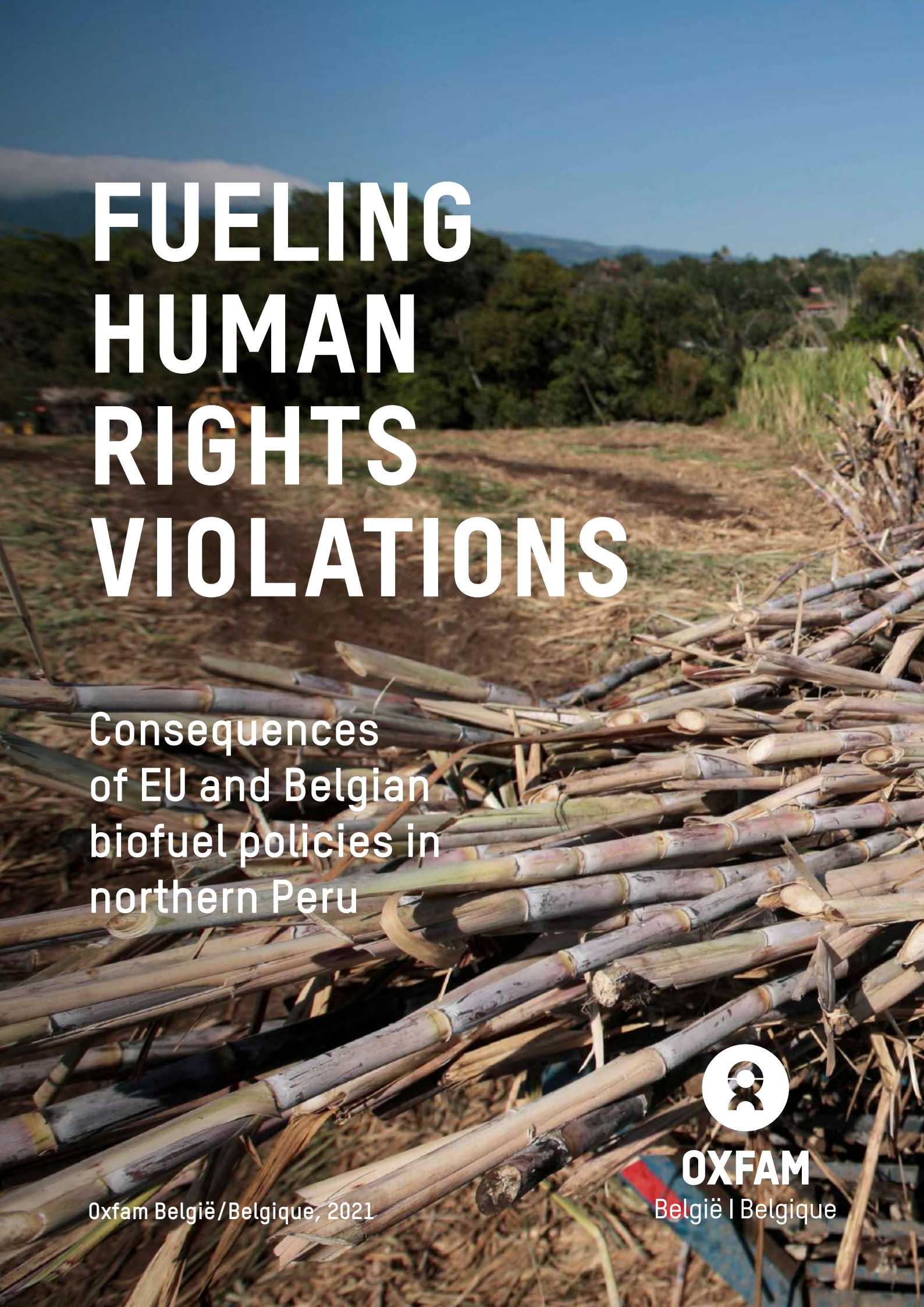

FUELING HUMAN RIGHTS VIOLATIONS

Consequences of EU and Belgian biofuel policies in northern Peru

Oxfam België/Belgique, 2021

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INTRODUCTION

First-generation biofuels have a somewhat paradoxical status. On the one hand, they have become key ingredients in many proposed sustainable energy policies around the world, including the EU's 'Green Deal' priorities (European Commission 2020). On the other hand, they have fuelled all kinds of environmental, social and political disruptions, and unleashed massive transformations – particularly in the Global South – because of rising international demand (Munting 2010). This has led many civil society organizations (CSOs), scientists and multilateral institutions to criticize their impacts on food prices, economic growth, energy security, deforestation and climate change (Khwaja 2010, 1). These critics have demanded further restrictions and regulations upon the legal and regulatory status of biofuels as sustainable strategies for climate change mitigation (Van de Poel 2012). Despite early hopes for first-generation biofuels to become a cornerstone in the global fight against the climate crisis, they seem to have become a mechanism to displace the environmental and social costs away from Europe and the United States, towards the livelihoods of rural populations in new agrobusiness frontiers around the world.

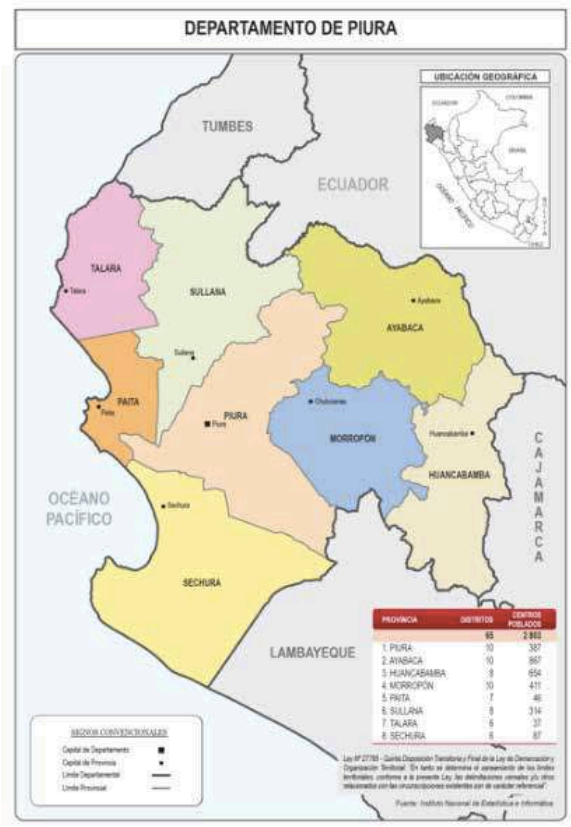
International organizations such as the Food and Agriculture Organization (FAO) and the Inter-American Institute for Cooperation on Agriculture (IICA) have expressed concerns about the environmental impacts of large-scale sugarcane plantations in ethanol-producing countries like Peru (Van de Poel 2012, 39). And in Brazil, allegations have been raised about child labor and forced labor been implicated in large-scale sugarcane production (Ecofys 2019, 79). Some commentators have also addressed the comparative economic inefficiency of large-scale ethanol production in creating jobs and good working conditions in contexts traditionally dominated by smallholding agricultural economies (Munting 2010, XXXVI; see also Roy 2013). Biofuels are also driving massive land-grab processes that are fundamentally altering agrarian structures around the world (Borras, McMichael, and Scoones 2010).

However, the supply chain impacts of sugarcane-based ethanol have been understudied compared to other biofuels, such as soy- or palm oil-based biodiesel. This evidence gap has reduced the possibility of conducting robust ethical, economic and social assessments of the role of European energy policies in indirectly fostering territorial dispossession, resource concentration and environmental harm in the Global South. At a time when new EU policy directives are seeking to reduce the risk of energy policies creating negative impacts through first-generation biofuels, it is fundamental that the impacts of sugarcane-based ethanol production are well understood by European decision makers.

In the early 21st century, Europe's energy policies created massive trade incentives for the Peruvian state to attract large-scale ethanol investments in the Chira Valley in Peru's Piura Region. Although Brazil is the world's largest sugarcane-based ethanol producer and exporter (Hill and Shi 2020), Peruvian sugarcane ethanol exports have increased in recent years, with most exported to the EU (about 94% in 2019) (Nolte 2020). Since 2018, Peru has supplied a significant share of ethanol imports of countries like Germany and Belgium (Federal Republic of Germany 2018, 165). A significant share of Peru's sugarcane-based ethanol exports to the EU comes from the ethanol plantation examined in this report (La Republica 2021).

The ethanol production operation examined in this report began its activities in 2006 as a project led by Maple Ethanol, a branch of the US-based corporation Maple Energy. It ventured into the ethanol business with financial support from institutions including the Belgian Investment Company for Developing Countries (BIO) and the Dutch Business Development Bank (FMO). Financial and logistical problems later forced Maple Ethanol to go into default and transfer its operations – including 13,946ha of land, an ethanol plant and a power station – to Agro Aurora, a branch of Grupo Gloria, Peru's largest conglomerate of sugarcane investments. The environmental and social impacts of this ethanol operation has continued and expanded under Agro Aurora's management. To emphasize the continuity of these impacts despite changes in corporate ownership, we will henceforth refer to the operation as the Maple Ethanol-Agro Aurora Operation (MEAAO). This term refers to the entire operation, including built infrastructure and large-scale sugarcane monocrop plantations from 2006 to today.

Figure 1. Administrative map of Piura (taken from INEI, 2018, p. 15)



By documenting the case of MEAAO, we hope to enrich the conversation about the environmental and social impacts associated with European energy policies related to sugarcane-based ethanol in the Global South. By highlighting the everyday experiences of the people most affected, we hope to foster a better understanding of the unintended externalities of EU policies, and an appreciation of the real costs of first-generation biofuels in countries like Peru. This report is divided as follows:

- Part 1 introduces the reader to the Chira Valley and the Piura Region, and emphasizes how the arrival of sugarcane investments took place in a fragile region marked by prior peasant struggles for land, lack of adequate property titling and uncertainty around water availability.
- Part 2 discusses EU and Belgian energy policy, and legal and regulatory reforms by the government of Peru intended to foster the expansion of biofuel investments.
- Part 3 describes the exports of Peru's ethanol towards the European Union.
- Part 4 describes the changes in the corporate governance of MEAAO and their implications for the relationships with local populations and authorities.
  Part 5 describes some of the conflict over land ownership in the Chira Valley.
- Part 6 assesses the implications of the ethanol investments for food security.
- Part 7 analyzes how the arrival of MEAAO created new disputes and conflicts over water management and access in the Chira Valley.
- Part 8 describes the social conflicts caused by the pollution from sugarcane field-burning by MEAAO.
- Part 9 discusses some of the gender implications of MEAAO's operations, as well as the fundamental role of women in opposing environmental harm.
- Part 10 presents some preliminary conclusions, elaborates upon some of the larger implications of the case and provides policy recommendations.
- Finally, Part 11 advances further research questions in order to propose a research agenda for future inquiries.

PART 1. THE CHIRA VALLEY AND THE PIURA REGION

The Piura region is located in northwest Peru. Its 35,892.49km2 territory contains eight provinces that are further divided into 64 districts (Cabrejos Vásquez 2011; Urteaga 2013, 62). Traditionally, Piura has been divided into three areas defined by their economic, demographic and socioecological characteristics:

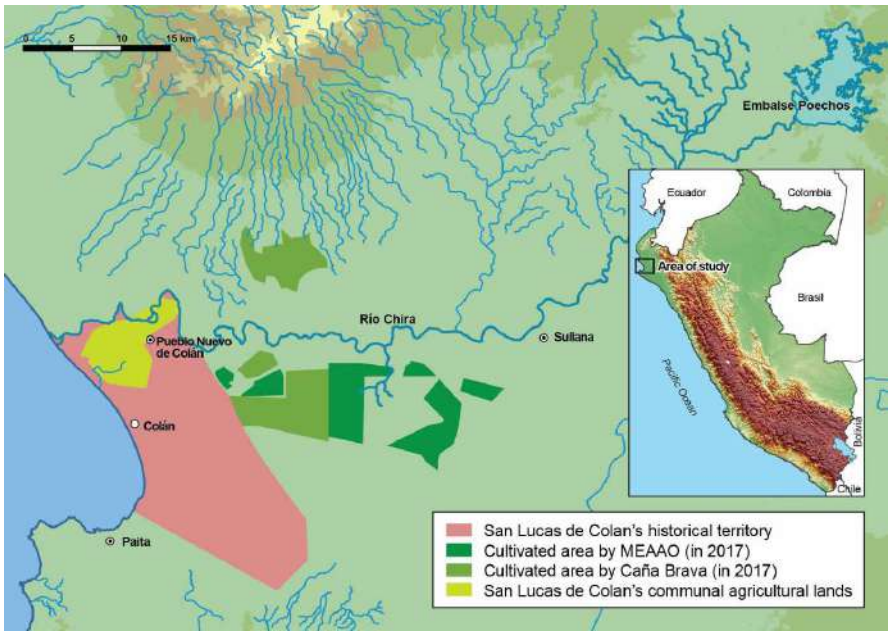
- the Andean area, defined by peasant subsistence economies and small cattle ranching;
- the Coast, defined by fishing and oil extraction; and
- the Coastal agricultural valleys, where small peasant agriculture coexists with large-scale agrobusiness endeavors (Revesz and Oliden 2011, 2).

While the Coast and the Coastal agricultural valleys have been involved in different cycles of productive modernization since the early 20th century, the Andean area has mostly not been the focus of public and private investments (Huaman 2017, 58).

In 2018, the Piura Region had a total population of 1,856,809, of which 79.3% live in urban areas (Instituto Nacional de Estadística e Informática 2018, 23). However, unlike most of Peru's regions, Piura's population is not concentrated in a single metropolitan area, instead made up of a network of large and intermediary urban spaces extending over the Coast and the Coastal agricultural valleys (Cabrejos Vásquez 2011). Despite this rather urban profile, about a third of the economically active population in Piura works in agriculture, particularly in the production of rice, cotton, maize, coffee, and nontraditional products such as lemons, mangoes, grapes, sugarcane and organic bananas (Cabrejos Vásquez 2011, 9). However, agricultural and grazing land in many parts of the Piura Region is pressured by oil investments in the Coast, agrobusinesses in the Coastal valleys, and urban expansion (Burneo 2016).

The Chira Valley is located in the Piura Region provinces of Sullana and Paita, encompassing both irrigated agricultural lands and dry forest ecosystems (Urteaga 2013, 62). The Chira River is one of the most important hydrographic basins in the otherwise arid lands of northern Peru. However, similar to most of the Piura region, it is vulnerable to the climatic oscillations caused by the El Niño effect, and thus to periodic flooding, which has caused considerable destruction to agriculture and human settlements for generations (Gosling et al. 2011, 11). The effects of climate change on El Niño cycles are still not fully understood. Yet, observations indicate that the northwest coast of Peru might be experiencing significant rainfall increases, which might make waterflow patterns more uncertain and extreme in the future (Marengo et al. 2014; see also Gosling et al. 2011, 98). Climate change could threaten the relative reliability of the Chira River, increasing the risks of flooding or drought (Gambini 2013).

Figure 2. The Chira Valley (Modified from Huaman 2017, 60)



Construction of both public and private irrigation canal systems in Piura's Coastal valleys dates back to at least 1895; this process has quadrupled the area of irrigated lands, and increased the strategic importance of Piura to the country (Revesz and Oliden 2011). Most of the modern hydraulic infrastructure in the Chira Valley was built since the 1970s via the Proyecto Especial Chira-Piura [Special Chira–Piura Project] (PECP), an integrated irrigation system regulated by the Poechos reservoir that joins the Piura and Chira hydrographic basins. Today, the PECP has three main canals: the Canal Miguel Checa, the Canal Norte and the Canal Sur. Most of the agricultural water users in the Chira Valley, including small peasant smallholders and large sugarcane producers, depend on this system (Tejada 2017, 21).

Hacendados [large landowners] took advantage of the growing availability of irrigated lands in the Chira Valley to expand cotton plantations across the basin and began a long-running struggle for irrigated lands between *hacendados* and peasant smallholders (Tejada 2017, 6; Huaman 2017, 75). The Revolutionary Government's 1969 Agrarian Reform replaced the cotton-producing *haciendas* that had thrived in the Chira Valley for most of the 20th century with small-scale agricultural units focused on rice and cotton (Huaman 2017, 90). There has since been a reorientation in Piura's agricultural valleys away from cotton production towards products with higher commercial demand (Tejada 2017, 6). Nonetheless, irrigated land and water remain scarce resources in the arid lands surrounding the Chira Valley that, as we will see, are still disputed between peasant producers and new large-scale agricultural endeavors.

Figure 3. The peasant community of San Lucas de Colán (taken from Huaman 2017, 64)

At the start of the 21st century, the middle and lower courses of the Chira Valley, where large-scale ethanol operations would later begin, was dominated by small-scale production units owned by local peasants across the district municipalities of Miguel Checa, La Huaca, Amotape, Arenal and Colán. The peasant community of San Lucas de Colán, a juridical entity that traditionally owns a large area of irrigated land and dry forest on the left margin of the Chira river, is also located in the lower course of the Chira river. Today, San Lucas de Colán includes the district capital of Pueblo Nuevo and six other small associated settlements. The San Lucas de Colán community is estimated to have 6,500–7,000 listed members, according to its president's own estimations. As we will see, the management and ownership of land over part of their lands has been disrupted by the growing presence of ethanol investments, including in the community's ancestral dry forest territories.

Peasant agricultural production in the Chira Valley comprises a variety of staples and high-value agricultural commodities. Some of the most important products for local commerce and self-consumption are sweet potato, maize, red onion, manioc, beans, chia, carob, tamarind, water melons and papaya. Rice is also produced in January, February, August and September, while organic bananas for export are produced all year (Tejada 2017, 28). With the arrival of sugarcane investments, many families in the Chira Valley have ventured into sugarcane production to sell to the Grupo Romero's *Caña Brava* (one of the large-scale ethanol producers in the valley), a trend that has reportedly diminished in recent years due to the more competitive prices for other crops (Huaman 2017, 59). MEAA0's ethanol production has always depended exclusively on their own plantations.

Most agricultural units are small (0.5–4.9ha) and managed by peasant families themselves (Huaman 2017, 62). The lack of gender-sensitive policies in land distribution and titling has meant that land is disproportionately owned by men, with women making up just a fifth of total landownership in the middle and lower course of the Chira Valley (Tejada 2017, 28). Many peasant families also make regular use of nearby dry forest areas, which are traditionally managed collectively in the Chira Valley for the grazing of animals and collecting firewood. Some supplement their income by breeding sheep, pigs, poultry and guinea pigs (Huaman 2017, 62; Tejada 2017, 28). Brick production has also been an important source of income for many local men (Tejada 2017, 31).

In this context, legal reforms and international trade conditions in the early 21st century paved the way for the transformation of the Chira Valley into an international agro-industrial hub (Urteaga 2013, 62). With state policy reforms promoting biofuels coming into effect in 2002, it became possible for state projects such as the PECP to transfer non-irrigated lands to private companies interested in developing sugarcane plantations (Huaman 2019, 131; Barrientos Felipa 2014, 47). Although land concentration linked to expanding agrobusinesses has been a trend across Peru, Chira is the only valley with sugarcane plantations specifically oriented towards ethanol production (Huaman 2017, 12–16). The Chira Valley is now host to an awkward spatial, economic and environmental coexistence between large-scale agricultural investments and small-scale agricultural production that has recreated in many ways the old forms of dispossession and resistance that characterized 20th-century peasant struggles for land and water (Revesz and Oliden 2011; Huaman 2019, 132).

PART 2. STATE BIOFUEL POLICIES IN PERU AND LINKS WITH EU AND BELGIAN POLICIES

International demand for biofuels in Peru increased in the early 21st century, as the EU and its member states implemented energy policies aiming to – supposedly – reduce greenhouse gas emissions in the transport sector. In reality, European and Peruvian policies have combined to displace social and environmental impacts to northern Peru. Today, biofuels and other forms of bioenergy make up 60% of the energy that the EU labels as 'renewable' and promotes as part of its policy to mitigate climate change (European Commission 2020). Belgium imports biofuels from 66 countries, including Peru. Although its sustainability criteria have improved over time, they are still insufficient to prevent the environmental and social costs of biofuel production. This section will consider how this situation has evolved over time.

In 2003, an EU directive (Council Directive 2003/30/EC) on the promotion of the use of biofuels in transport set voluntary biofuel targets of 2% by the end of 2005 and 5.75% by the end of 2010. The following year, Belgium started considering biofuels as a 'sustainable' source of energy (Government of Belgium 2004). In 2006, the Belgian government designed a fiscal incentive to encourage biofuels' incorporation into the transport sector (see Annex II). Gasoline that was at least 7% bioethanol in volume would benefit from a tax reduction. However, the environmental and social criteria for fuel companies benefiting from this fiscal incentive were insufficient to ensure due diligence. Documents such as a 'declaration of honor' and an 'engagement' to submit reports were deemed sufficient by the Belgian government to prove respect of social rights at sites of production and for the tracing of the origin of feedstocks (Government of Belgium 2006). It was during this period that Maple Ethanol negotiated and signed a contract with the Peruvian government and began its sugarcane ethanol project.

In 2009, the EU's Renewable Energy Directive (RED I) (Council Directive 2009/28/EC) required 20% of all energy consumed in the EU and at least 10% of all fuels used in road transportation to come from renewable sources by 2020. The latter target was increased to 14% by 2030 in the second Renewable Energy Directive (RED II) of 2018 (Council Directive 2018/2001). The Fuel Quality Directive (FQD) of 2009 (Council Directive 2009/30/EC) also mandated a 6% reduction in the carbon intensity of road transport fuels by 2020. To meet the legal requirements of the REDI, the FQD and the Energy Taxation Directive of 2003 (Council Directive 2003/96/EC), Belgium adopted legislation between 2011 and 2015 to increase the amount of biofuels that would be subject to fiscal incentives (Government of Belgium 2012) and introduce a binding minimum blending target (Government of Belgium 2013). These reforms increased demand across the EU for bioethanol made from food crops such as cereals and sugar – and created conditions for new investments in biofuel production around the world. Multilateral financial institutions such as the World Bank Group, the Inter-American Development Bank (IDB) and the Development Bank of Latin America (CAF) started to provide financing for projects targeting the emerging European biofuels market. It was also during this period that Belgium and the Netherlands decided to invest in Maple Ethanol's operation in northern Peru through their development banks, BIO and FMO (CAF 2010). By 2013, financial loans funding biofuel production in Latin America totaled $1.4bn (Connectas 2013).

2.1. PERUVIAN POLICIES FROM 2003 TO 2018

From 2003, under the advice of the IDB, Peru's government set the legal and technical conditions for future biofuel production projects in the country (Urteaga Crovetto 2017, 9) (see Table 1). These regional and national legal reforms played a key role in facilitating land and water rights acquisitions by large-scale agricultural investments. The reforms built upon prior government initiatives that since the 1990s had sought to open Peru's arid coastal lands for agribusiness (Urteaga 2013, 63). Law No 28054, Law for the Promotion of the Biofuel Market (2003), and Supreme Decrees No 013-2005-EM (2005) and No 021-2007-EM (2007) set the mandatory use of bioethanol and biodiesel in Peru's internal energy market; a series of incentives for biofuel commercialization; and the creation of PROBIOCOM, Peru's Program for

the Promotion of Biofuel Use (Huaman 2019, 131). The Ministries of Agriculture, Energy and Mines, and Production were all given new administrative responsibilities for the development, promotion and commercialization of biofuel production initiatives in the country (Nolte 2020, 4). Combined, the goal of these legal and administrative reforms was to stimulate biofuel production and consumption in order to increase employment, diversify the country's fuel sources, foster agricultural development and reduce environmental pollution (Nolte 2020, 4). They also seek to promote the development of biofuel production, particularly palm oil-based biodiesel, as an economic alternative to coca cultivation as part of Peru's anti-narcotics policies in the Amazon (Khwaja 2010, 4). These reforms set regulatory and normative conditions for an expansion of ethanol projects in Peru targeting EU markets even before the Free Trade Agreement between both entities took effect in 2013 (EU-Peru-Colombia Trade Agreement 2012).

Table 1. Peruvian state policies and main government actions related to biofuels, 2003–18 (taken from Pacheco Canales 2019, 138)

Policy	Government actions	Legal framework
Incentivizing the commercialization of biofuels	Established the use of bioethanol and biodiesel. Created a technical commission to propose (a) mix percentages for biofuels and an application chronogram and (b) a promotion programme regarding biofuel use.	Law No 28054, Law for the Promotion of the Biofuel Market
	Established as mandatory the Peruvian technical norm, guaranteeing a quality certificate.	Supreme Decree Nº 021-2007-EM, Rules for the Commercialization of Biofuels
	Created state agencies for production and commercialization.	Supreme Decree Nº 021-2007-EM, Rules for the Commercialization of Biofuels
	Established mandatory percentages: 7.8% for bioethanol, and 5% for biodiesel.	Supreme Decree Nº 021-2007-EM, Rules for the Commercialization of Biofuels
	Established an application chronogram.	Supreme Decree Nº 021-2007-EM, Rules for the Commercialization of Biofuels
Incentivizing private participation	Created the Programme for the Use of Biofuels (PROBIOCOM).	Law No 28054, Law for the Promotion of the Biofuel Market
	Issued directives for the functioning of PROBIOCOM.	Supreme Decree Nº 013-2005-EM, Rules of Law No 28054
	Subsumed biofuel projects under the Law of the National System of Environmental Impacts Assessment.	Supreme Decree Nº 013-2005-EM, Rules of Law No 28054
Promoting biofuel production in Peruvian Amazonia	Appointed the National Commission for Development and a Life Without Drugs (DEVIDA) as the promotor of private investment on alternative crops in Amazonia.	Law No 28054, Law for the Promotion of the Biofuel Market
	Appointed DEVIDA as the investment promoter in areas that require alternative crops.	Supreme Decree Nº 013-2005-EM, Rules of Law No 28054
Promoting the development of scientific and technological structures for biofuel research	Designated the National Council of Science, Technology and Technological Innovation and universities as the promoters of the development of new technologies for biofuel supply chains.	Law No 28054, Law for the Promotion of the Biofuel Market
Promoting training on biofuels		Law No 28054, Law for the Promotion of the Biofuel Market
Incentivizing biofuel-related technology transfer and application		Law No 28054, Law for the Promotion of the Biofuel Market

The opportunity for MEAAO was created by Law No 277887 – the 2003 *'Law that Establishes Dispositions for the Selling of Lands Set Up by Especial Hydro-Energetic and Irrigation Projects in Peru', which authorized the Peruvian state to sell supposedly 'unproductive'* lands [*tierras eriazas*] in the context of large irrigation projects to private companies willing to implement agricultural investments (Barrientos Felipa 2014, 47). However, much of this 'unproductive' land was actually important for a variety of local livelihoods,[1] but were tagged as such by state authorities in order to legitimize their privatization. This was the case in Chira Valley. Some of the land included under Law No 277887 was covered by irrigation projects in northern Coastal Peru, which had proven capacity for sugarcane cultivation, such as Chinecas, Chavimochic, Tinajones, Jequetepeque-Zaña, Puyango-Tumbes and the PECP (Barrientos Felipa 2014, 54; Huaman 2019, 131). The Peruvian research center CEPES estimates that about 84,000ha of arable land in northern Coastal Peru had been acquired by international investors by 2012 (Tejada 2017, 8). Some of the conglomerates that came to invest in sugarcane (including Grupo Gloria, which would later come to own MEAAO), have been identified by researchers as examples of private 'political capture', given their excessive influence upon the state and its decisions (Eguren C., Eguren López, and Durand 2018, 172).

The creation of these new conditions for investment was followed by a 'land rush' in which Peruvian and foreign investors became increasingly interested in biofuel operations in Peru (Huaman 2017, 128). Biodiesel-focused palm oil plantations grew in Amazonian regions such as Ucayali, San Martín and Loreto to 48,000 tons per year in 2010, with deforestation and territorial dispossession unleashing various social and ecological problems (Khwaja 2010, 4). International companies showed interest in venturing into sugarcane production for biofuel – several agricultural plantations and biofuel processing plants reached a prospecting phase (Tejada 2017, 8). However, to date, Maple is the only sugarcane-based ethanol production operation with international backing that has actually materialized (Huaman 2017, 208). National conglomerates have also shown interest in sugarcane and ethanol production; nine of Peru's main business groups currently own lands for sugarcane production. Grupo Gloria, the current owner of MEAAO via its branch company Agro Aurora, is the largest of these, owning about half of all planted lands to date (Huaman 2019, 132). Many of the sugarcane investments in Piura are conducted by elite Peruvian families who owned large estates several decades ago in the same areas where today their sugarcane plantations are implemented. Thus, as Tejada has argued, the expansion of ethanol production is demonstrating *'the re-concentration of land ownership is bringing back to power the old 'hacendados', who were expelled when Velasco Alvarado declared Piura a zone of agrarian reform'* (Tejada 2017, 10).

Despite the initial enthusiasm for biofuel investments, after two decades, results have been limited, likely due to shrinking international support and demand. In 2008, the Office of Agrarian Promotion of the Ministry of Agriculture had registered about thirty projects for the production of bioethanol and biodiesel in the country, most of which went into operation during the government of Alan Garcia (2006–11) (Urteaga Crovetto 2017, 19). By 2012, 164,000ha, out of a planned total of 390,000ha, had been dedicated to biofuel production (Tejada 2017, 8). In 2013, 45,000ha of sugarcane for ethanol production were announced, to be funded by $2bn in investments from interested parties. Ethanol exports were to grow to $900,000, creating about 40,000 new jobs. Yet, over the next few years, investments crumbled, with many of the planned investments halting in northern Coastal Peru, creating a crisis in Peru's biofuel promotion policy (Burneo 2016, 10). In the Chira Valley, only two large-scale ethanol production projects materialized, Maple Ethanol (MEAAO) and the Romero Group's *Caña Brava* operation. These represent only 39% of the originally projected area for ethanol production in the Chira Valley (Huaman 2017, 208).

2.2. EU'S SUSTAINABILITY FRAMEWORK

Renewed interest in biofuels from the EU and Belgium restored the market for Peruvian bioethanol from 2018. After stopping its tax incentive for biofuels in 2014, Belgium focused its efforts on the establishment of mandatory mix targets for fuel companies feeding the Belgian market (Government of Belgium (CONCERE-

1 The same problematic concept of 'unproductive', 'abandoned' and 'severely degraded' lands has been taken up by the EU to claim sustainability for its biofuel strategy. For example, see Commission's Delegated Regulation 2019/807: "(2) 'unused land' means areas which, for a consecutive period of at least five years before the start of cultivation of the feedstock used for the production of biofuels, bioliquids and biomass fuels, were neither used for the cultivation of food and feed crops, other energy crops nor any substantial amount of fodder for grazing animals; (3) 'abandoned land' means unused land, which was used in the past for the cultivation of food and feed crops but where the cultivation of food and feed crops was stopped due to biophysical or socioeconomic constraints; (4) 'severely degraded land' means land as defined in point 9 of Annex V, part C to Directive (EU) 2018/2001."

ENOVER) 2018). In less than ten years, the mandatory target was almost doubled – currently the obligation stands at 9.55%. (Government of Belgium 2020). Despite ongoing problems in the MEAAO plantation, Belgium and other European countries started buying from MEAAO in 2018 to fulfil their increasing biofuel demand.

CSOs, academics and international organizations have gradually convinced EU and Belgian decision makers gradually integrate sustainability considerations into their frameworks. However, these have not been strong enough to prevent social and environmental impacts in producing countries like Peru, nor prevent EU countries sourcing biofuels from places that are negatively impacted by biofuel production.

RED I introduced reporting obligations for EU member states and the European Commission (EC). Since 2012, the EC must report every two years on the impacts of its energy policies for soil, water and air; the affordability and availability of food, in particular for people living in developing countries; and the respect of land use and labor rights.[2] The reporting format provided to members states, however, asked for the impacts on food and land prices, water and soil generated by the production of biofuels in the member state, even though most of the biofuel they consume originates outside their borders.[3] The EC's reliance on these reports from member states led it to conclude in its 2020 report (European Commission 2020) that impacts were both small and site-specific.[4]

Belgium's Renewable Energy Report to the European Union for 2017–18 stated: *'No effects are known on changes in raw material prices and land use due to increased use of biomass and other renewable energy sources … there are no known negative impacts on biodiversity, water and soil quality specifically due to the cultivation of biofuels.'* (Government of Belgium (CONCERE-ENOVER) 2018) This conclusion ignores extensive evidence of the opposite (see Herman and Mayrhofer 2016). Around 97% of biofuels consumed in Belgium are imported from 67 other countries, including Peru (CNCD-11.11.11, et al. 2019). On the other hand, Germany's latest Renewable Energy Report criticizes the weakness of sustainability standards in associated agricultural policies for energy markets: *'imports of biofuels and bioliquids from outside Europe are not covered by the requirements of European agricultural policy. This applied to around 16% of raw materials in 2015 and 24% in 2016; in 2018, 36% of feedstocks came from outside the EU, and the majority were raw materials whose cultivation was associated with high ecological risks, such as palm oil, sugar cane, soya and maize. The environmental sustainability of these raw materials therefore depends mainly on agricultural practices in producing countries.'* (Federal Republic of Germany 2018).

However, the EU has started recognizing the sustainability and human rights issues associated with food-based biofuels. RED II includes a clause requiring that biofuels produced from food and feed crops can account for no more than 7% of member states' energy for transport. Additionally, this 7% was made optional, with the remaining 7% originating from renewable electricity, electrofuels, recycled carbon fuels and advanced biofuels remaining mandatory.[5] The EU also included a requirement to phase out 'high

2 Para 7 of Article 17 Sustainability criteria for biofuels and bioliquids of the EU Council Directive 2009/28/EC.

3 *'Question 7: Please provide information on any changes made to the prices of commodities and to the allocation of land in your Member State in the last 2 years linked to the increased use of biomass and other types of energy from sustainable sources. Please indicate, where applicable, the reference of the documents relating to these impacts in your country'* (Article 22(1)(h))
'Question 9: Please provide information on the estimated impact of bio fuel and bio liquid production on biodiversity, water resources, water quality and soil quality in your country over the last 2 years. Please provide information on the way in which these impacts are evaluated, by providing references to relevant documents concerning these impacts in your country.' (Article 22(1)(j))
'Question 10: Please estimate the net reductions in greenhouse gas emissions achieved thanks to the use of energy from sustainable sources.' (Article 22(1)(k)) of the EU Council Directive 2009/28/EC.

4 The cultivation of feedstock for the production of biofuels consumed in the EU can potentially result in negative environmental impacts. Apart from indirect impacts these effects are usually site-specific and depend on the agricultural practices. These negative environmental impacts include eutrophication of water bodies, water scarcity, soil erosion, soil compaction, air pollution, and habitat and biodiversity loss. Impacts such as the conversion of land with high carbon stock and land of high biodiversity value are prohibited by the sustainability criteria. In their progress reports, most member states point to the limited cultivation of feedstock used in biofuel production compared to total agricultural activities, and consider that associated environmental impacts are therefore low. Several member states point out that all agricultural production is regulated with respect to environmental impacts, so consider that no more impacts should be expected from biofuel crop production than from other crop production.

5 According to Article 26 of Council Directive 2018/2001: *'For the calculation of a Member State's gross final consumption of energy from renewable sources referred to in Article 7 and the minimum share referred to in the first subparagraph of Article 25(1), the share of biofuels and bioliquids, as well as of biomass fuels consumed in transport, where produced from food and feed crops, shall be no more than one percentage point higher than the share of such fuels in the final consumption of energy in the road and rail transport sectors in 2020 in that Member State, with a maximum of 7 % of final consumption of energy in the road and rail transport sectors in that Member State. (…) Where the share of biofuels and bioliquids, as well as of biomass fuels consumed in transport, produced from food and feed crops in a Member State is limited to a share lower than 7 % or a Member State decides to limit the share further, that Member State may reduce the minimum share referred to in the first subparagraph of Article 25(1) accordingly, by a maximum of 7 percentage points.'*

[indirect land use change] ILUC risk' biofuels, such as palm oil, by 2030[6] (Commission Delegated Regulation 2019/807 2019). Unfortunately, member states such as Belgium have used the flexibility given by the EU to maximize imports of food-based biofuels to the limit, despite continued pressure from NGOs and reports from the Belgian federal administration about their associated social problems (CETRI (Monique Munting) 2010).

However, Belgium has included a definition of 'sustainable biofuels' in 2011's and subsequent legal reforms (Government of Belgium 2011), which distinguish between first-generation and more advanced biofuels. These introduce sustainability criteria and monitoring mechanisms considering greenhouse gas emissions, deforestation and biodiversity. However, the technical analysis behind this monitoring system is unable to prove the scale of an impact (Transport & Environment 2016). The legislation also makes no reference to human rights issues, despite an explicit request by official Belgian advisory councils (Conseil Fédéral du Développement Durable (CFDD) 2018). Between 2016 and 2017, Belgium released a list of the feedstock that would be allowed in each category of biofuels, and made it mandatory for each actor involved in the value chain within Belgium to provide information on the type of feedstock, imports, exports and final consumption within Belgian territory (Government of Belgium 2017). In subsequent years, Belgium has reinforced its sustainability framework a few times, albeit insufficiently. In 2018, it established a maximum of 7% volume for first-generation biofuels, while keeping an overall mandatory minimum of 6.5%. It also started promoting the development of advanced biofuels and electricity as an alternative to first-generation biofuels, while improving its biofuel monitoring system and its enforcement. Despite this growing awareness of the problems associated with first-generation biofuels, Belgium started buying bioethanol from the Chira Valley in 2018, and continues today.

In 2019, Belgium submitted its National Energy and Climate Plan (NECP), as mandated by EU Regulation on the Governance of the Energy Union (Council Regulation 2018/1999 2018). Belgium ignored reports from the Intergovernmental Panel on Climate Change,[7] CSOs and other international organizations, and set a biofuels target of 13.9%. This plan was criticized by the EU for its insufficient consideration of a just transition and a deficient impact evaluation (European Commission 2019). Only the Walloon region made reference to the policy's impacts in the Global South. Recognizing the gendered impacts of biofuel-related violence and landgrabs on women from the Global South, the Walloon government declared it would commit to integrating a gender dimension into its mobility, town planning and regional development policies, from the analysis of projects to their evaluation. By 2020, Belgium had increased its mandatory minimum for biofuels by volume to 9.55%, with no specific legal measures to enforce the social safeguards mentioned in the NECP.

The EU is currently discussing the possibility of modifying RED II. The EC has recently tabled a proposal to increase the 2030 target for renewable energy from 32% to 40% as part of its 'Fit for 55' package of measures to meet its new emissions reduction target of 55% by 2030 (European Commission 2021). This proposal includes no new elements to address the use of unsustainable crop-based biofuels in transport, leaving open the possibility of using food for fuel. The proposal also fails to account for emissions from ILUC arising from deforestation and peatland degradation induced by increased demand for bioenergy. In the absence of an adequate accompanying sustainability framework, the global social and environmental cost of this growing European demand for bioenergy will keep escalating, with people living in poverty paying the highest price.

Belgium's national transposition of RED II is due in 2021. This proposal needs to take into consideration that human rights violations are happening in the field, besides the incipient social sustainability principles included in the legislative documents and reporting mechanisms. In short, Belgium needs to move fully away from food-based biofuels.

6 According to Commission's Delegated Regulation 2018/807 high ILUC refers to the displacement of agriculture into forested land and carbon sinks to compensate for the land that is used for biofuels, and that therefore produces additional greenhouse gases emissions, which are often not accounted for. The Commission Regulation includes only 'high ILUC-risk feedstock', for which a significant expansion of the production area into land with high carbon stock is observed. In reality this will only rule out palm oil with exceptions, and will not impact high-ILUC biofuels such as rapeseed and soy.

7 The Intergovernmental Panel on Climate Change (IPCC) special report on land and climate change of 2018 raised the dangers of massive biofuel expansion (IPCC 2019).

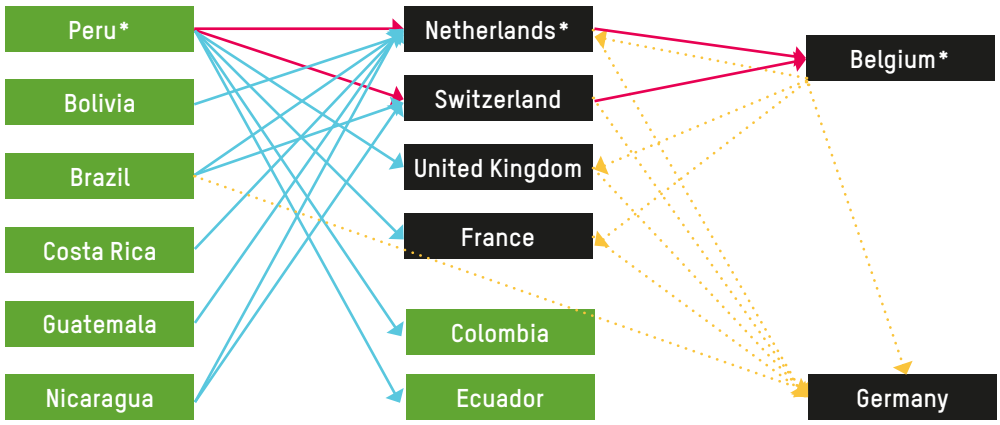
PART 3. ETHANOL EXPORTS

Since 2008, the year Peru began producing sugarcane-based ethanol, a considerable part of domestic ethanol production has been exported to countries such as the United Kingdom, France, Ecuador, Colombia, etc. (Nolte 2020, 7). In this context, the European Union has become a prominent market for Peruvian ethanol, with 94% of Peruvian exports going to European Union markets today (see Table 2) (Nolte 2020, 5). Despite its relatively minor stature in the international market, Peru's ethanol exports have in some years constituted a significant share of overall biofuel imports in some European countries, such as Belgium in 2018 and 2020 (see Figure 6) and Germany in 2018 (Federal Republic of Germany 2018, 165). Peruvian ethanol arrived in Belgium via third countries, such as Switzerland and the Netherlands. Even though Peru has been an importer of US ethanol since 2018, US markets, on the other hand, have remained outside the reach of Peruvian producers, as their ethanol production does not satisfy US renewable fuel standards (Nolte 2020, 8). By contrast, the EU offers price premiums to Peru for green harvesting (i.e. harvesting without cane field burning), despite ample evidence that field burning is regularly conducted in Peru's sugarcane-based ethanol operations. In 2019, export prices for Peruvian ethanol in the EU ranged from $0.52 (January) to $0.63 (September) per liter (Nolte 2020, 8).

Table 2. Peruvian Ethanol Exports in 2019 (Taken from Nolte 2020, p. 7)

Peruvian undenatured ethyl alcohol exports (220710) (in million liters)			
	2017	2018	2019
World	91	108	170
Netherlands	50	64	129
U.K.	0	21	18
France	3	5	13
Ecuador	13	14	5
Colombia	16	3	4

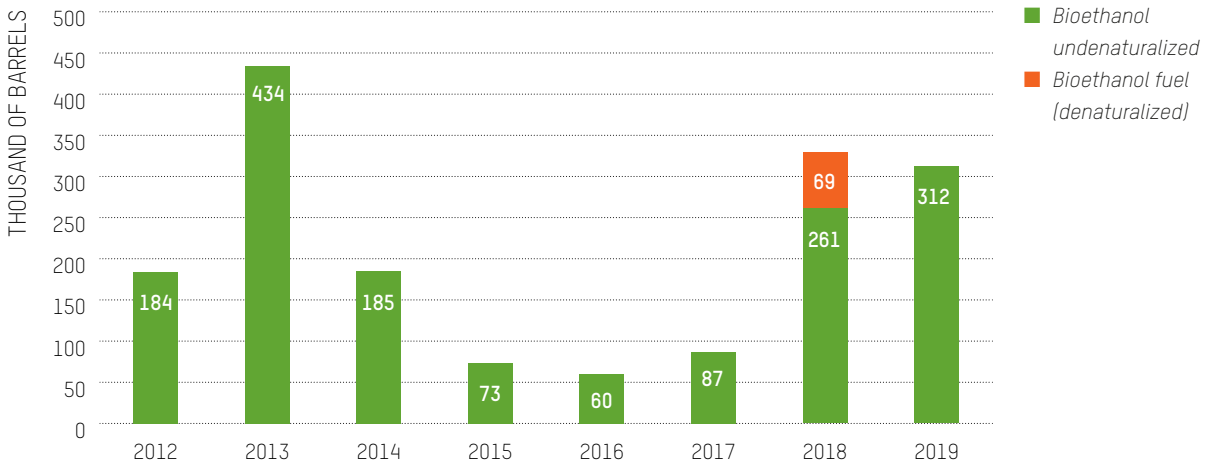
Figure 4. Sugarcane-based ethanol value chain flows.



*Red lines represent how sugar cane is flowing from Peru into Belgium. Blue lines represent national data on bioethanol from sugarcane for fuel purposes. Doted yellow lines are macroeconomic data from the UN trade database on general ethanol flows for from several feedstocks and purposes. *Countries that were confirmed during the research to play several roles, as producers, intermediaries and/or end-consumers. (elaboration by author).*

As the only northern Coastal valley with sugarcane production specifically oriented towards ethanol production (Huaman 2017, 16), the Chira Valley is significant for both domestic consumption and export. The Romero Group's *Caña Brava* operation owns a $210m facility in the Chira Valley that maintains about 8,000ha of planted sugarcane fields and a production capacity of about 127m liters per year. Similarly, Agro Aurora, MEAA0's current owner, has a facility that processes about 6,500ha of sugarcane (Nolte 2020, 6). In 2020, both facilities combined accounted for 90% of Peru's ethanol production for export, with Agrojibito S.A. (MEAA0's plant) accounting for 144,727m3 of alcohol and Sucroalcolera del Chira S.A. (Caña Brava's plant) accounting for 60,410m3 (La Republica 2021). The Chira Valley, therefore, has become a central node in Peru's ethanol economy, with MEAA0 in particular accounting for a significant share of total exports, most of which are sent to the EU.

Figure 5. MEAA0's ethanol exports, 2012–19 (Taken from Pacheco Canales 2019)

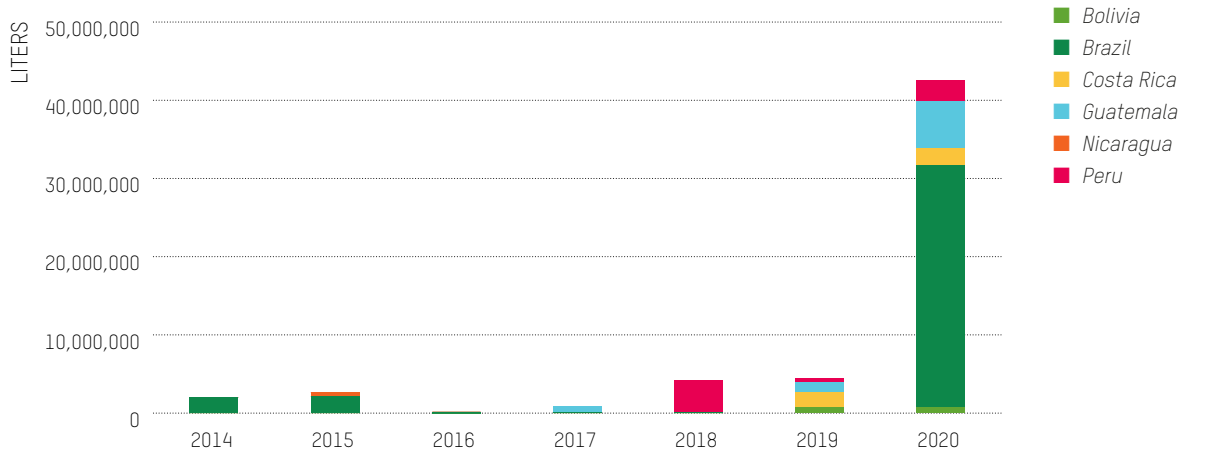


Belgium's consumption of ethanol has been increasing during the past decade, both in relative and absolute terms, with 72.6m L, representing 11% of the consumption in Belgium's road transport in 2014, to 136.7m L representing 26% of the consumption in 2020, according to official data. Ethanol from sugar cane imports have followed a similar trend, with Peru representing a constant supplier since 2018 (see table 1).

Table 3. Belgium's sugarcane's ethanol imports, including Peru, in Liters (2014–20). First imports were recorded in 2014.

	2014	2015	2016	2017	2018	2019	2020
Bolivia	-	-	-	-	-	720,304	717,059
Brazil	2,004,557	2,137,348	141,295	448,97	56,105	-	31,028,288
Costa Rica	-	-	-	-	-	1,988,390	2,126,280
Guatemala	-	-	-	857,687	-	1,260,581	6,008,259
Nicaragua	-	541,374	-	-	-	-	-
Peru	-	-	-	-	4,137,634	437,303	2,623,437
TOTAL (L)	***2,004,557***	***2,678,722***	***141,295***	***1,306,657***	***4,193,739***	***4,406,578***	***42,503,323***

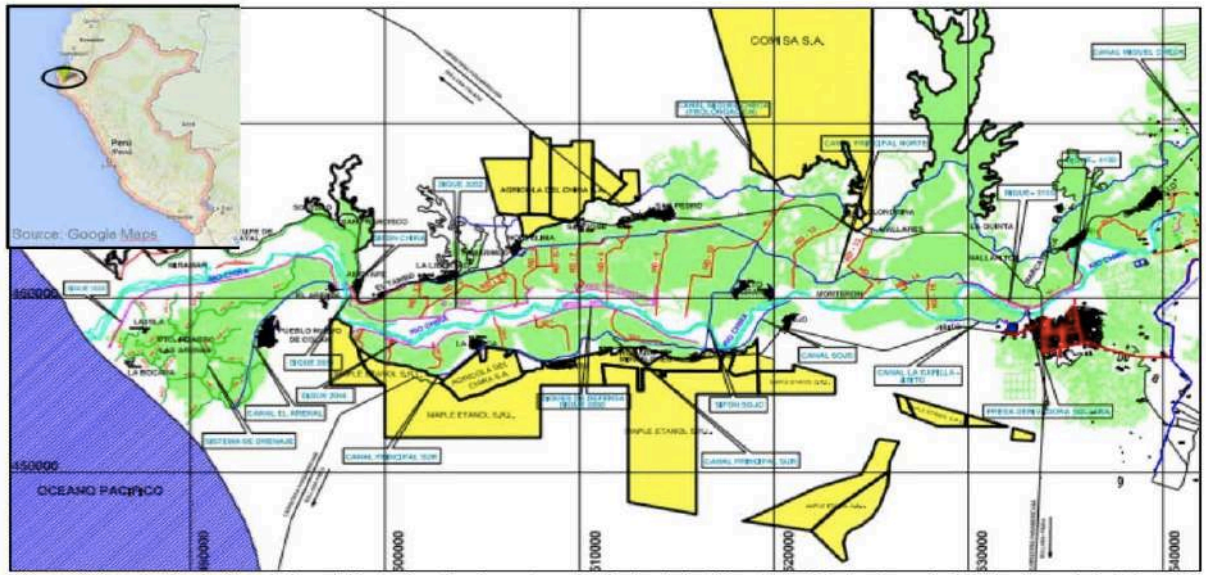
Figure 6. Belgium's ethanol imports, including Peru (2010–20)



PART 4. MEAAO'S CORPORATE GOVERNANCE: MAPLE ETHANOL & AGRO AURORA

4.1. FUNDING AND ESTABLISHMENT, 2005-11

Figure 7. Maple Ethanol originally adjudicated lands in the Chira Valley (Taken from Tejada 2017, p. 21)



In 2003, shortly after PECP's main canals had been completed, a special committee was created in Piura to promote private investments in the region (Tejada 2017, 21). In the following years, many companies showed interest in developing ethanol projects in the Chira Valley through the new adjudication mechanisms (Huaman 2017, 203). The PECP was the designated state entity in the Chira Valley in charge of conducting the sale of state lands to foreign and national investors. In 2006, lands were adjudicated to two companies: *Caña Brava* (owned by the Romero Group) and Maple Ethanol (Huaman 2017, 203). Land was sold to *Caña Brava* through auction, while Maple Ethanol acquired its lands via a separate private request (Tejada 2017, 21). By means of this mechanism, Maple Ethanol received a total adjudication of 10,684ha at $60 per hectare, in addition to a commitment to make an annual payments of $500,000 over 20 years, making their investment total $254m (Huaman 2017, 207; Urteaga Crovetto 2017, 21). Later, Maple Ethanol would buy 3,262ha more land by other means, bringing its total in the Chira Valley to 13,946ha[8] (see Table 6).

Table 4. Lands acquired by Maple Ethanol, totalling 13,946ha. (taken from Huaman 2017, 207)

Surface (ha)	Type of access
10,684	Land adjudication from Piura's Regional Government
3,262	Additional land purchasing
13,946	TOTAL

Maple Energy is a North American energy company primarily focused on oil. It is legally constituted in the British Virgin Islands and its stock trades in New York, London and Lima. The company established a branch

8 As a means of comparison this would represent about 86.4% of the total surface of the Brussels region.

called Maple Ethanol to take advantage of the growing international market for biofuels in the early 21st century. Maple Ethanol received $130m in loans from institutions funding the exploration of alternatives to fossil fuels, including the World Bank Group, the Inter-American Development Bank, the Development Bank of Latin America and the Entrepreneurial Development Bank of the Netherlands (FMO) (Huaman 2017, 207; Connectas 2013). In 2010, Maple Ethanol received a €6.5m ($9m at the time) loan from BIO to implement its ethanol production project in the Chira Valley (see Table 2). This loan was later criticized in evaluations of BIO's performance as an international investor, given the dubious record of ethanol production as a 'sustainable' energy source (Van de Poel 2012; see also Zaccharie et al. 2013).

Table 5. Investments in renewable energy projects by BIO (taken from Van de Poel 2012, 37)

Project	Country	Year	€ (x10^3)	Info
Polaris Energy (project)	Nicaragua	2010	8,342	Geothermal energy
Amayo II (project)	Nicaragua	2010	6,686	Wind energy
Maple Ethanol (project)	Peru	2010	6,497	Ethanol production from sugarcane for biofuels
Jakarta Tank Terminal (direct)	Indonesia	2010	3,856	Petroleum storage facility
Interact Climate Change Facility (project/syndication vehicle)	ACP countries	2010	10,000	Project financing in 'clean technology' of EIB
Hohhot (direct)	China	2009	3,484	Coke production in Inner Mongolia

4.2. OPERATIONS UNDER MAPLE ETHANOL, 2012–15

Maple Ethanol began its activities in March 2012 with an ethanol production capacity of 2,500 barrels per day (Pacheco Canales 2019, 142; Tejada 2017, 26). In the first phase of the project, Maple Ethanol planted 7,500ha of sugarcane; in the second phase they planted 2,300ha more (Urteaga 2013, 74). By 2013, the company was harvesting 1 million tonnes of sugarcane, and producing 70m liters of fuel-grade ethanol. Around 96% of this early production was exported to the EU (Booker Tate n.d.).

In June 2014, Maple Ethanol employed between 700 and 800 people, 65% of whom were from the neighboring districts of La Huaca, El Arenal, Pueblo Nuevo de Colán, Amotape, Tamarindo and Vichayal. Most were subject to the common labor law and not the special (and more precarious) special labor law for the agrarian sector (Tejada 2017). Maple Ethanol hired an additional 200–300 staff via a subcontractor called Grupo Paem under temporary contracts (ibid. 26). When Agro Aurora took control of operations in 2015, they kept about 1,000 workers on its payroll. When considered along with the neighboring company of Caña Brava, which employs about 1,500 people, ethanol investments in the Chira Valley do appear to satisfy the original policy goal of generating local jobs. However, policy evaluations suggest that ethanol investments in the Chira Valley have been less relevant at a regional scale, only employing 0.3% of the economically active population of the Piura Region (Pacheco Canales 2019, 143). This resonates with critical evaluations conducted for the Chira Valley, which have shown that small-scale family agriculture is far more efficient in providing jobs and revenue streams to local populations than large-scale plantations (see Roy 2013).

Besides providing jobs, Maple Ethanol sought to mitigate its negative impacts through corporate social responsibility (CSR) initiatives aimed at neighboring districts. For example, it supported social initiatives for women entrepreneurs in La Huaca, and others cleaning public spaces. Through the NGO Cedepas Norte, Maple Ethanol supported small cooperatives of organic banana producers in the lower Chira Valley (Tejada 2017, 27). According to some people interviewed for this report, these initiatives were related to conditions of Maple's international funding. This would explain, in the opinion of these interviewees, why such policies did not continue once MEAA0's control was transferred to Agro Aurora, a company owned by Peruvian capitals.

At the end of 2014, Maple Ethanol went into default and declared itself incapable of paying its debts (Pacheco Canales 2019, 142). By 2010, a series of

disappointing results in oil prospection had seriously damaged Maple Energy's stock value. Rising debt costs left it with scarce resources to push forward strategic investments in its ethanol branch project in the Chira Valley. Combined with a fall in global ethanol prices, Maple Ethanol was pushed into bankruptcy (Huaman 2019, 140). The strong dependence of operational capacities on Maple's stock market value reveals the extent to which contemporary agrobusiness, including biofuel investments, are at the mercy of financial capital (Huaman 2017, 251). However, others have also associated Maple Ethanol's crisis to production problems related to water scarcity in the Chira Valley (Tejada 2017, 23). In any case, during 2014 Maple Energy started to search for investors to acquire their oil and ethanol operations in Peru. Some of Peru's most powerful corporate groups, such as the infrastructure company Graña y Montero, considered buying Maple's debt (Mining Press 2015), as well as the Belgian company Alcogroup S.A. In April 2015, Grupo Gloria, via its sugarcane production wing *Corporación Azucarera del Perú* (Coazúcar), announced that it would buy Maple Ethanol's overall assets for $108m (Huaman 2019, 140; Mining Press 2015).

4.3. OPERATIONS UNDER GRUPO GLORIA, 2015-21

Grupo Gloria, a large corporate group known in Peru primarily for its dairy businesses, is also the country's largest sugarcane producer. Maningham Holding S.A., constituted in Panama, is the holding company that brings together the many sugarcane-based operations that Grupo Gloria owns in Peru. Grupo Gloria's sugarcane operations in northern Coastal Peru include Agrolmos, Casa Grande, Cartavio, San Jacinto, Sintuco and Chiquitoy (Navarro Palacios 2019). Grupo Gloria restructured Maple Ethanol's assets into at least two subsidiary companies:

- Agropecuaria Aurora, in charge of the plantation;
- Agrojibito, in charge of the production plant; and
- Jibixport.

For ease, in this report we will refer to these subsidiary companies together under their common name, Agro Aurora. In total, Agro Aurora acquired from Maple Ethanol its 13,946ha of adjudicated land, only partially used for sugarcane cultivation at the time of the transfer; an ethanol production facility and an energy plant (Mining Press 2015). Agro Aurora added another 527ha of land previously adjudicated to Grupo Gloria by the regional government of Piura (see Table 5) (Huaman 2017, 208).

Table 6. Lands acquired by Agro Aurora in the Chira Valley. Total: 14,446ha. (Taken from Huaman 2017)

Surface (ha)	Type of access
13,946	Purchase of Maple Ethanol's assets
500	Land adjudication from Piura's Regional Government
14,446	TOTAL

In addition to being one of the most powerful and influential corporate groups in Peru, Grupo Gloria is also a controversial one. In 2019, its export dairy business suffered backlash from the US Food and Drug Administration, which red-listed Gloria S.A. for offering evaporated milk that did not comply with US standards (Navarro Palacios 2019) Grupo Gloria has been involved in a number of political scandals. For example, its CEO, Vito Rodriguez, was cited by judicial authorities in 2019 as part of a criminal investigation into irregular contributions made to the political campaign of Keiko Fujimori, a Peruvian presidential runner facing charges for money laundering (Gestión 2019). Controversies surrounding the Grupo Gloria have also arisen from the asset transfer with Maple Ethanol. In 2017, a report from the Anti-Corruption Office of the Regional Government of Piura concluded that the contract between the companies had caused financial losses to the Piura region of more than $8m, as state authorities had allowed the transfer even when Maple Ethanol had previously committed to pay $10m over 20 years, as well as a $3.2m fine in case its ethanol project did not materialize (Diario Correo 2019). For such reasons, according to local testimonies, the arrival of Grupo Gloria in the Chira Valley was received with widespread skepticism by many local communities and authorities.

As soon as Agro Aurora gained control of MEAAO, the company decommissioned the ethanol production facility and redirected the 6,000ha of land under sugarcane production at the time to produce sugar for human and industrial consumption (Nolte 2020). In 2018, Agro Aurora resumed ethanol production and registered ethanol exports amounting to 69,000 barrels, according to Peru's Customs Office (Pacheco Canales 2019, 142). That year, Peru's ethanol exports accounted for 99% of ethanol exports to Belgium (see Figure 6). By 2020, Agro Aurora accounted for 47% of all of Peru's ethanol exports, most of which still flows towards EU markets (94% in 2019) (La Republica 2021).

The change in corporate ownership of MEAAO has not affected the environmental and social costs associated with its ethanol production operations. Indeed, it may have worsened them. Interviewees from

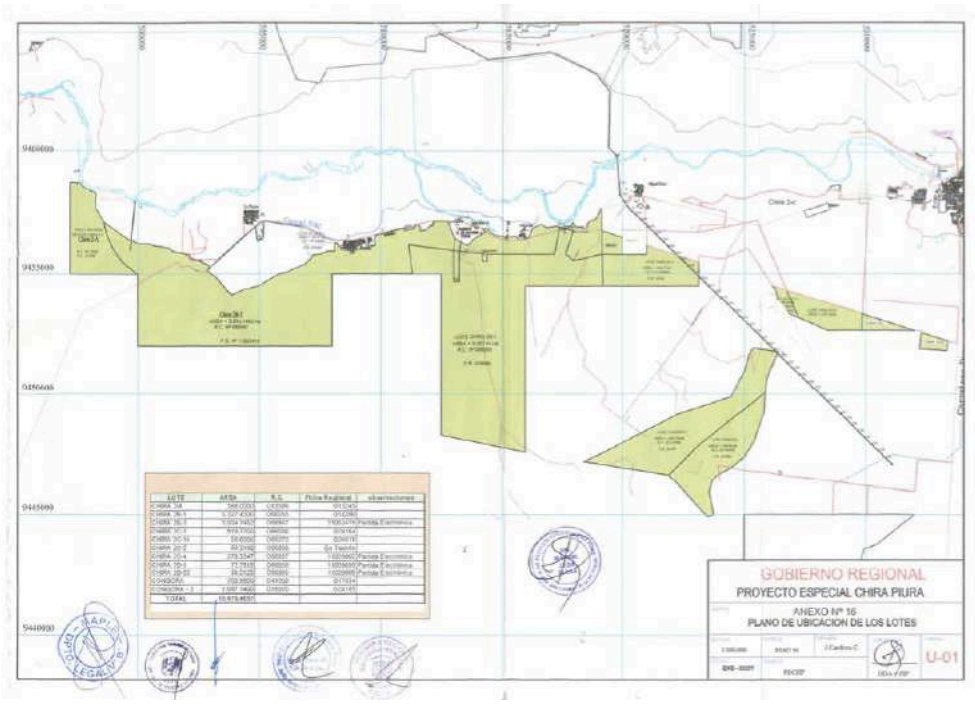
CSOs and neighboring district authorities told us that, Agro Aurora does not undertake any CSR activities or hold regular dialogues with local authorities, unlike Maple Ethanol. This might be related because, unlike Maple Ethanol, whose funding placed it under the supervision of international investors, Agro Aurora belongs to a national corporate group lacking incentives and a historical record on sustaining positive relations with neighboring populations. However, this does not relieve Maple Ethanol and its funding sources of responsibility for the negative impacts brought about by ethanol investments in the Chira Valley. Even when the original funding framed the project as a 'sustainable' and 'green' energy source, both European funding and trade regulations failed to set conditions that could guarantee the continuity of environmental and social standards over time.

PART 5. LAND CONFLICTS

Peru's biofuel policy in the early 21st century was bavsed upon the belief that private investments would modernize agriculture and improve 'unproductive' lands. This narrative resonated with broader international enthusiasm propelled by the goals of EU energy policies, which framed biofuel investments as a way to add value and improve agricultural yields. In reality, however, many of the lands deemed 'unproductive' by the Peruvian state were used by local populations, often under common-use arrangements, and their privatization for large-scale monocrop production was conducted without consultation.

As some researchers have pointed out, biofuel policies gave very little attention to the impacts of investments upon the availability of resources such as land and water, especially in arid regions such as northern Coastal Peru (Urteaga Crovetto 2017, 9). The large-scale privatization of common land highlights the social inequities and power asymmetries between private companies and local communities, and thus the various acts of dispossession and displacement that have sustained the advancement of ethanol investments in northern Coastal Peru (Urteaga 2013, 63).

Figure 8. Lands bought by Maple Ethanol from the PECP, 5 January 2007 (Source: PECP archives)



In order to legitimize this dispossession and displacement, state biofuel policies legally categorized certain lands as 'lazy' or 'abandoned' so that they could go to public auction and land adjudications mechanisms allowing private companies to acquire them (Burneo 2016, 366). In the Chira Valley, the PECP was instrumental in this process. By presenting itself as the legitimate owner of such lands and claiming to operate through principles of technical modernization and neutrality, the PECP was able to bring large extensions of land deemed 'unproductive' and declare their adjudication to new ethanol investments as matters of 'public interest' (Huaman 2017, 2018; 2019, 136). Theoretically, such lands consisted of dry forests with no natural disposition for agriculture, given their lack of irrigation. However, the 'improvement' supposedly carried out by companies entailed using a public subsidy to irrigate for sugarcane cultivation by redirecting water resources in their favor in an area already under water stress (Urteaga Crovetto 2017, 12). In the Chira Valley, most of the land sold was located in an area known locally as 'El Tablazo', a vast dry forest located between the cities of Paita, Piura and Sullana that was regularly used by local populations for grazing, wood collection and other low-intensity activities (Urteaga 2013, 69).

PECP's land adjudication in favor of Maple Ethanol was controversial throughout. The $60 per hectare price paid was considered by several civil society advocates to be well below the real market price, which was estimated at about $1,000 per hectare (Huaman 2017, 215). Indeed, public auctions conducted by the PECP in the late 1990s saw land in the Chira Valley sold for $400–1,430 per hectare (Eguren C., Eguren López, and

Durand 2018, 46). The local water councils [*Juntas de Agua de Riego*] in the Chira Valley were first to protest the regional government's decision to grant land and water rights to ethanol companies. In October 2006, Ántero Nizama, president of the local water council of the middle and lower course of the Piura River, announced that thousands of small agricultural producers would protest against the agreement (Urteaga Crovetto 2017, 28; Connectas 2013, 4).

However, perhaps the biggest problem with Maple Ethanol's land acquisitions in the Chira Valley was the overriding of existing claims to the ground. In 2009, media commentators calculated that about a third of the lands adjudicated to Maple Ethanol were in practice used by local smallholding producers (Bajo la Lupa 2009). These lands were located in the district of La Huaca and the eastern portion of the peasant community of San Lucas de Colán, mainly in a sector known as Las Arenas Altas (Huaman 2017, 140). In a declaration in Congress in June 2008, Piura's regional president at the time, César Trelles Lara, admitted that his administration did not take into account the fact that the land adjudicated included towns and small settlements that found themselves, all of a sudden, within the property boundaries of a newly arrived company (Bajo la Lupa 2009).

The situation for the peasant community of San Lucas de Colán, located in the lower course of the Chira River, was particularly difficult given that the community lacked property titles over most of its ancestral communities at the time of Maple Ethanol's arrival. The superimposition between the adjudicated lands of Maple Ethanol and the peasant community included 924ha that spanned not only dry forest lands, but also the small settlements of Las Arenas Grandes, a settlement within San Lucas de Colan, and La Rinconada. According to testimonies collected at the time, the peasants who lived in these settlements only learned that their lands had been sold to the company once representatives from Maple Ethanol visited the area to inspect their new acquisitions (Huaman 2017, 215).

About 200 families in the La Huaca district were affected, as their houses, farmyards and schools were included in the adjudication without consultation (Huaman 2017, 215). According to some testimonies, this even resulted in some evictions from the disputed land and the exclusion of peasants from using areas that used to be held in common, such as the dry forest lands of El Tablazo. These areas, despite been deemed "unproductive" by official state discourses, were in fact abundantly used by local populations for cattle grazing, firewood and *algarrobo* fruit collection (Tejada 2017, 34). La Huaca's local cemetery was enclosed in Maple Ethanol's land adjudication, but was fortunately excluded from its sugarcane plantation plans. However, water runoff from plantations has damaged burial sites; as one of our interviewees put it, 'our dead are now drowning in water'.

In 2007, Maple Ethanol organized an assembly in La Huaca to deal with the land conflicts arising from superimpositions (Tejada 2017, 22). Several interviewees note that Maple Ethanol was not fully transparent with its intentions during this assembly, and claim that an attendance sheet was reportedly taken by the company as evidence of peoples' compliance with company proposals. Reports from the Ombudsman's Office in Peru [Defensoría del Pueblo] indicate that, until 2010, the company and local civil society where not talking to each other (Connectas 2013, 4). As a result of dialogue facilitated by state authorities, Maple Ethanol agreed to donate 842ha of land to the district of La Huaca and to shift sugarcane plantations to the higher parts of the Chira Valley, where it would not interfere as much with homes and livelihoods (Tejada 2017, 22). This was possible because the company used its resources to channel water from the Chira River into these higher lands with the compliance of local state authorities, something that was also questioned by local agricultural producers (Huaman 2017, 216).

Downstream, the situation with the peasant community of San Lucas de Colán was also delicate. In 2010, the World Bank's Ombudsman opened an investigation to determine whether an institutional audit was needed given the social conflict caused by the presence of Maple Ethanol in the Chira Valley. In 2012, the preliminary investigation was closed (Connectas 2013, 4). Land conflicts caused community representatives to take the company to trial to determine ownership of superimposed lands. As the trial went forward, Maple Ethanol provisionally proposed a non-binding leasing of the lands under consideration, which would allow the company to plant sugarcane fields until the case was resolved (Huaman 2017, 216). After several bargaining meetings, in August 2012 Maple Ethanol agreed to move forward with the land leasing scheme by raising the proposed annual payment for 224ha of land from S/. 100,000 to S/. 335,000 (Peruvian soles, about $37,200 to $124,500 in August 2021 rates) (Burneo 2016, 371). This amounts to a payment of about $450 per hectare per year, significantly higher than that paid by Maple Ethanol to the PECP a few years before (Huaman 2017, 216). In 2014, the judge found in favor of the peasant community of San Lucas de Colán, and the lands in dispute came to be definitively in control of the community (Huaman 2017, 219). Yet, this legal decision only concerned the land that was superimposed on San Lucas de Colan's historical territory. Other areas of El Tablazo in the Chira Valley, including areas immediately adjacent to towns, farmyards and even the La Huaca cemetery, remained under the company's control.

Maple Ethanol's presence in San Lucas de Colán became not only the cause for evictions and uncertainties around land ownership – it redefined the relationships between the peasant community as a political and juridical body and its members, with the former having its authority eroded and younger community members preferring to negotiate directly with private companies (Burneo 2016, 370). Similarly, the irregularities in land acquisitions have been even framed as 'abuse' by international organizations like the FAO for the risible prices paid by the company and the infringement on property rights, impact on livelihoods and local access to natural resources (Khwaja 2010, 21). While Maple Ethanol technically followed all legal procedures to acquire land via adjudications from the PECP, it is also true that a due diligence process involving a prior assessment of the area and the real land rights existing on the ground could have avoided a long history of conflict with both the district of La Huaca and the peasant community of San Lucas de Colán. Once Agro Aurora took control of MEAAO in 2015, conflicts around access to land receded, but new social and environmental conflicts appeared in the relationship between the company and local populations.

PART 6. FOOD SECURITY

In a context where nearly 842 million people in the world suffer from not getting enough healthy food in their diet, the dilemma "food vs fuel" has thus become increasingly prominent in biofuel policy discussions (Subramaniam, Masron, and Azman 2019, 72). The production of first-generation biofuels competes with food markets for raw materials. In 2014, about 17% of global sugarcane production and 15.1% of global corn consumption was for ethanol production; about 16.1% of soy demand and 5.9% of palm oil demand worldwide was for biodiesel production (Koizumi 2014, 1). Since 1990, more than half of all sugarcane production has been used for bioethanol (ibid., 86). Large-scale biofuel investments also compete for land and water supply, potentially redirecting productive assets away from food-oriented agriculture towards the interests of biofuel agribusiness schemes. In places like the Chira Valley, both land and water are scarce and require substantial infrastructure investments, so resource competition is particularly problematic. Since 2006, the international intensification of biofuel markets, along with population growth, urbanization and the expansion of wage economies, which creates an imbalance between demand and food availability , has led the FAO and the G8 to discuss the complex relationship between the expansion of biofuels and rising problems related to food security (IFPRI 2008; Koizumi 2014, v).

However, the specific links between biofuel expansion and food security issues have not been fully understood in the literature, in part because measuring the impact is methodologically difficult (Thornhill et al. 2016). Indeed, some literature maintains that biofuel operations can actually increase food security for local populations (Negash and Swinnen 2013, 973; Thornhill et al. 2016). However, others have compellingly argued that biofuels worsen food security in developing countries (Subramaniam, Masron, and Azman 2019, 72), and disproportionately impact impoverished populations that are more vulnerable to fluctuating food prices and corporate pressures upon natural resources (IFPRI 2008). In response to such potential negative impacts, better regulations and policies have been proposed to impose food security provisions in biofuel production schemes, including crop yield improvement, more investment in research and development, and the adoption of advanced biofuel alternatives, which supposedly have lower impacts on food security (Subramaniam, Masron, and Azman 2019, 80).

In the Chira Valley, the relative proximity to urban centers and easy access to trade routes has meant that food sources have not been particularly disrupted with the arrival of ethanol investments. Nonetheless, the land dispossession and resource concentration caused by private companies has reportedly diminished the capacity of many small-scale agricultural producers to effectively produce agricultural yields for local markets. Some interviewees have pointed out that increasing pressures upon water since the arrival of ethanol investments have meant that human water consumption in the towns of the La Huaca and Miguel Checa districts is periodically limited during the dry months of the year. Thus, even when food security per se has not been seriously compromised in the Chira Valley, the increasing concentration of productive assets in fewer hands and the dispossession of local producers does point towards an increasing vulnerability of local populations in their ability to produce income, especially as the weather uncertainties caused by climate change are expected to increase in the upcoming years.

PART 7. WATER CONFLICTS

Water scarcity and the variability of supply are seen as a growing food security problem in the EU (Ercin, Chico, and Chapagain 2016). As the supply chains of various products such as soybeans, rice, sugarcane, cotton, almonds, pistachios and grapes have increasingly involved areas with significant water scarcity and/or fluctuations caused by climate change, imports for EU markets risk disruption. This risk might also extend to domestic energy consumption, given increasing reliability on first-generation biofuels. Areas vulnerable to water fluctuations caused by climate change are responsible for 56% of sugarcane-derived imports to the EU (ibid. 2). As climate change creates even more drastic extreme weather events related to water availability, this problem might intensify in the upcoming decades (Mekonnen and Hoekstra 2016). Climate change thus constitutes a fundamental threat to any energy strategy based on first-generation biofuels, as the productive and commercial rhythms of large-scale plantations will continue to demand huge water supplies in the face of increasingly uncertain and erratic hydrological patterns.

In the Chira Valley, the arrival of ethanol investments was supported by a state narrative by which private investments would transform "unproductive lands" into productive agricultural frontiers by means of the entrepreneurial expansion of water irrigation infrastructures. In the matter of just a decade (2000–09), cultivated areas in the Chira Valley grew 76.13% to 41,930ha via the irrigation of previously 'unproductive' lands. In this process, sugarcane became the largest semi-permanent crop in the valley (Urteaga 2013, 62). The expansion of irrigation led by sugarcane investments transformed not only the conditions of land ownership and livelihoods, but also water management. The expansion of irrigation necessary to turn land into productive sugarcane plantations required connections to the Chira Valley's water system and, thus, their owners gained the right to request water from local authorities. This put significant pressure on the water supply of the valley (Urteaga 2013, 70).

Despite the risks of rising water demand associated with sugarcane plantations, the Chira Valley was praised by biofuel promoters as a good investment environment because of its good weather and potential for expanded irrigation (Urteaga Crovetto 2017, 10). However, such praising did not consider that the Chira Valley is also an arid environment with an average annual rainfall of only 25mm. Further, the irrigation infrastructure of the PECP depends upon the Poechos Reservoir, located upstream, where sedimentation levels due to a lack of maintenance have nearly halved its original water supply capacity (Nolte 2020, 7; Khwaja 2010, 50). When ethanol investments were promoted as state policy, experts calculated that sugarcane plantations could use 17–20,000m3 of water per year, since sugarcane requires irrigation year-round, in contrast to rice and other crops cultivated in the Chira Valley (Nolte 2020, 7; Urteaga Crovetto 2017, 27). While the Chira River is not characterized by endemic water scarcity like the case of other rivers in the Piura region, seasonal variation can still cause scarcity and conflict during the dry months of the year (Urteaga Crovetto 2017, 25). Thus, the sudden massive demand for water coming from a water-intensive crop such as sugarcane would impose a highly unpredictable pressure upon the availability of hydric resources in the valley.

Problems with water availability in northern Coastal Peru had already been anticipated by experts before Maple Ethanol began ethanol production in the Chira Valley in 2012. For example, the Ministry of Agriculture's National Agroenergy Plan 2009–2020 mentioned that the lack of technical information on current and future water availability, as well as the lack of clarity on existing rights and obligations associated with water usage in many parts of the country, posed a fundamental risk in the expansion of ethanol investments (Urteaga 2013, 64). In 2010, an FAO study determined that, under current conditions, there was not enough water available to support the additional 23,976ha of sugarcane projected to be planted in the Chira Valley (Khwaja 2010, 48; see also Ocrospoma 2008, 48). The now-defunct National Institute of Natural Resources (INRENA) also stated that the planned projects would seriously stress the Chira River's capacity and hamper opportunities for growth for local agricultural producers (Van de Poel 2012, 39). Regardless, the legal framework for the expansion of biofuel investments in Peru did not take much consideration in the management of water resources (Urteaga Crovetto 2017, 18; Urteaga 2013, 64).

In September 2005, Maple Ethanol requested 186m cubic meters of water from the Chira Water Authority to irrigate 11,000ha of sugarcane plantations (Bajo la Lupa 2009). In support of its request, Maple Ethanol argued that it would make use of subterranean waters and surface water from the Chira River that would otherwise flow into the ocean, rather than be used by other people (Urteaga 2013, 71). This claim was met with skepticism and opposition by other water users in the basin and regional and national state authorities, such as the president of the Autonomous Authority of the Chira-Piura Hydrographic Basin and peasants

associated with local water boards (Urteaga Crovetto 2017, 28). However, the company allied with Piura's regional government and Peru's national government to pressure the authorities to comply with the request (Urteaga 2013, 71).

Local authorities rejected Maple Ethanol's request by expressing their concerns about the long-term sustainability of granting such water rights. The PECP's director of operations even claimed that *'it is likely that I will be fired on Monday for saying this, but I have to be honest and say that going forward with 14,000ha of planted sugarcane for ethanol production will threaten local water reserves, because dry years might come in the future. I do not know how Maple … will irrigate its lands if waters are low.'* (Urteaga Crovetto 2017, 28). Experts maintained that these doubts were well-founded given that the original water balance for the Chira-Piura basin, which was used to argue for the viability of Maple Ethanol's request, was calculated when the Poechos Reserve was operating at full capacity, and did not contemplate the extension of the agricultural frontier in the Chira Valley that had taken place since (Urteaga 2013, 72). In response, Maple Ethanol commissioned a hydrological report to prove the viability of its request. This, however, estimated water availability without collecting data during the dry months of the year, when the volume of water that is lost into the sea is actually negative (meaning that available water is not sufficient to meet existing demand) (Urteaga 2013, 71). This bias in the study caused it to be rejected by the local authorities. In this context, the general director of the PECP concluded that *'the regulated system of the Chira-Piura does not have the possibility to attend the unproductive lands in the left margin of the Chira River'* that were to be used for sugarcane plantations (Urteaga 2013, 71).

Despite the increasing consensus around the unsustainability of Maple Ethanol's water request, national authorities, including INRENA, eventually aligned with national government priorities and supported the claim that the water request was viable (Urteaga 2013, 72). In September 2006, the national government issued Supreme Decree 056-2006-AG, which granted an additional water reserve of 186m cubic meters of water for two years in favor of the PECP, a volume that would subsequently be bestowed upon Maple Ethanol (Urteaga Crovetto 2017, 28; Urteaga 2013, 73; Bajo la Lupa 2009). César Zapata, president of the Committee of Cotton Producers of the Lower Piura, accused the regional government of lobbying in favor of Maple's ethanol project, saying: *'We denounce that this company will cultivate over 20,000ha of land that today does not have water rights. Water is already a problem even in areas that already have water rights of their own!'* (Urteaga Crovetto 2017, 28).

The lack of consistency in the government's decision was clearly revealed a year later. In May 2007, the Ministry of Agriculture released a ministerial disposition declaring that the Chira River's water supply had been exhausted, and so the provision of new water licenses would have to be suspended (Bajo la Lupa 2009). The most affected by this decision were not only new ethanol companies that had expressed interest in investing in the Chira Valley, but more significantly small agricultural producers who could not gain access to water rights for their own land (Urteaga 2013, 72). Despite this suspension, in August 2008, the Ministry of Agriculture prolonged the water reservation in favor of Maple Ethanol for two additional years (Bajo la Lupa 2009).

This was not the only way in which the government catered to the needs of Maple Ethanol. In 2006, the National Water Authority issued directorial resolution 1497-2006-IRH, which authorized the construction of two pumping stations – named Macacará and El Arenal – along the Chira River. These stations and their associated reservoirs had a total storage capacity of 650,000 m3 (Urteaga Crovetto 2017, 28). These pumping stations were eventually directed to supply water for Maple Ethanol's operations. The Macacará station, operating in the district of La Huaca, was granted a license to pump 2,452,800m3 of water from the Chira River for the industrial use of Maple's ethanol production facility(Urteaga 2013, 74). Thus, in contrast to other water users in the Chira Valley, whose dependence upon the poorly maintained Poechos reservoir would force them to deal with water scarcity during the drier months of the year, Maple Ethanol could benefit from a year-round waterflow thanks to these pumping stations (Urteaga 2013, 28).

Water conflicts did not seem to diminish once Agro Aurora took control of MEAAO. Public complaints, small protests led by local inhabitant and meetings summoned by authorities have been taking place. The conflict has also been covered by newspaper articles. More recently, civil society representatives in La Huaca district have complained that, during the dry months of the year, Agro Aurora employees use bulldozers to pile dirt blockages along the course of the Chira River. These, according to interviewees, divert the flow of the river, allowing the company to capture and pump water to their plantations more easily (Figure 9). Testimonies allude that water pumping is mostly done by Agro Aurora from Macacará. Local civil society representatives state that even though Agro Aurora is legally allowed to pump a given volume of water from the Chira River, it is not permitted to divert the river to capture even more. Such actions harm the minimal flow that the river must maintain, according to legal provisions, and leave agricultural producers downstream, including the peasant community of San Lucas de Colán and those in the district of Amotape, without sufficient water to irrigate their land. In 2019, Agro Aurora rejected the allegations of local

populations and denied its involvement in the building of the dirt blockages in the Chira River (Cutivalú 2019). However, in 2020 the existence of pile dirt blockages in the Chira river merited meetings in the La Huaca district between local producers, state authorities and Agro Aurora. In this meeting, the latter committed to remove the blockages (SolTV Viviate 2020).

Figure 9. A pile of dirt in the middle of the course of the Chira River built by Agro Aurora (courtesy of representatives from the Comité de Defensa de la Margen Izquierda del Río Chira, 2019)

State permissiveness and complicity has allowed MEAAO's owners to concentrate water resources to the detriment of local producers. The result has made supplies to local producers and other water users more precarious, especially along the lower course of the Chira River. It is, in effect, a concentration of water resources by ethanol companies, and a growing disempowerment of the institutions that have traditionally mediated water management at a local scale (Tejada 2017, 30-31 37-38). This situation is particularly critical during the dry months of the year. However, as climate change increases water variability and the likelihood droughts, it is likely that the arid landscapes of the Chira Valley will suffer even more water stress – which will not be suffered alike by all users.

PART 8. FIELD-BURNING CONFLICTS

Of all the causes of conflict that interviewees reported, sugarcane-field burning is doubtless the one with the greatest environmental and social costs. It has also seen the greatest local social mobilization in recent years. Both ethanol operations that operate today in the Chira Valley, the Romero Group's *Caña Brava* and the Grupo Gloria's Agro Aurora, are involved in this controversial practice. Just before harvesting a portion of their fields, they clear the sugarcane to be harvested from foliage by setting controlled fires. If the winds blow the wrong way, the columns of ash and smoke can easily reach the houses, streets, schools and roads of local settlements. According to some reports, sugarcane-field burning in the Chira Valley affects as many as 12,000 people (El Comercio 2019).

Figure 10. Sugarcane field burning in the vinicity of Viviate, La Huaca district (Courtesy of the Comité de Defensa de la Margen Izquierda del Río Chira, 2021)

This practice has been reported as far back as at least 2009, mostly by the company *Caña Brava* (Tejada 2017, 22). According to interviewees, conflicts with Maple Ethanol related to sugarcane-field burning were minor in 2012–15, as the company used alternative methods. This might have been due to environmental conditions associated with Maple Ethanol's international funding sources. This situation changed once Agro Aurora took ownership of MEAAO. Since April 2016 – i.e. before Agro Aurora resumed ethanol production in 2018 – the Observatory of Social Conflicts of the Ombudsman's Office reported an "active conflict" between various communities in the La Huaca and Miguel Checa districts with Agro Aurora on account of the environmental effects of sugarcane-field burning. According to the report, this conflict continues to be considered active to date (Adjuntía para la prevención de conflictos sociales y gobernabilidad 2021, 76).

Figure 11. The floor of a school in the town of Viviate after a nearby sugarcane-field burning (Courtesy of the Comité de Defensa de la Margen Izquierda del Río Chira)

The environmental and social costs of this practice in the Chira Valley have been dramatic. In November 2012, five people were killed in a car accident on the road between Sullana and Paita allegedly caused by poor visibility due to sugarcane-field burning by Caña Brava. This led Peru's public prosecution authorities and the Ombudsman's Office to demand *Caña Brava* stop such activities immediately (Tejada 2017, 22). Field burning by both *Caña Brava* and Agro Aurora has been associated by local residents with pollution, lung diseases and various impacts on local infrastructure. A man from the town of Viviate said: *'All night we see ash coming into our houses, even if we try to keep our windows shut. Once the sun rises, all of our houses are suddenly full of smoke!'* A woman from the same location said: *'You would have to see the soccer playground in the primary school full of ash in the morning (Figure 11). When the children go to school, they run the risk of breathing all of it!'* As a result of the ash and smoke in their towns, many residents have pointed out that lung diseases in the districts of La Huaca and Miguel Checa have increased significantly since ethanol operations started to burn their fields in the Chira Valley[9]. In 2021, the case of a small baby that was covered with ash in his own house was reported in the city of Sullana (Cutivalú 2021).

According to the mayor of Viviate, while problems arising from sugarcane-field burning were caused by *Caña Brava* in the early years of ethanol investments in the Chira Valley, in recent years problems are increasingly related to Agro Aurora (El Comercio 2019). Information from Peru's Environmental Evaluation and Supervision Agency (OEFA) shows that Agro Aurora's field-burning practices are regulated by a semi-detailed environmental impact assessment (EIA-sd) submitted to the authorities describing how the environmental impacts of its agricultural and industrial practices must be mitigated by the company. This document was approved on 19 January 2017. Before this date, Agro Aurora conducted activities without an approved environmental planning document, a fact that was noted by OEFA in 2016 (OEFA resolution IS 0781-2016-OEFA-DS-IND). According to interviewees, the EIA-sd details specific schedules for field burning, which is supposed to take place during set times of day, taking into consideration wind and foliage volumes. Further, according to a state report that recommended the approval of Agro Aurora's EIA-sd in 2017 (0-85-2017-PRODUCE-/DVMYPE-I/DIGGAM-DIEVAI), the company committed to harvesting sugarcane located less than a mile away from human settlements and roads without controlled fires. However, interviewees point out that, sugarcane fields are still being burned in ways that seriously affect local populations.

Once Agro Aurora resumed export-oriented ethanol production in 2018, OEFA detected a significant rise in the number of issues related to field burning and other environmental problems. Only in 2018, at least four complaints were submitted to OEFA on account of Agro Aurora's sugarcane field-burning activities in the Chira Valley (OEFA resolution IS 0573-2018-OEFA-DSAP-CIND). In 2018–19, at least four OEFA supervision reports concluded that Agro Aurora failed to conduct a satisfactory management of their controlled fires (OEFA resolutions IS 0110-2020-OEFA-DSAP-CIND, IS 0773-2019-OEFA-DSAP-CIND, IS 0329-2019-OEFA-DSAP-CIND, and IS 0573-2018-OEFA-DSAP-CIND).

9 We recommend that further research in the Chira Valley examines the allegations made by local residents on the link between field burning and the rise in lung diseases (see Part 11 in this report).

Other reports from the same time mention that Agro Aurora failed to manage other field aspects that were included in its EIA-sd, including processing side-products from foliage (OEFA resolution IS 0773-2019-OEFA-DSAP-CIND) and managing industrial byproducts in appropriate ways (OEFA resolution IS 0760-2019-OEFA-DSAP-CIND). In April 2021, regional newspapers in Piura reported new sugarcane field fires by Agro Aurora (Cutivalú 2021). However, Peruvian ethanol exports to the EU still benefit from price premiums for green harvesting (i.e. harvesting without cane field burning) (Nolte 2020, 8).

Figure 12. Women lead protests against sugarcane-field burning in the Chira Valley (Courtesy of the Comité de Defensa de la Margen Izquierda del Río Chira, 2019)

Civil society actors in the districts of La Huaca and Miguel Checa have strongly reacted against the environmental and social effects of sugarcane-field burning. Some of the main protagonists of this opposition are the Defense Committee of the Interests of the Left Margin of the Chira River, the priest of the La Huaca district, and the mayors of the settlement of Viviate and Paita province. All interviewees we spoke to have remarked on the crucial role played by women in social mobilization (Figure 12). Given that women in the rural settlements of the Chira Valley are traditionally responsible for care work, many have been the first to react against harm to their homes and families. In late 2019, a group of local activists and authorities from the Chira Valley was successful in enlisting a congress representative, Hernando Cevallos (Figure 13). Cevallos supported the group through meetings in Lima with authorities from the Ministries of Production and of the Environment on sugarcane-field burning. Cevallos also supported the creation of a law proposal in Congress to improve the regulation of sugarcane-field burning nationwide. However, due to the political crisis that Peru has suffered since 2019, and the COVID-19 pandemic, this legal reform is still pending.

Figure 13. Local activists and authorities from the Chira Valley meet with congress representative Hernando Cevallos (Courtesy of the Comité de Defensa de la Margen Izquierda del Río Chira, 2019)

PART 9. GENDER-RELATED IMPACTS OF ETHANOL INVESTMENTS IN THE CHIRA VALLEY

As in most of Peru, there is a significant gap in economic and political power between men and women in the Chira Valley. In 2017, women made up only 20.6% of landowners in the middle and lower course of the Chira (Tejada 2017, 28). This number may be even lower in practice as, even when women are listed as landowners, men are often the ones who actually control land in practice (Tejada 2017, 8). Men dominate agricultural production, both staples aimed at local trade and export-oriented products such as organic bananas. According to Peru's National Agrarian Census, in 2013, 88% of agricultural producers in the district of Colán, one of the districts where the peasant community of San Lucas de Colán is located, were men (Huaman 2017, 61) (Figure 18). Women are traditionally associated with domestic care and socially less prestigious activities, such as wood collecting and goat grazing.

Table 7. Gender data for landowners in the middle and lower course of the Chira Valley (taken from Tejada 2017, 28)

District	Men	Women	Total	%of Men	%of Women
Arenal (Paita)	25	2	27	92.6	7.4
Colan (Paita)	1435	190	1625	88.3	11.7
I. Escudero (Sullana)	1732	300	2032	85.2	14.8
La Huaca (Paita)	880	229	1109	9.4	20.6
Miguel Checa (Sullana)	408	53	461	88.5	11.5
Sullana (Sullana)	3128	709	3837	81.5	18.5

This situation does not seem to have changed with the arrival of ethanol investments in the Chira Valley. According to interviewees, most jobs offered by ethanol companies are biased towards men, probably because of the association of sugarcane harvesting with 'masculinity' and difficult working conditions. One interviewee estimated that 80% of ethanol company employees are men. Female interviewees mentioned that a minority of female workers is employed by the companies, particularly in tasks such as foliage removal and some mechanical operations.

On the other hand, some female interviewees pointed out that, since ethanol investments arrived, alcoholism and subsequent gender-based violence have been on the rise[10]. A local NGO worker who has worked in the area for years even mentioned that this fact was pointed out in a meeting with Maple Ethanol in 2015. The attendees at the meeting asked the company to conduct a social intervention to tackle the rising violence problem. This never materialized.

In the political sphere, however, women are playing a prominent role in decision making and resistance related to the environmental and social costs of ethanol production in the Chira Valley and other rural areas of Peru. In 2020, Peru's Ministry of Women and Vulnerable Populations stated that women participate in 35% of local decision-making spaces related to the management of water resources, which, while still low, demonstrates an increase in formal political participation (Agencia Agraria de Noticias 2020). According to most of our interviewees, women have been extremely active in leading protests against sugarcane-field burning and its negative impacts on the communities of the Chira Valley. As women gain high-profile roles in the fight for the defense of their territories, it becomes clear that they continue to carry a disproportionate share of the burden of collective care in their local communities. This, however, does not bring with it recognition of their importance as stewards of their communities. As one female interviewee said, 'women are always ahead here, even when men blame us for everything'.

10 We suggest that further studies in the Chira Valley examine the scope of this social phenomenon (see Part 11 in this report.)

PART 10. CONCLUSION AND POLICY RECOMMENDATIONS

This report has explored a case study that shows some of the environmental and social costs associated with the expansion of sugarcane-based ethanol investments in the Global South as a result of the EU's policies on first-generation biofuels. At the turn of the century, biodiesel and bioethanol production awoke widespread enthusiasm in development policy circles and private investment conglomerates in Peru. Yet, the reality has fallen short of expectations, and Peru's biofuel revolution, particularly ethanol production in northern Coastal Peru, has been only moderately successful to date. Despite this, ethanol investments in the Chira Valley have been unfortunately successful in at least one thing: they have radically transformed local conditions concerning access to scarce resources such as land and water, which fits into larger international trends of dispossession and displacement.

In its lack of consideration of long-term planning and supervision, the role of the Peruvian state in facilitating resource concentration has oscillated between permissiveness and negligence. Ethanol production policies did not include sufficient consideration of the long-term social and environmental sustainability and safeguards of the operations they promoted. This was particularly visible, for instance, in the process by which Maple Ethanol was granted water rights in the Chira Valley; despite abundant evidence to the contrary, national authorities secured water supply for private companies to the detriment of local users and producers. Similarly, state ethanol promotion neglected existing rights on the ground, as well as social institutions of collective ownership that had traditionally mediated access to resources in the dry forests of the Chira Valley. Instead of acknowledging such institutional realities, the state decided to reframe lands that had been regularly used by local communities as 'unproductive' spaces that could be legitimately privatized in order to unleash the productive power of agribusiness. In this process, it also gave away entire settlements where people who were not consulted lived and worked, creating the conditions for future land conflicts and enforcing proximities that created conditions for the environmental harms brought about by sugarcane-field burning.

Despite the fact that Maple Ethanol implemented a series of CSR actions as part of the conditions of its funding, the company failed to conduct due diligence that could secure the real sustainability of its plans. In this way, Maple Ethanol became complicit with the unsustainable and socially irresponsible policies taken by the Peruvian state in the Chira Valley. All of these actions were boosted and encouraged by EU energy policies that fostered such reckless agricultural investments. Once Maple Ethanol sold MEAAO to Grupo Gloria's Agro Aurora, many of the guiding principles that had led its actions were lost. Agro Aurora has proven to be a much less communicative company with neighboring populations; it has even been involved in legally dubious actions such as diverting the Chira River's course and conducting field-burning activities without necessary precautions. As a result, not only have conflicts that originally arose with Maple Ethanol endured over time, but new problems have appeared and intensified. The legacies of this process should be a warning sign to consider better regulations and safeguards when funding alternative energy sources in the Global South.

Finally, it is important to consider the real long-term sustainability of promoting ethanol investments as a national strategy for economic and social development. The expansion of biofuel investments was originally imagined in Peru as a way to modernize agriculture and expand the agricultural frontier. However, some commentators have questioned its economic efficiency by focusing on its profit distribution structure and employment-generation capacity. They have done so by comparing large-scale ethanol production to alternative sources of income in the Chira Valley, such as export-oriented organic banana production (Roy 2013, 86). In the context of climate change, the environmental sustainability of these operations needs to account for weather-based fluctuations in water availability, especially in areas that are affected by the El Niño effect, such as northern Coastal Peru. If left unchecked, the displacement and dispossession brought by the expansion of ethanol investments in the Global South might not only prove generally unsustainable, but end up externalizing significant environmental and social costs onto the most vulnerable groups in society, including women and people already living in poverty (see Borras, McMichael, and Scoones 2010).

In this context, EU and Belgian policies need to be modified to be sensitive to the larger implications of food-based first-generation biofuels. Their role in fostering a market expansion for energy sources with serious environmental and social costs should not be overlooked. Such policy discussions should seriously address and interrogate the very sustainability of first-

generation biofuels as an energy source. If European policy-makers truly aim to align green energy policies to principles of sustainability and social justice, they must:

- Stop counting the contribution of all land-based biofuels, including from sugar cane, towards the EU's Renewable Energy Directive (RED) targets by 2030 the latest. Crop biofuels should also be excluded from FuelEU Maritime and Refuel Aviation regulations.
- Include extended and binding social sustainability criteria for land-based fuels, advanced fuels and fossil fuels, especially when produced outside the EU; to cover land and water grabbing; land, water and air pollution and degradation; impacts on ecosystem services; impacts on governance; respect of FPIC and full respect of all human rights through the whole value chain, including food sovereignty, health, decent work, child work, women's rights and indigenous people's rights.
- Enable the adoption of additional sustainability criteria at national level with its RED directive
- Improve and enforce the monitoring mechanism by including more frequent independent audits and extending the analysis of impacts in the Renewable Energy Reports of Member states to include the producing and intermediary countries.
- Ensure that a target for advanced renewable fuels in transport is based on a robust impact assessment.
- Include a loss & damage mechanism as a part of the just transition fund to compensate for past projects.
- Gear up efforts to reduce energy consumption in the transport sector and support the long-term decarbonization of the transport sector by phasing out new internal combustion engines, through modal shift, reduction in transport demand, and through additional incentives for renewable electricity in the RED.

Further modifications of the policy incentives in the EU for bioethanol production remain to be seen – current policy discussions are insufficiently addressing the impacts of biofuels on human rights. The latest proposal includes no new elements to address the use of unsustainable crop-based biofuels in transport, leaving open the possibility of using food for fuel (see European Commission 2021). The proposal also fails to account for emissions from ILUC arising from deforestation and peatland degradation induced by the increased demand for bioenergy. In the absence of an adequate accompanying sustainability framework, the global social and environmental cost of growing European demand for unsustainable bioenergy will keep escalating, with people living in poverty paying the highest price. Belgium's national transposition's of RED II is due in 2021. It needs to take into consideration that human rights violations keep happening in producing countries besides the incipient social sustainability principles included in the legislative documents and reporting mechanisms. Belgium needs to move fully away from food-based biofuels.

PART 11. RESEARCH OPPORTUNITIES

This report has examined the case of MEAA0 as a way to throw light upon the impacts of European energy policies, both in terms of new funding and trade opportunities, in the development of high-impact ethanol projects in Northern Coastal Peru. Due to COVID-19 pandemic restrictions, the author of this report was unable to conduct in-person fieldwork in the Chira Valley, or access some archives. As a result, many questions remain to be explored in order to achieve a clearer picture of the broader implications of European biofuel policies in Peru. These are some of these larger themes that could be expanded in further investigations:

- **Gender-related impacts of ethanol investments in the Chira Valley**. It is very difficult to grasp gender dynamics on the basis of technical documentation and telephone communication not based on a prior rapport. Fieldwork in the Chira Valley and one-on-one contact with local residents would allow further research to better understand the narratives, discourses and perceptions that express gender dynamics in the area.
- **Archival documentation on trends in gender-based violence in the Chira Valley.** Understanding how these trends have changed in the last decade should allow us to test the hypothesis, suggested by some interviewees, that the arrival of ethanol investments caused an increase in gender-based violence in the Chira Valley. Despite our best efforts, it remained extremely difficult to gain access to databases on domestic violence police records from Lima, particularly as the districts being studied are semi-rural, and information is often stored on paper.
- **Local medical records related to lung disease.** One of the focal points of conflict between Agro Aurora and local populations is the harmful effects of sugarcane-field burning on health. Interviewees reported perceptions of a steep rise in lung disease as a result of the intensification of sugarcane-field burning in recent years, but medical records showing this rise could strengthen this claim.
- **Documentation from the mediation processes facilitated by the Ombudsman's Office in Piura.** According to interviewees, disputes around water and field burning have been mediated over the years by the Ombudsman's Office in Piura. This office holds a register that includes summaries of the positions and commitments of different parties in social conflicts. These records could serve as a rich source of information to better understand the conflicts in the Chira Valley. Unfortunately, their archive has remained closed during the COVID-19 pandemic, which prevented the author from gaining access to the information via a public information request.
- **The employment structure created by ethanol investments, and labor conditions in Agro Aurora's operations.** In recent years, Peru's agribusiness sector has become the object of national labor protests aiming to improve labor regulations. As far as we know, such protests did not take place in the Chira Valley. However, some interviewees did accuse Agro Aurora of providing bad working conditions that impacted upon the health and dignity of workers. More research is needed to substantiate these claims.
- **The alternative value chains for economic activities for families in the area.** In particular, further research should understand the productive structure and social dynamics that emerge from organic banana production, a growing productive sector in the Chira Valley, in order to contrast its potential as a development strategy with that represented by large-scale ethanol investments.

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ANNEX I. SUMMARY OF IMPACTS FROM MEAAO OPERATIONS

Table 8. Summary of impacts from MEAAO operations

	Specific impact	Population potentially impacted
Sugarcane-field burning	Increased respiratory health problems	12,000 (source: El Comercio 2019)
	Damage to local infrastructure	
	Increase in car accidents	
Land	Legal dispossession of El Tablazo lands used as commons by local populations	40,404 (population of districts La Huaca, Miguel Checa, Amotape, Arenal and Colán, (source: Instituto Nacional de Estadística e Informática 2018)
	Enclosing human settlements and public spaces within large sugarcane plantations	
Water	Water scarcity events that harm small-scale agricultural production during dry months of the year	
Governance	Erosion of communal authority in land negotiations	6,500-7,000 (members of the peasant community of San Lucas de Colán, source: President of San Lucas de Colán)
	Local distrust of regional and national authorities	40,404 (population of districts La Huaca, Miguel Checa, Amotape, Arenal and Colán, (source: Instituto Nacional de Estadística e Informática 2018)

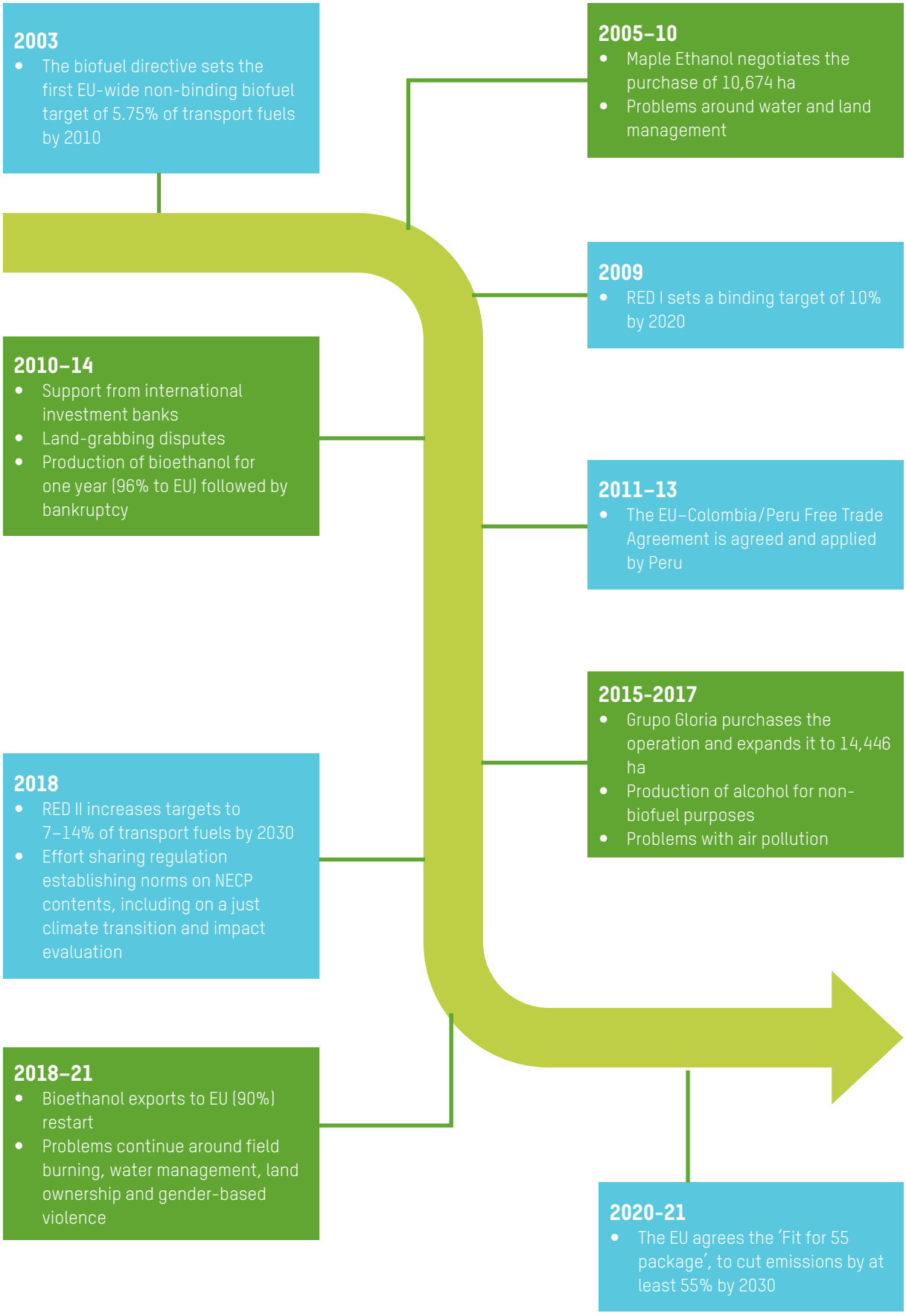
ANNEX II. LEGAL INSTRUMENTS IN BELGIUM FOR THE PROMOTION OF BIOFUELS

Table 9. Legal instruments in Belgium for the promotion of biofuels

Date	Type	Title
19-03-20	ROYAL DECREE	Arrêté royal du 19 mars 2020 modifiant les articles 3 et 4 de l'arrêté royal du 4 mai 2018 fixant les volumes nominaux minimaux des biocarburants durables qui doivent être incorporés dans les volumes de carburants mis annuellement à la consommation
04-02-20	MINISTERIAL DECREE	Arrêté ministériel du 4 février 2020 modifiant l'arrêté ministériel du 15 mai 2018 déterminant le modèle de formulaire destiné à l'établissement de la balance des produits pétroliers et la déclaration de biocarburants, d'huiles minérales et de leurs produits de substitution d'origine biologique
17-12-19	ROYAL DECREE	Arrêté royal du 17 décembre 2019 modifiant l'arrêté royal du 15 novembre 2017 relatif à l'exigence de déclaration de biocarburants, d'huiles minérales et de leurs produits de substitution d'origine biologique
15-05-18	MINISTERIAL DECREE	Arrêté ministériel du 15 mai 2018 déterminant le modèle de formulaire destiné à l'établissement de la balance des produits pétroliers et la déclaration de biocarburants, d'huiles minérales et de leurs produits de substitution d'origine biologique
04-05-18	ROYAL DECREE	Arrêté royal du 4 mai 2018 fixant les volumes nominaux minimaux des biocarburants durables qui doivent être incorporés dans les volumes de carburants mis annuellement à la consommation
23-02-18	ROYAL DECREE	Arrêté royal du 23 février 2018 relatif au contrôle des obligations et aux amendes administratives de la loi du 17 juillet 2013 relative aux volumes nominaux minimaux de biocarburants durables qui doivent être incorporés dans les volumes de carburants fossiles mis annuellement à la consommation
26-01-18	ROYAL DECREE	Arrêté royal du 26 janvier 2018 modifiant l'arrêté royal du 16 juillet 2014 relatif aux obligations en matière d'information et d'administration en ce qui concerne les biocarburants de la catégorie B et C en accord avec la loi du 17 juillet 2013 relative aux volumes nominaux minimaux de biocarburants durables qui doivent être incorporés dans les volumes de carburants fossiles mis annuellement à la consommation
15-11-17	ROYAL DECREE	Arrêté royal du 15 novembre 2017 relatif à l'exigence de déclaration de biocarburants, d'huiles minérales et de leurs produits de substitution d'origine biologique
07-07-17	ROYAL DECREE	Arrêté royal du 7 juillet 2017 modifiant l'arrêté royal du 16 juillet 2014 relatif aux obligations en matière d'information et d'administration en ce qui concerne les biocarburants de la catégorie B et C en accord avec la loi du 17 juillet 2013 relative aux volumes nominaux minimaux de biocarburants durables qui doivent être incorporés dans les volumes de carburants fossiles mis annuellement à la consommation
21-07-16	ROYAL DECREE	Arrêté royal du 21 juillet 2016 fixant les volumes nominaux minimaux des biocarburants durables qui doivent être incorporés dans les volumes d'essence mis annuellement à la consommation
26-12-15	LAW	Loi du 26 décembre 2015 modifiant la loi du 17 juillet 2013 relative aux volumes nominaux minimaux de biocarburants durables qui doivent être incorporés dans les volumes de carburants fossiles mis annuellement à la consommation
07-05-15	ROYAL DECREE	Arrêt de la Cour constitutionnelle n° 52/2015 du 7 mai 2015 «- annule l'article 7, §§ 2 et 3, de la loi du 17 juillet 2013 « relative aux volumes nominaux minimaux de biocarburants durables qui doivent être incorporés dans les volumes de carburants fossiles mis annuellement à la consommation » et l'article 7, § 6, de la même loi, en ce qu'il concerne le diesel.»

Date	Type	Title
16-07-14	ROYAL DECREE	Arrêté royal du 16 juillet 2014 relatif aux obligations en matière d'information et d'administration en ce qui concerne les biocarburants de la catégorie B et C en accord avec la loi du 17 juillet 2013 relative aux volumes nominaux minimaux de biocarburants durables qui doivent être incorporés dans les volumes de carburants fossiles mis annuellement à la consommation
19-04-14	ROYAL DECREE	Arrêté royal du 19 avril 2014 relatif aux modalités et aux conditions et obligations concernant la déclaration trimestrielle des quantités des carburants fossiles et des biocarburants mis à la consommation, imposées par la loi du 17 juillet 2013 relative aux volumes nominaux minimaux de biocarburants durables qui doivent être incorporés dans les volumes de carburants fossiles mis annuellement à la consommation
28-11-13	ROYAL DECREE	Arrêté royal du 28 novembre 2013 modifiant provisoirement la loi du 10 juin 2006 concernant les biocarburants
27-09-13	ROYAL DECREE	Arrêté royal du 27 septembre 2013 modifiant provisoirement la loi du 10 juin 2006 concernant les biocarburants
17-07-13	LAW	Loi du 17 juillet 2013 relative aux volumes nominaux minimaux de biocarburants durables qui doivent être incorporés dans les volumes de carburants fossiles mis annuellement à la consommation
24-12-12	LAW	Loi du 24 décembre 2012 portant modification de l'article 419 de la loi-programme du 27 décembre 2004 et de l'article 4 de la loi du 10 juin 2006 concernant les biocarburants
26-11-11	ROYAL DECREE	Arrêté royal du 26 novembre 2011 établissant des normes de produits pour les biocarburants
09-02-11	ROYAL DECREE	Arrêté royal du 9 février 2011 concernant les biocarburants
30-11-09	MINISTERIAL DECREE	Arrêté ministériel du 30 novembre 2009 précisant les données à communiquer par toute société pétrolière enregistrée concernant les biocarburants mélangés aux carburants fossiles et la preuve de leur durabilité
22-11-06	ROYAL DECREE	Arrêté royal du 22 novembre 2006 complétant l'arrêté royal du 4 mars 2005 relatif aux dénominations et aux caractéristiques des biocarburants et d'autres carburants renouvelables pour les véhicules à moteur et pour les engins mobiles non routiers
27-10-06	ROYAL DECREE	Arrêté royal du 27 octobre 2006 modifiant certains taux d'accise concernant les biocarburants
22-06-06	ROYAL DECREE	Arrêté royal du 22 juin 2006 relatif au fonctionnement de la Commission d'agrément des biocarburants
10-06-06	LAW	Loi du 10 juin 2006 concernant les biocarburants
04-03-05	ROYAL DECREE	Arrêté royal du 4 mars 2005 relatif aux dénominations et aux caractéristiques des biocarburants et d'autres carburants renouvelables pour les véhicules à moteur et pour les engins mobiles non routiers
31-12-04	PROGRAM-LAW	Loi-programme du 27 décembre 2004
21-12-98	LAW	21 DECEMBRE 1998. - Loi relative aux normes de produits ayant pour but la promotion de modes de production et de consommation durables et la protection de l'environnement [, de la santé et des travailleurs].

ANNEX III. MEAAO TIMELINE



METHODOLOGICAL NOTE

This report was produced during the COVID-19 pandemic. Due to Peru's state emergency restrictions, it was impossible to conduct in-person fieldwork and interviews in the Chira Valley. Accordingly, the bulk of the research data was collected via online or telephone interviews, and a thorough literature review.

INTERVIEWS

The author conducted 12 structured interviews with researchers, local civil society activists and state authorities in the Chira Valley. Their names will not be disclosed in order to protect their identities.

ARCHIVAL SOURCES AND LITERATURE REVIEW

The author submitted public information requests and gained access to documentation from the following institutions:

- Peru's Assessment and Environmental Control Agency (OEFA);
- Peru's National Water Authority (ANA); and
- the Especial Chira-Piura Project (PECP).

Public information requests were also sent to Piura's Ombudsman's Office. However, due to pandemic restrictions, it was not possible to gain access to their internal documentation at this time.

The literature review included 34 specialized publications, including peer-reviewed articles, books, technical reports and newspaper articles. Energy policies and legislation concerning biofuels in Peru, Belgium and the EU were also included in our analysis.

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