words of representatives of the Ayoreo community (see box 4.2), they 'do not know how to burn responsibly' because they come from a different cultural and geographical background, with different agricultural practices and relationships with nature.

Fundación Tierra has carried out an exhaustive study of the areas affected by the fires,[72] and concluded that indeed, the communities that had benefitted from the state authorisation of settlements had a role in some of the fires, particularly in a zone between San José de Chiquitos and Roboré, the protected area of Ñembi Guasu, and to a lesser extent in San Ignacio de Velasco. But the study concluded that the main protagonists were large cattle ranchers found in the areas of the agricultural frontier, particularly in San Ignacio de Velasco and San Matías.

It stressed that the recent legislation leading to the lack of protection for the forests, the cancellation of sanctions for illegal clearing and the authorisation of new settlements had created the incentives for the deforestation carried out by different sectors in 2019. However, in the final analysis, it was large landowners who benefitted most from the process of clearing the Chiquitano and Amazonian forests to turn them into lands for agro-exports.[73]

A final factor, which probably did not attract as much attention, was the role that climate change played as a 'stress or threat multiplier'. Meteorological data have shown that in recent years in the Chiquitania for example,

71 Tierra, 2019, p.69.
72 Tierra, 2019. Ibid.
73 Tierra. Ibid., pp. 77-80.

there has been an increase in the length of the dry season and warmer temperatures, consistent with the climate models suggesting temperature increases for Bolivia's lowland areas between 2000 and 2030 of between 1°C and 2°C; similarly, there was an observed drop of 14% in annual rainfall in Chiquitania between 1980 and 2012.[74] Interviewees also frequently pointed out the lack of rain in the rainy season in recent years, and the lack of predictability as to when it would arrive. (See boxes 4.1 and 4.2)

Moreover, a study carried out by FAN/CIPCA in 2019 of the municipality of Ascensión de Guarayos in Chiquitania (home to around 28,000 people) showed that on average temperatures rose by 0.5°C in the period 2001-2018 compared to the period 1981-2000.[75] Rainfall over the same period dropped by 13%. The largest temperature difference was in September (+1.1°C), and the largest rainfall decrease was in October (-64%). Projecting forward, the study suggests that by 2050, the municipality would suffer an extreme loss of water availability and an extension of the dry season by three months.

Photographs of the drought in 2019 illustrate the background conditions to the fires. As the director of CIPCA Santa Cruz, Sheyla Martínez, told Oxfam, 'in many ways, the story was just as much the drought as the fires'. For example, the accumulation of very dry biomass clearly facilitated the spread of the fires.

In conclusion, we can say that the fires were the result of a combination of factors, which some commentators have described as a 'perfect storm'. As Pamela Rebolledo, the coordinator of the climate change programme for the Santa Cruz department, explained to Oxfam, 'climate change was not the detonator of the fires. They were started deliberately. But climate change created the conditions which made the fire grow to such unmanageable levels. The region was more vulnerable as a result of climate change.'

4.3 THE FIRES, TERRITORY AND INDIGENOUS GROUPS

Oxfam is particularly concerned by the situation facing the lowland Indigenous communities affected by the 2019 fires, and by the continuing uncertainties about their land rights and practices in the future. 34 of the country's 36 recognised Indigenous peoples live in the eastern lowlands; the most numerous are the Chiquitano, Guaraní and Mojeño.

A number of different Indigenous organizations are active at the national, regional and local levels, including CIDOB – the national representative of lowland Indigenous groups – and CPESC in Santa Cruz. According to CPESC leaders, CPESC consists of five different Indigenous peoples, totalling around 20,000 people – the Ayoreo, Yuracaré, Mojeño, Guaraní Izoceño and Guarasué. (See box 4.2) As outlined in section 2, these organizations, and others, have suffered splits during the Morales government years over the degree to which they support the government. Many Indigenous groups and communities became politically divided, creating parallel Indigenous organizations, starved of state resources or attention, and have lost some of their capacity to make policy proposals and put pressure on local, regional and national authorities to have them enacted.

74 Fundación Amigos de la Naturaleza (FAN). 2016. Atlas Socioambiental de las Tierras Bajas y Yungas de Bolivia. Editorial FAN. Santa Cruz de la Sierra, Bolivia.

75 CIPCA/FAN. 2019. Cambio de uso del suelo y sus efectos actuales y futuros en el municipio de Ascensión de Guarayos, Santa Cruz.

Historically, Indigenous groups and communities in the eastern lowlands lived in harmony with the forests and land, rarely taking part in deforestation practices. It is calculated that less than 1% of their lands were deforested.[76] In more recent years, Indigenous communities have faced a series of newer challenges including insecure land tenure, lack of capacity or training, lack of enforcement of forest laws, and state policies that favour extraction industries and export-oriented agriculture.[77] In particular, the pressure on their lands has increased due to the rapid expansion of the agricultural frontier, and the above-mentioned settlement of 'intercultural communities' from outside the lowlands, including on protected areas and Indigenous territory, a policy that gave rise to more conflicts with Indigenous communities.

According to Fundación Tierra, Chiquitania had been in the eye of the storm of land conflicts for at least five years prior to 2019, pitting Indigenous communities, the new settlers, and medium and large-sized landowners against one another.[78] At the beginning of that same year the conflicts attracted media attention, especially a demonstration in March by different groups, including small and medium-sized cattle ranchers, in San Ignacio de Velasco opposing the INRA policy of promoting settlements of mainly intercultural 'outsiders' from the department of Cochabamba and MAS sympathizers on state lands.

The fires undoubtedly made the lives of Indigenous communities even more difficult. Some of the worst fires affected the Indigenous territories known as TCOs or TIOCs. According to official figures, nearly 11% of all the land and forests, equivalent to 387,000 hectares, burnt down during the fires were in TCO/TIOCs, compared to 1,700,000 hectares (47%) on state land and 720,000 hectares (20%) belonging to agricultural enterprises. (See Map 4.2) The worst affected were Monte Verde, Lomerío and Pantanal. Such territories were meant to be legal protection against uncontrolled expansion or settlements, so the reason for the fires there was either uncontrolled fires encroaching from other areas, or in some cases, the illegal presence of outsiders, or deals done between some Indigenous leaders under pressure from commercial logging or agro-export interests.[79]

Ñembi Guasu is one of the most recent Protected Areas to be set up (in 2019) and is mostly situated in the Indigenous First Peoples and Small-Scale Farmers Autonomy (Autonomía Indígena Originaria Campesina – AIOC) of Charagua - Iyambae to the south of Roboré, near the border with Paraguay. It is a conservation area of over a million hectares under the jurisdiction of the Guaraní people, and is also home to one of the last Ayoreo Indigenous groups, a hunter-gatherer people thought to be the last uncontacted group south of the Amazon. Ñembi Guasu lost more than 420,000 hectares to the fires (a third of its territory) which were thought to have originated in state lands situated nearby. The Protected Area is home to several settlements, where fires were started and then got out of control and spread southwards to Charagua. (See Photos) According to Tierra, this is the worst case of an identified connection

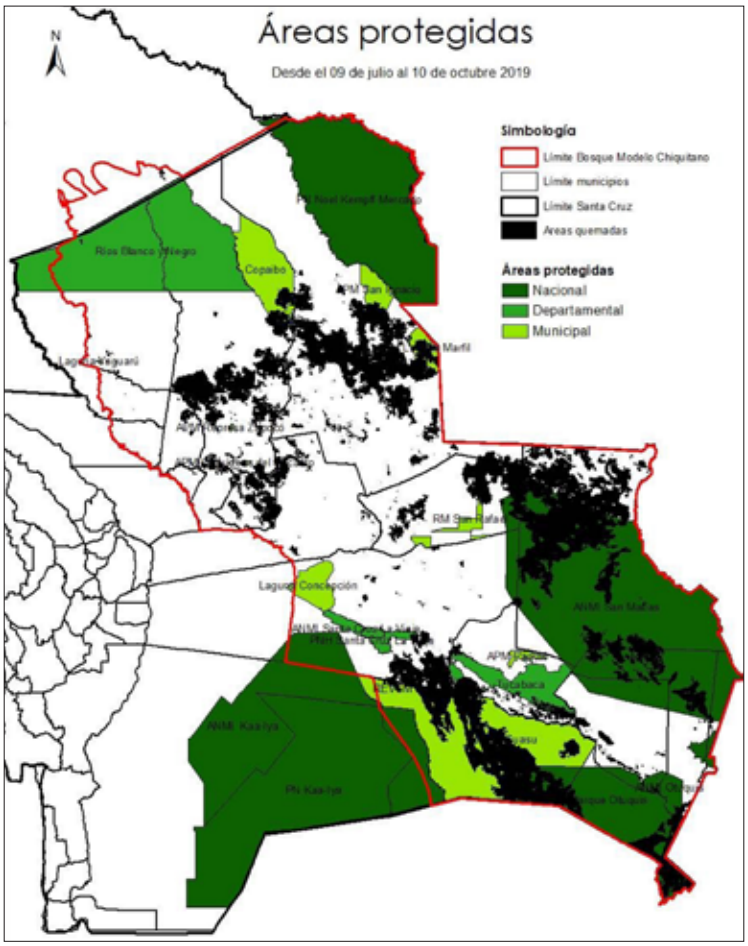
76 Killeen T.J. et al., 2007. Thirty Years of Land-cover Change in Bolivia. AMBIO: A Journal of the Human Environment 36(7), pp. 600-606.

77 Author interviews; and He Y., et al., 2019. Guardians of the Forests: How Should an Indigenous Community in Eastern Bolivia Defend Their Land and Forests under Increasing Political and Economic Pressures? Case Studies in the Environment. University of California Press.

78 Tierra, 2019, Section 1.1.

79 Tierra. Ibid., p. 35.

MAP 4.2 FIRES IN PROTECTED AREAS



Source: Observatorio Bosque Seco Chiquitano

between the settlements and fires on state lands.[80]

The fires in Indigenous territories prompted several Indigenous organizations to coordinate protests in late September to demand that the fires be declared a national emergency and Law 471 and Supreme Decree 3763 repealed.

In early 2020, the new government led by Jeanine Añez announced that it would carry out a review of the Morales government's practice of handing out properties to 'intercultural communities' in Santa Cruz and other departments. However, critics pointed out that there was no talk of changing the legislation that led to the expansion of the agricultural frontier for cattle and exports and the practice of burning.[81] Ruth Alipaz, a representative of CONTIOCAP, asked whether the new government would attend to the long-standing petitions of Indigenous groups to acquire group titles to their land, an issue described in Section 2.3, which she said 'had not been heard during the 14 years of the Morales government or by the current authorities'.

This was one of the pressing issues mentioned by CPESC representatives interviewed by Oxfam. They also complained of corruption or delays in the handing out of relief supplies to Indigenous groups affected by the fires, the lack of consultation with them about applying traditional methods of fire control

80 Tierra. Ibid., p. 31.

81 https://es.mongabay.com/2020/02/bolivia-gobierno-revisa-adjudicacion-irregular-terrenos-chiquitania/

in some of their territories, and the failure to bring them into discussions regarding future polices to avoid a repeat of such terrible fires affecting such a unique area of biodiversity.

The perspectives and policies put forward by Indigenous groups and other entities interviewed by Oxfam are summarised in sections 6 and 7.

BOX 4.1 VOICES FROM THE FIRES

ROBERTO NAVIA GABRIEL, JOURNALIST, QUOTED IN 'CHIQUITANIA EN LLAMAS. ARTE EN LA PLAZA'

The flames were just the tip of the iceberg in terms of the wildfire. There are people who won't ever forget what came out of the fires. They will never forget the animals turned into ghosts, covered in flames, running, lurching, emitting a sound that seemed otherworldly. They will never forget the deer or the pigs, or the armadillos or any other animal without legs that looked like snakes. The beetles and bugs were fleeing and Pablo, who lived in the community of Taperes, wanted to block them out because his wife and children were in a room with windows and a door covered in damp sheets so that the flames wouldn't enter. But the cries of the animals in flames penetrated the gaps and he told his loved ones to cover their ears until everything had passed. But it didn't pass.

At dawn, Pablo saw another horrific scene. With their last breath, the animals that managed to survive made it to the train tracks. The townspeople tried to help them but they all died. Pablo couldn't help the animals survive, but he did help some die. He shot cows and horses to end their suffering. They had horrific burns all over their bodies and it was terrible to see their agony.

VANIA MONTENEGRO, comunidad Peniel, Oxfam testimony

We had reforested the land here by planting about 30 small lemon trees. All of them were consumed in the flames. In another area nearby we had planted others that already had flowers and fruit - all burnt to a cinder. I have six children, and I don't know now how I will look after them. Maybe I will have to grow maize, which gives you a crop the fastest. I have no other option but to keep working. 70 to 80% of this community's land has burnt to the ground. I am not the only one. There are about 11 of us, a small number of families, but really the most hard-working of this community.

GERMAN ANTONIO VEGA VARGAS, member of the Santa Cruz Ethnic Peoples' Organization (CPESC) technical group

We know how to start small fires to clear the land and prepare it for the next crop, because we've been doing that since the time of our ancestors. We start these small fires for subsistence purposes, not to clear the land so we can sell it to other people. We're not large-scale soya farmers or large-scale sorghum farmers.

In the Chiquitanía region, most of those people are illegal settlers in indigenous territories. They don't know anything about controlled fires because it's a different way of working the land. They come from the mountains, where there are no trees and they don't burn the vegetation. That's the difference. They came here and deforested large swathes of land by burning it, and that's why the situation got out of control. The Chiquitano forest is being turned into pampas (grasslands), which is very painful for us as indigenous people to see.

Because of climate change, the rains have become unpredictable. We used to know when the rains would come, when to plant seeds, when to stop, when to start. Now, with climate change, it's raining at times when it didn't before, and we have droughts instead of rain.

BORIS COLOMBARA, COUNCILLOR, San Ignacio de Velasco

We still have many difficulties in my community. We're coming to the end of summer and there's no water. Some communities' wells are dry. Where I live, I'm remaking the *atajado* (catchment pond). There are communities where we are still sharing food. Why? There isn't water for the lands we cultivate, the parts that didn't burn. And because October, November and December have passed, we're at the end of January. These four months, that's the maize cycle. Some are already harvesting maize. But those who lost everything really lost everything. Everything burnt down. People had their pigs, chickens – the ponds they filled with fish all burnt up. It's awful. We still have wells with only about 20 to 30 centimetres of water and we're coming up to the end of the rainy season when they were meant to fill up again. We've been living with severe water shortages for about 10 to 15 years now.

ROSENDO ALPIRI NOMINE

CPESC is made up of five different Indigenous groups – around 20,000 people. These are the Ayoreo people, the Yuracaré, the Mojeño, the Guaraní Izoceño and the Guarasué.The Guarasué are in an especially vulnerable position, they are in danger of extinction and we are working hard to preserve their culture and language, and ensure that they are represented in political spaces as well, and contribute to decisions at a regional level. We are talking about around eight families and there are only a few that speak the language. We are about to lose this language.

The majority of the Indigenous people collect fruit and hunt, food that comes from the forest, our lands, and we manage this in a sustainable way. Indigenous people live by principles and norms passed down from our grandparents and ancestors.

We respect Nature because Nature is part of us and we are part of Nature. That's one of our principles. The forest looks after us; it provides us with food, what we collect. There are a lot of foods, fruits that have been affected by the fire. The motoyoé fruit, for example, only grows in the wild, we don't cultivate it. It has almost all been burned down. It's going to take a lot for Nature to produce fruits again because there are a lot of plants that need around 15 to 20 years to produce fruit.

Photography: Oxfam/Patricio Crooker

5. PANDO – 'ANOTHER WAY IS POSSIBLE'

5.1 INTRODUCTION

Pando is Bolivia's remotest and least populated department, situated in the Amazon region and inhabited mostly by small-scale farming and Indigenous communities that have historically been some of the poorest in the country. In recent years, important political, social and economic changes have been taking place and have added pressure on these communities.

On the one hand, there is a growing presence of oil and mining companies, logging interests (often from neighbouring Brazil), cattle ranching, agro-industrial companies and influxes of settlers from other parts of Bolivia with a very different vision of agricultural production and forest management from that of many Indigenous and small-scale farming families.

On the other hand, Oxfam, CIPCA and other organizations are working with communities in Pando (and other areas in Bolivia's northern Amazon region) to follow a different economic, social and cultural model. This is based on combining traditional small-scale agriculture geared towards supplying basic food items and the sustainable use of forests, at the same time minimising the effects of climate change in the region and conserving the rich biodiversity of the area.[82] Women and young people are very involved in the formulation and execution of some of these new initiatives. As several leaders of communities and organizations involved in these initiatives in Pando told Oxfam, 'we want to protect the forests, not burn them down. Another way *is* possible.'

Pando shares some of the characteristics of other parts of Bolivia's Amazon region but in other ways, it is different:

- Despite the dominant economic model of agro-extraction and the expansion of the agricultural frontier, deforestation rates in Pando are not as critical as in other departments. Pando is estimated to have lost about 6% of its forested area, equivalent to about 67,000 hectares, but deforestation is highly concentrated in some areas, particularly around Cobija.

- As Chart 4.2 shows, about 4,000 hectares were lost to forest fires in Pando in 2019. According to Luis Méndez, secretary of the APMT for the departmental government of Pando, the low level of fires was due to the mobilisation of local forces to put them out; and in general, he told Oxfam, the low

82 CLARA network, 2019. Agroforestry Systems in the Bolivian Amazon; A way of life.

Foto: José Marcelo Arandia

deforestation rate was in part due to the recovery of *barbecho* (fallow land) rather than the opening up of new lands.

- Although poverty levels in Pando are dropping, poverty is still widespread. Official figures from 2012 suggest that nearly half of the population suffered 'moderate poverty', although it was significantly higher in some municipalities.[83] A 2018 study by CIPCA found that the average annual income of around BOB32,400 (US$4,700) for a small farming or Indigenous family came mostly (60%) from collecting natural forest products (like Brazil nuts, cocoa beans, and fruits like asaí and majo), proving the importance of the forests and their natural resources for their livelihoods.[84]

- Pando's population more than doubled between 2001 and 2012 (from 53,000 to 110,000), mostly due to new arrivals from other departments, many as part of a government-backed resettlement scheme. According to analysts speaking to Oxfam, this has caused a number of problems including lack of planning, pressure on the new arrivals to burn down parts of their property to comply with the social economic function (FES) rule, and some land conflicts between new arrivals and existing communities.

- Climate change has added an additional layer of stress to the region, with temperatures rising around 2°C in the last 25 years and more prolonged droughts and changes in the patterns of rainfall,[85] which local farmers perceive to be often more intense and more short-lived. (See Box 5.1 and Section 5.3 below)

- Flooding incidents are frequent, and are exacerbated by the diminishing capacity of the forests to absorb heavy rainfall and the reduced evapotranspiration of the water cycle, leading to rapid changes in the volume of water flowing through the river systems in the region.[86] In Cobija, the capital of Pando, there was extensive flooding in 2012, and then again in 2015, which caught local residents by surprise as heavy rainfall was seen as a once every 20 years occurrence.

Changing climatic conditions may have played a major role in the low production levels of

83 Soliz L. and Vos V., 2019. Medición experimental de indicadores de Objetivos de Desarrollo Sostenible en el Norte Amazónico de Bolivia. IPDRS/Oxfam.

84 CIPCA, 2018. (Quoted by Soliz and Vos, but not in their bibliography)

85 Soliz and Vos. Ibid, pp. 35 ff.

86 CIPCA-NA, 2017. El Cambio Climático en la Amazonia Boliviana.

Brazil nuts in 2016-17, which fell by between 30% and 50%. This caused serious economic hardship for many families, various conflicts and demonstrations, and the intervention of a major purchaser, the British company Eat Natural, to work with CIPCA to offer short-term alternatives for a number of affected communities.

According to CIPCA, Brazil nuts represent about 70% of Pando's exports and generate employment for over 70,000 people, and so are seen as the main economic driver of Pando and the Bolivian Amazon.[87] The Brazil nut tree stands out because of its height. During the harvest season, from December to March, its fruit, which looks like a coconut, drops to the ground. The nuts are found inside. The high value of the Brazil nut tree has played a major role in slowing rates of deforestation and preserving the rainforest; however, according to local expert Marco Albornoz, the trees are fragile and take a long time to replace.

The low production levels in 2016-17 followed a delayed rainy season and high temperatures, which created very dry conditions, high evapotranspiration and significant levels of water stress for many forest products including the Brazil nut.[88] Although there are many factors affecting Brazil nut production, including soil quality and the presence (or absence) of predators and pollinators, experts suggest that the low levels of rainfall and high temperatures in 2016 were not just due to natural weather cycles like El Niño but also to global increases of greenhouse gases directly affecting the Amazon region, including rainfall patterns and prolonged droughts.[89]

5.2 FINDING ALTERNATIVES

It is against this background that in recent years Indigenous and small-scale farming communities in Pando have been involved in various types of initiatives aiming to offer an alternative to the dominant model of clearing forests for food production and cattle rearing. They share common aims of generating economic, socio-cultural and environmental benefits.

The Morales government launched what it called its comprehensive and sustainable forest management plan (GISB) in 2017, which was framed within the existing legislation described in section 2 (such as Law 071 on the rights of Mother Earth and Law 300 establishing the creation of the APMT and mechanisms for managing forests).[90] The main elements of the GISB are territorial governance with local decision-making and

Feria en Guayaramerin

87 CIPCA-NA, 2018. Apoyando el manejo sostenible de los bosques de castaña.

88 Soliz and Vos. Ibid., p.37.

89 CIPCA-NA, 2018. Ibid.; Soliz and Vos, ibid.

90 DANIDA/FAN, 2018. Avanzando en la gestión integral y sustentable del bosque en Bolivia, p.4.

participation, socio-ecological resilience, life system management, democratisation of individual and collective rights over the forests, diversification of products and poverty reduction.

In the case of Pando, Indigenous communities put forward 35 different plans covering more than 350,000 hectares, which included the management of their land for various types of agriculture activities, and which were approved by the ABT. According to a joint Oxfam/IPDRS 2019 study, the plans that were in operation showed a number of positive aspects in terms of empowering families and communities, the management of natural resources, the processing of asaí, and tangible benefits in terms of food and income from forest products.[91] Another study by DANIDA/FAN found that for the period 2015-17, there was a 70% increase in family income for the families in the Northern Amazon region.[92]

However, the Oxfam/IPDRS report found that only 8 of the 35 plans were well-advanced. It concluded that although these plans were environmentally sustainable, culturally beneficial and profitable, they were not 'exempt from the risks associated with the expansion of the agricultural frontier, the incentives for land use change, cattle rearing and intensive crops like rice, maize, sugar cane and soya, which were being boosted by the state in contradictory fashion at different levels.'

For several years, another initiative known as SAF (Agroforestry Systems) has been promoted in the North Amazon region by NGOs, particularly CIPCA, at the family level. The aims of SAF are to boost food security

and income, aid environmental conservation, capture carbon, improve soil quality, recover degraded lands and, most importantly, provide a social and economic alternative to the dominant agro-industrial model. In short, the model is 'resilient, holistic, productive and sustainable'.[93]

The produce is varied depending on soil and geography but could be a mixture of annual crops (for example, rice, maize and beans), perennial fruit trees such as cocoa and copoazú, and timber trees. A 2015 CIPCA study of 13 land plots adopting SAF showed that there was a drop in income in the third to fifth year after implementation but in general SAF produced higher incomes than other agricultural systems in the region, reaching an average income of BOB55,000 (US$8,000) per hectare in the first ten years of its implementation.[94] It also provided additional sources of food for consumption.

The same study also calculated that the plots captured an average of 16.6 tonnes of carbon per hectare through carbon sequestration, thus contributing to climate mitigation, and showed higher levels of diversity of flora and fauna. Survey work carried out for the

91 Soliz and Vos. Ibid., p. 63.

92 DANIDA/FAN. Ibid., p. 17.

93 CLARA network, 2019. Ibid.

94 CIPCA-NA, 2015. Sistemas Agroforestales en la Amazonía Bolivia; una valorización de sus multiples beneficios.

2015 study suggested that the communities involved in SAF appreciated the income and food security along with the many other economic, environmental and psycho-social benefits. Manuel and Shirley in La Trinchera community in Pando share this point of view. (See 5.3 below)

The Oxfam/IPDRS study also found that land plots using SAF had been affected by fires, floods and drought, but that in general they were more able to adapt to climate change impacts than other agricultural and forestry systems. However, the report pointed out that SAF needed greater empowerment in all three dimensions, particularly in the economic one to consolidate them as a consistent alternative for the region. It quoted figures showing that (only) 2,200 hectares were using SAF in the whole region, so the need for 'scaling up' was a priority.[95]

A variety of social, community and Indigenous groups in the region and sectoral organizations in the region, such as the Plataforma Interinstitucional de Frutos Amazónicos,[96] which brings together a wide group of public and private organizations, share a vision of trying to make a living from the forest without chopping it or burning it down to clear land. As Doris Domínguez, president of the coordinating body that groups together 90 productive associations in Pando, told Oxfam:

According to our SAF system, we sow crops both for the short and long term. We don't burn down the forest, or keep animals on cleared land. We try to reforest the area. What we are promoting is caring for our Amazon, and caring for our forests to be able to live in harmony with Nature – because that is our life, our lungs, where we participate in life, and where we are seeing the effects that climate change is having.

The alternative agricultural systems have had some success encouraging women and young people to participate in decision-making processes and benefit from income-generating opportunities. However, the DANIDA-FAN study found that although the participation of women in decision-making had improved, they still encountered major obstacles in this area.[97]

Many young people in the region are developing their own initiatives in their territories and communities, which are normally linked to forest and natural resource management involving processing different products and then selling them.[98] For example, Oxfam is supporting a project called 'Agroforestería

95 Soliz and Vos, pp. 60-62.

96 Their full title is 'Plataforma Interinstitucional de Articulación del Complejo Productivo Integral de Frutos Amazónicos'.

97 DANIDA/FAN. Ibid., p.15.

98 Soliz and Vos. Ibid., p.125; CIPCA-NA, 2019. Sistemas Agroforestales mejorados por jóvenes del Norte Amazónica de Bolivia.

BOX 5.1 TESTIMONY OF ADELITA DURI

'My name is Adelita Duri Pana. I'm from the Takana Indigenous group, which is from the municipality of San Lorenzo, in the province of Madre de Dios.

I am president of CIJAP, which is the Indigenous Group of Young People from Pando in the Amazon. We are a new organization, from five different Indigenous groups in the area: the Takana, the Cavineño, the Esse Ejja, the Yaminahua and the Machineri. We live on the Peruvian/Brazilian border. We've seen how important it is for us to speak up and organize as young people as previously nobody took any notice of us.

We've also been helped by various Indigenous organizations such as CIMAP and CIPOAP to get set up.

What we focus on is protecting the natural world, particularly the vegetation because that is what sustains us; it's where and how we live. If we don't have a forest, we don't have food. We live from hunting, fishing, that's how we live. If we don't look after our environment, how are we going to live as Indigenous people in the Amazonian region of Pando?

In our communities we make *chacos* (plots of cleared land), we grow seedlings that will grow into trees whose wood we can sell, like mahogany, cedar, chestnut, and rubber trees. When we plant around 50 to 100 seedlings, this covers our outgoings. We are also trying to reforest and plant more trees to protect our forest so that in the future we can feed ourselves and sustain our families.

At the moment we have flooding, which we as Indigenous communities are used to suffering from time to time. That's because our villages are situated around the river basin of the Madre de Dios. When it's the dry season people lose their crops because they plant them around the river basin where it's more humid and the plants tend to do better, but then the floods can come unpredictably.

In the dry season we are also really affected. If we sow seeds at the height of the dry season, sometimes the cassava doesn't grow, sometimes our rice doesn't grow. Sometimes the maize doesn't grow large, and the rice shoots are small. In other areas, if we have water, it gives us better quality crops.

The changes in the climate are very noticeable; before we could plant and leave land fallow in cycles of two or three years, but now after only a year, or sometimes two, we can't carry on using the same land for growing crops. Sometimes the rice won't grow, sometimes the plantains won't grow – or if they do, they're really small.

The season when the river levels are low is longer and that affects us badly. Then the floods come with the rain and take everything from us, the floods carry away our crops, everything we plant and then we can't feed ourselves.

Amazónica Productiva y Resiliente', aimed at supporting rural youth organizations in 20 small-scale farming and Indigenous communities in Pando and Beni.[99] One such project involves converting degraded land into productive plots growing a diverse range of fruits and enabling beekeeping for honey production. (See photo) In some areas, young people are forming their own organizations.

For example, Adelita Duría Pana, a 23-year-old Takana Indian and university student, is president of a new organization called CIJAP, made up of young Indigenous people who felt marginalised from decision making. (See box 5.1) These are inspiring examples of the possibility of constructing a better future that could provide sufficient income, food and work for Indigenous families, while protecting the environment and biodiversity. They may also provide a viable alternative to the dominant model of the expansion of the agricultural frontier, change in soil use to monocultures, and the expansion of cattle farming – all of which, unless checked, will undoubtedly continue to alter Pando and the wider Amazonian region dramatically.

5.3 CASE STUDY OF LA TRINCHERA COMMUNITY

Manuel Lima and Shirley Segovia have lived for over 30 years in the community of La Trinchera, about 50 km east of Cobija, close to the border with Br azil. They are both former union leaders: Manuel in the FSTCP, and Shirley in the Bartolina Sisa women's federation. About 23 families live in La Trinchera community, which has received about 9,000 hectares as part of the government land distribution programme. Manuel started with the SAF programme in 2012 and now grows about 35 different types of agro-forestry products on a 3-hectare plot, including 29 Brazil nut trees, and many species of fruit trees, including asaí and copoazú. About half the families living in La Trinchera are involved in similar agro-forestry progammes and the rest follow the agricultural practice of clearing the forest to grow rice, banana and cassava, and providing pasture for cattle.

Q: Why are you so committed to following this pathway of Nature-friendly development? Why don't you rear cattle?
Manuel: It's simple. First, this land is not suitable for rearing cattle. You have to create the pasture. Second, it's a very large investment to buy cattle. You don't recover your investment when you sell the meat. Everyone who is involved in large-scale cattle farming says that they live off the proceeds. In my opinion, it's a lie, it's a money-laundering exercise. As regards timber extraction, it's true that you can earn money, but not a lot. I may be a small-scale farmer, but I am not an idiot – I know how in this department they engage in these activities to launder money.

Q: And so it's an economic decision, pure and simple?
Shirley: No, it's to do with our relationship with Nature. Unlike cattle farming, you don't have to do anything, just pick up the fruit. It's the same with the asaí fruit. You go to the mountain, you pick up the fruits that have fallen, take out the Brazil nuts, get rid of the rotten ones, dry them, then sell them. It may only give you BOB200 (US$30) a bag, but it's direct income for your family. You don't have to fork out a lot of money up front. You don't have to pay for vaccinations for the cattle, or pay to put up barbed wire to keep them in. You don't have to chop down trees or harm Nature. You just have to look after Nature, which also gives us clean air here. We're sharing the space with Nature. We want to live well like this.

99 CIPCA-NA, 2019. Ibid., p. 10.

showing them that there is an economic alternative, moving away from simple subsistence agriculture. The SAF allows you to improve you and your family's diet, your children learn what's good to eat; second, it allows more space to conserve the environment as a greater variety of trees and plants helps to capture carbon dioxide from the atmosphere and improve air quality. And that is helping everyone – not just your family but people in far-flung corners of this planet, including those who are polluting this world with their factories.

Q: Does everyone in your community feel the same?
Manuel: No, about half of us – 11 or 12 families – share this concept of protecting, looking after, and living in harmony with Nature – and growing alternatives. The rest think differently, they grow produce and rear cows and have other types of income. We can sit down and chat, and we agree about a lot, but for example, some of them are in favour of deforestation in order to grow produce like cassava, maize and rice and sell it, then grow pasture and rear cattle in the second year. And that's how they are increasing deforestation which I do not agree with.

Shirley: The minority here wants to conserve Nature, but the majority wants to destroy it.

Q: Can you say more about the advantages of SAF?
Manuel: The diversification of crops and produce has several advantages. It contributes to having a better quality of life and it also helps change the mentality of people here by

CIPCA came here in December 2012 with 20 mandarin and 20 orange saplings. We started with that. It's a long process, but every year we planted more and now we have three hectares. It helps to keep a cooler temperature in this micro-area, and we are also contributing to reducing the effects of climate change.

Q: And what about the effects of climate change here in La Trinchera?
Manuel: We have felt the higher temperatures, for example in August and September last year. When I was young, we had clearly-marked seasons – the 'winter' when it rained roughly from October to March, a cold season with mists from April to June, and then a dry season from July to August or September. Now, it's not regular. The rains often come with very heavy downpours – it pours down and clears up again. Drought meant a poor harvest in 2016-17 but there were other factors too. Private owners who clear the forest use pesticides and that affects the pollinators, like the large bees. A lot of the fruit just did not take that year.

6.

PERSPECTIVES ON CLIMATE CHANGE, THE ENVIRONMENT, AND INEQUALITY

In January and February 2020, Oxfam researchers held meetings with social and Indigenous organizations, government representatives, local politicians, and NGOs. The full list can be found in the acknowledgements at the end of this report. The testimonies of some of the individuals can be read in preceding sections of this report. Research done by organizations such as CIPCA and FCBC has already been used extensively in this report. Here we summarise the perspectives of six other interviewees on the themes of this report, namely climate change, the environment and inequality. The quotes have been edited for style and ease of understanding, and only represent a portion of the content of what was said during the meetings.

MARIO ZENTENO, FORMER NATIONAL DIRECTOR OF THE APMT

The climate change agenda of the previous government hasn't been positive in some respects around adaptation to the climate change Bolivia is facing. For example, the policy of redistributing land without taking adequate care has had a harmful effect on the country, most notably leading to deforestation.

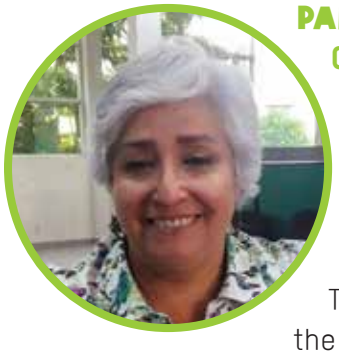
The state is still too weak to carry out these policies effectively (such as complying with plans on land use, safeguarding natural resources, and distributing land), particularly when land policies are managed in a very diffuse and secret way, leaving you with the sensation that only certain groups have benefitted, and that it's less to do with promoting equity and the wellbeing of vulnerable populations.

Supposedly, it has led to more equality in terms of access to natural resources for the poorest sectors of society but it hasn't always been like that. While priority was given to providing land access to poor populations, neither capacity building nor providing tools for the sustainable use of forests were taken into account. The obvious consequence is that climate change will affect the most vulnerable populations and those provided with land that is now deteriorating due to unsustainable land practices.

Bolivia as a whole is very vulnerable to climate change due to mistaken development policies, and the worsening of this interim government's management of the environment reoriented to favour political groups from the past government. This same vulnerability comes from a disconnect between the environmental effects from unmanaged rural areas, mining, extraction agriculture and unplanned urbanisation. It is likely that in

the coming years Bolivia will face a serious environmental crisis and that is worrying.

Fortunately, Bolivian society is recognising that the environment is an important issue. For example, with the fires in Chiquitania, people living in urban areas have now woken up to the harmful effects that can happen in terms of climate and ecosystem change. Young people have become more empowered as to the importance of the environment. It is something that has to be on the political agenda of all governments and political parties, and I hope that the new government considers a more serious agenda on the environmental issue, which is not just limited to making speeches but involves serious decision-making, across the whole of society. This would make Bolivia more resilient to climate change.



PAMELA REBOLLEDO, COORDINATOR OF THE CLIMATE CHANGE PROGRAMME FOR THE SANTA CRUZ DEPARTMENT ON WATER

The previous government had the aim of making sure everyone has access to water. But how can you put this into practice without first carrying out a hydrological study of the availability and distribution of water across the country? For example, Santa Cruz has a different pattern of water availability due to its geological differences. The problem in Chiquitania is that there is very little water. We are boring wells there but it's not sustainable. We can say we have achieved more access to water and are adapting to climate change, but for how long? and how much water will we have? I don't think we should be drilling more wells; we should be improving the system of catching and storing water with *atajados* (catchment ponds or tanks).

On reforestation

Some authorities are saying that we have to respond to the needs of the people in Chiquitania now, we have to plant seedlings now, we have to reforest. But I ask them: "Where? Who is going to look after the trees? What species of tree are we talking about? How are the people there going to benefit?" Despite the disaster, we have still not learnt that we need to carry out research and monitoring, and do everything properly. We are in a moment of political campaigning, and politicians want to be seen planting seedlings. It doesn't matter whether the young trees survive or not. They want to be seen to be doing something so the press can take photos. A lot of companies have turned up, saying they will save the fatherland and Chiquitania by planting trees. The only thing they are going to achieve is changing and harming the local ecosystems. Reforestation is not necessarily an efficient form of restoration. There are 16 different types of ecosystems in the Chiquitano forest; these all have to be taken into account. This is the complexity of the region.

On women's participation

We need to generate a process working with the communities, not with companies. That way we will have shared responsibility. The main actors have to be the communities, who will also be the beneficiaries of taking action. The areas of the forest that are lived in need to be restored with agro-forestry systems. The areas not lived in need to be left to regrow on their own. If they don't recover, they need to rely on local seed banks. In our opinion, the issue of gender and young people is crucial – gender, because it is the women who spend most of the time at home working, whilst the men are usually working on the large estates earning a wage. It's the women who take charge of everything. And young people, in school or in their communities, should be part

of this process of looking after the forests. Without the participation of women and young people, it's not going to work.

THE COORDINATING BODY OF THE ETHNIC PEOPLES OF SANTA CRUZ (CPESC)100

One of our many problems has been the invasion of Indigenous territories (TIOCs) by Andean communities who come with a logic brought from the *altiplano*, which says that you have to burn down the forest in order to grow crops. In contrast, we are the guardians of the forest and we live off the forest. Recent state policies have favoured the highland communities, and not the lowland communities.

The situation is very difficult for us right now, as the governing class play pass the parcel but never consult directly with us, either before the fires or after, or ask our advice. Right now our priority is to recover our sustainability, for example our medicinal plants that help us to recover from any illness that we get living in the forest. We have lost many fruit trees that grow in the forest, such as the motoyoé. These trees need 15 to 20 years to recover, and that's a long time to wait, not just for us, but also for the animals that eat the fruit. We eat a lot of river turtles but many were killed in the fires.

PAULA PACHECO M., AGUA SUSTENTABLE

At Agua Sustentable, we've done several scientific studies, including on glaciers, climate modelling, adaptation plans and analysis of climate change vulnerabilities. We have also worked with communities to strengthen their capacity for resilience and adaptation to climate change, including risk reduction and early weather alerts. In particular, we've worked with communities around Illimani and Mururata (see section 3) near La Paz, and in the Sajama National Park in the department of Oruro near the border with Chile.

For example, we know that from 1985 to 2009, Illimani lost about 30% of the surface area of its glacier and the Sahama glacier lost more than 50% from 1986 to 2011. This can add to the pressure on water availability, particularly for irrigation, for the communities who live nearby. We also know that in the whole of the Sajama National Park, nearly 30% of their *bofedales* (wetland areas) were lost in the same period.

In the area around Illimani, women from the communities tell us that they are very worried about the rising temperatures, the sudden hailstorms, and having to use strong chemical pesticides to counter the increase in blights caused by the warmer temperatures.

There's very little Bolivia can do to stop glacial melt. We have good laws such the Law of Mother Earth but a lot more needs to be done to put them into practice.

100 Several members of the CPESC were present, so these quotes are illustrative.

TERESA HOSSE, JUAN CARLOS ALARCÓN, MARTIN VILELA, PLATAFORMA BOLIVIANA FRENTE AL CAMBIO CLIMÁTICO

Since 2009, as far as climate change impacts are concerned, we have seen the disappearance of Lake Poopó and the 2016 drought in La Paz. There's also the issue of food security. It's very common to hear now that the weather has changed, and food production has suffered. For example, the rainy season is shorter and more intense on the *altiplano*, and to adapt to this, families have had to plant types of potato seeds that produce potatoes in a shorter period. Maize and beans too. These can produce in as little as three months. And many women talk about the lack of water. And then there was the severe drought in Chiquitania, which made the fires worse. People there say that *chaqueo* (clearing or burning the land) has always taken place.

In Bolivia, we now have a good normative framework with a good Constitution and several good laws. But it is the lack of implementation that is the problem, and lack of resources to implement it. The other main problem is the economic model based on extraction industries, and the emphasis on agro-industrial products. Land has been handed out within this same model of extraction industries.

We have heard and documented testimonies from Indigenous women suffering from the advance of hydroelectric projects, oil and gas exploration, and road building.[101] We are also doing research on how a limited number of extraction companies are responsible

BOX 6.1 THE MAIN ACTIVITIES AND DEMANDS OF CPESC:

- Demand, defend and exercise the social, civil, political, cultural and economic rights of Indigenous people.
- Promote and consolidate the economic development of Indigenous families and communities based on sustainable strategies and maintaining cultural identity.
- Defend, manage and conserve natural resources, the environment and the biodiversity of our territories and common lands.
- Develop, promote and implement intercultural and bilingual education.
- Achieve social and judicial recognition of the collective and individual knowledge of Indigenous peoples.
- Achieve formal recognition and political, social and administrative management of our Indigenous lands (TCOs).
- Preserve, value and promote traditional medicine and achieve official recognition of our native healers' knowledge and practices.

101 CNAMIB/CONAMAQ/Plataforma, 2019. Informe Alternativo de la Alianza de Mujeres Indígenas Originarias de Bolivia para el EPU.

for much of the greenhouse gas emissions in the country. We have to resolve not only the inequalities between developed and developing countries in terms of emissions but also reduce the inequalities within each country.

We have several concerns for the future about climate change. Four of them would be forests, changes in the energy system, water, and the urban sprawl and the growth of 'heat islands' like the ones studied in Cochabamba. Urban areas have changed a lot with the extra buildings and the absence of trees of sufficient size to help the environment.

OSCAR BAZOBERRY, INSTITUTO PARA EL DESARROLLO RURAL DE SUDAMÉRICA (IPDRS)

We at IPDRS are concerned about inequality in terms of the distribution of land across several South American countries, including Bolivia, and access to land. We put a lot of emphasis on communication, particularly via social media and the internet. We want to show that access to land is a contemporary issue, and not something rooted in the past; that people are still fighting for land. We systematise the case studies and provide time lines, stories and sometimes videos. This material can be found at www.porlatierra.org

We use an array of digital technologies to illustrate the problems of access to land. You have to remember that the small-scale farmer of today has a mobile phone. They can produce their own content for communication. They pay around US$15 a month to have access to the internet. Our study on the rural community of Macharetí in Chuquisaca for example,[102] showed that everyone aged 16-19 and 83% of 20-29 year olds had access to the Internet (mostly via a smartphone). We also publish a collection of country case studies of access to land in book and pdf form.[103]

The basic idea is to aid the process of consolidating territory, which underpins identity. Communication strengthens identity. It helps to maintain local languages and customs. There are many things going on in rural areas that we don't see. We systematise the actions taken to get land, and the land conflicts, and all the various forms of getting access to land. The message is that people are still using the land, and it's not true that everyone is just migrating to towns and cities. We are giving visibility to the experiences of local small-scale farmers and Indigenous communities. An example of this from the Pando is the video 'Amazonía Tierra Mía',[104] which shows local communities following the Agroforestry Systems (SAF) rather than the dominant extraction model.

102 Mercado K. and Bazoberry O. 2019. Acceso a internet y ruralidad: el caso de Macharetí. IPDRS.
103 IPDRS, 2019. Informe 2018: Acceso a la tierra y territorio en Sudamérica.
104 https://www.youtube.com/watch?v=fJCHvoQzOjU

7. CONCLUSIONS AND RECOMMENDATIONS

The 2009 Oxfam report made a series of recommendations to the international community, the Bolivian government and civil society to mitigate the vulnerability of the country to climate change impacts. A key recommendation was that 'an overarching institutional and public policy framework for national policy on climate change adaptation and mitigation' needed to be developed, which included embedding climate change concerns into the new Constitution and subsequent legislation.

As several of our interviewees commented, the new Constitution of 2009 and the subsequent slew of new legislation and new institutions, such as the Law of Mother Earth and the APMT, have given the country a solid legislative base. However, they also commented that the challenge has been the lack of implementation, and the need to allocate resources to the execution of effective policies based on targeting vulnerable groups – not just supporters of the governing party.

No matter which government emerges from the current political uncertainty, it will be faced with a series of new challenges and a different Bolivia from that of ten years ago. As this report has mentioned, the Morales government achieved significant reductions in poverty and inequality but important sectors have been left out of these trends, with lowland Indian communities skewered at the sharp end of a series of policies promoting agro-export expansion.

The country has changed importantly too in terms of the political participation of previously excluded Indigenous populations (particularly Aymara, Quechua, Guaraní and Chiquitano) and communities, the growing number of poor people living in urban as opposed to rural areas, and the advance of digital technologies which allow previously marginalised sectors to be better informed about issues that affect their wellbeing.

However, much has remained the same. Changing climatic conditions and extreme weather events have continued to affect large areas of the country. Some sectors of the population, such as women and Indigenous lowland communities, are still suffering the effects of climate change impacts which fall disproportionately on those with fewer resources, accentuating their conditions of territorial inequality.

As Oxfam has constantly pointed out, climate justice is an issue that includes gross disparities between developed and developing countries, and startling disparities within countries as a limited number of companies and well-off sectors are responsible for a much larger carbon footprint than poor families. In the Bolivian context, a large oil and gas company or soya exporter clearing

the forest has a much greater role in, and responsibility for, carbon emissions than a poor Aymara farmer living in Khapi.

Climate change is an issue that is hard to divorce from other environmental challenges such as deforestation, soil erosion, biodiversity loss, air pollution, and contamination from mining and other extraction industries. For example, as this report has mentioned, the terrible forest fires in Chiquitania in 2019 were in part related to higher temperatures and drought and at the same time, their effect was to destroy biodiversity and livelihoods, and pump out an extra amount of greenhouse gas emissions. In the areas of water supply, food security, migration, and forest protection, climate change clearly acts as a stress multiplier.

The science of climate change has also advanced in the last ten years, showing both that the impacts on developing countries are likely to be severe even at 1.5°C, that action needs to be taken quickly to reduce emissions and the risk of the worst impacts, and that each government has a responsibility to put forward its proposals to reduce emissions within the framework of the forthcoming negotiations via the UNFCCC.

RECOMMENDATIONS FOR THE INTERNATIONAL COMMUNITY:

- Around the world, the climate emergency, food insecurity, rapid urbanisation and rising levels of contamination are harming human ecosystems and health. The ecological transformation must be a just one, and the fight against inequality must be included in the implementation of environmental and climate policies.

- Commitments made so far by countries to reduce global emissions will not keep global temperatures from rising above 1.5°C. If the world is to have any chance of avoiding catastrophic climate impacts, it is critical that all countries – led by the largest emitters – commit to much deeper emissions cuts in 2020.

- Wealthy countries are not providing the funds that are needed to help poorer nations adapt to the climate crisis, which they did little to cause, and to help them transition to zero-carbon economies. Rich polluting countries pledged almost US$90 million in new funding for adaptation at the COP25 in Madrid and made additional pledges to the Green Climate Fund. However, Oxfam's analysis shows that right now the target of reaching US$100 billion per year in climate finance by 2020 remains a distant dream.

- The Gender Action Plan approved at the Madrid summit sets out a plan for increasing the participation and leadership of women in international climate talks, and designing and implementing climate policies at the national and local level. It is encouraging to see this blueprint for change given that poor women are often the hardest hit by the climate crisis, but the plan needs to be translated into concrete measures.

- The debt of especially vulnerable countries like Somalia should be forgiven and the money reallocated to mitigation and adaptation projects in these countries.

RECOMMENDATIONS FOR THE BOLIVIAN GOVERNMENT:

- More action needs to be taken at the municipal level across the country to strengthen the capacity of vulnerable groups to be able to respond to the impacts of climate change at the local level by emphasising disaster preparedness, crop diversification and water catchment. For example, the Territorial Plans for Integrated Development (PTDIs),[105] which have to be implemented at the departmental, regional and municipal level and include

105 http://www.planificacion.gob.bo/uploads/PTDI.pdf

climate change and disaster risk management, are an important initiative to promote good practice but need more time for proper consultation with local communities, experts and relevant research.

- As appropriate, priority should be given to poverty and inequality reduction in small-scale farming and Indigenous communities, particularly in Amazonian regions, by promoting community-led adaptive and integrated territorial development models, such as SAFs, that build climate change resilience, improve food security and income, strengthen ecosystems and protect forests. These should be seen as an alternative to the dominant agro-export and extraction model of development.

- The laws passed since 2013 (particularly Law 741 and Supreme Decree 3973) that give incentives to burn down forests to bolster land ownership and promote agro-exports should be repealed. The national and subnational governments should stop encouraging the expansion of the agricultural frontier, protect remaining forests and ecosystems, and promote sustainable agricultural production in areas already converted for agriculture. All action should be rooted in the integrated management of forests, a concept present in the Constitution and other laws derived from it.

- Water storage, conservation and management should be made a major priority, particularly in urban areas where increased demand is generating water shortage problems at times of drought. At the rural community level, existing rainfall must be captured, stored and used to the maximum capacity. Glacial retreat adds another layer of water stress, so constant risk assessments are needed, informed by natural and social sciences and based on a participatory approach that includes local values, traditions and perceptions.

- In large cities, new green areas should be developed with shrubs and leafy trees to absorb radiation; urban expansion and buildings should be controlled and rationalised in favour of more green protected areas.

RECOMMENDATIONS FOR BOLIVIAN CIVIL SOCIETY AND SOCIAL MOVEMENTS:

- Civil Society should be encouraged to exercise social control over the Plan of Land Use (Plan de Uso de Suelo - PLUS) currently taking place in the Amazon region, and collegiate bodies, authorities and producers as established by the Constitution must participate in monitoring public policies in this area.

- The number of organizations run and/or led by women in small-scale farming and Indigenous communities may have increased in the last ten years, and the presence of women in leadership and decision-making roles, and their control of family resources have probably improved; however, these advances are patchy, and need to be strengthened and expanded.

- There are also signs that young people are taking a more active role in development and environmental issues, both in rural and urban areas. In particular, various platforms of young people concerned about climate change and other environmental problems have emerged. Their participation in practical policy formulation and execution needs to be strongly encouraged, for example in sustainable and resilient development.

- Indigenous group organizations at the national, regional and local level need to be (re-) strengthened in their leadership capacity and their ability to put forward influential policies that protect their interests, territories and visions of development that are more harmonious with the sustainable development of natural resources. In particular, support should be given for the efforts by lowland Indigenous groups to secure collective administration of their territories.

- At the South American regional level, efforts should continue to increase policy coordination and integration within and between countries in areas of climate change policy, deforestation and income generation initiatives in the Amazon, and the development and implementation of adaptation actions.

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