



DON'T BURN FOOD

The Problem with New Zealand's Proposed Biofuel Mandate



Burning biofuel in our cars takes food and land from people who need it.

The New Zealand government wants to introduce a biofuel mandate, with the aim of lowering carbon emissions in the transport sector. But biofuel produced from crops can actually increase carbon emissions and compete with food production, contributing to global hunger.

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This paper was written by Nick Henry. Oxfam acknowledges the assistance of Rachel Smolker in its production. It is part of a series of papers written to inform public debate on development and humanitarian policy issues.

For further information on the issues raised in this paper please email oxfam@oxfam.org.nz.

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SUMMARY

The New Zealand government has recently proposed a biofuel mandate, with the aim of reducing carbon emissions from transport vehicles.

Oxfam Aotearoa is concerned that requiring the use of biofuels will not necessarily reduce carbon emissions and is likely to increase competition for food commodities and agricultural land, contributing to global hunger.

This briefing paper outlines the impacts that global demand for biofuel has on land use and carbon emissions.

Producing crop-based biofuels directly competes with food production and has the potential to drive up the price of food commodities, contributing to global hunger. Demand for agricultural land to grow crops for biofuels has also driven speculative investment in land and displacement of farming communities.

When the direct and indirect impacts on land use change are included in the analysis, the carbon emissions associated with biofuels can be as bad or worse than their fossil fuel equivalents.

With growing international awareness of the social and environmental harms associated with biofuel production, Oxfam believes it would be a mistake for New Zealand to introduce a biofuel mandate.

This briefing paper outlines how the global biofuel industry increases competition for agricultural land, contributes to global hunger, and fails to meaningfully reduce climate pollution.

1. WHAT ARE BIOFUELS

Like petrol, biofuels are liquid fuels that can power our cars and other vehicles. Unlike petrol, which is made from oil that takes millions of years to form below the earth's surface, biofuels are made from new feedstock. A feedstock is a plant or animal material that can be converted into fuel through processes like fermentation. All biofuel feedstocks have to be harvested from somewhere – either as crops grown specifically for biofuel, or as waste from another process.

The type of feedstock is the difference between a good biofuel and a bad one. Good biofuels are made from feedstocks that would otherwise be thrown away as waste. Examples include biofuels made from used cooking oil and forestry waste. Bad biofuels take supplies of food, and land that could be used to grow food, and divert them into inefficient ways of powering private cars.

Oils harvested from plant or animal sources are generally the feedstocks for bio-diesel, the type of biofuel that is most in demand for heavy transport vehicle. Palm Oil is the most popular feedstock for making biodiesel. Unfortunately, Palm Oil is also the single most harmful product to choose as a fuel. Other vegetable oils are nearly as bad, in part because of the substitution effect, meaning that using other oils also increases demand for Palm Oil. The best feedstock for biodiesel from a sustainability perspective is used cooking oil, but this is in limited supply.

Alcohol-based biofuels are most commonly made by fermenting sugars extracted from feedstock crops such as sugarcane and corn, or from animal products such as whey. With more difficulty, sugars can also be industrially extracted from the cellulose in wood and other plant fibres. Producing biofuel from these cellulosic sugars seems preferable, because there is some potential to use waste material from forestry and other sources. But the processes for extracting cellulosic sugars are technically difficult and expensive. There is also a concern that the plantation forestry needed to produce cellulosic biofuels competes with agricultural land and water resources.¹

In addition, even if cellulosic sugars can be reliably extracted from forestry waste for fermentation into ethanol, it is not clear that this is the best use for the waste material. In Aotearoa, business cases prepared for the Ministry of Primary Industries concluded that producing biofuel from forestry waste would be possible, but would likely be unprofitable, and would produce lower returns than other uses for forestry waste, such as producing solid fuel pellets.²

In summary, the problem is that supplies of good biofuels are limited. This is either because supplies of the feedstock are limited, or because the process is technically difficult and not currently commercially viable. For these reasons, international experience has been that the majority of biofuels used to meet mandates have been conventional, crop-based fuels.

2. BIOFUELS AND LAND USE

A biofuel mandate like the one proposed for New Zealand would increase demand for conventional crop-based biofuels. This is a problem because consuming crop-based biofuel creates competition with food production and puts pressure on farming communities and ecosystems around the world. Demand for biofuel is taking land from communities and farmers, using scarce water supplies, and worsening global hunger.

Farmland is increasingly scarce around the world. From 2003 to 2019, global cropland increased by nine percent, primarily due to expansion in Africa and South America, of which half replaced forests and natural vegetation.³ Eradication of forests and natural vegetation for cropland is bad for climate change, but people need to eat. However, even as developing countries increased the total area of cultivated land, the area available for food crops

shrank due to biofuel production. Research shows that increasing cultivation of biofuel crops is associated with a decrease in food security for the country of production.⁴ We need to preserve the cropland we have for human food and protect natural forests and vegetation. Biofuel expansion undermines this.

Crop-based biofuels also require large volumes of fresh water, both for irrigation and for industrial processing. A typical ethanol refinery can use three to four litres of fresh water for every litre of ethanol produced.⁵

Demand for crop-based biofuels, driven by government mandates, has fuelled global waves of speculative land-grabs by investors. In 2022, the International Land Coalition's Land Matrix database listed 299 deals with a stated purpose of producing biofuels, covering more than 8 million hectares of farmland globally.⁶ These massive land acquisitions displace existing communities, often with little, if any, consultation or compensation. Local communities often lack formal recognition of their land titles and are ill-equipped to oppose the power of corporate investors acting with state support.

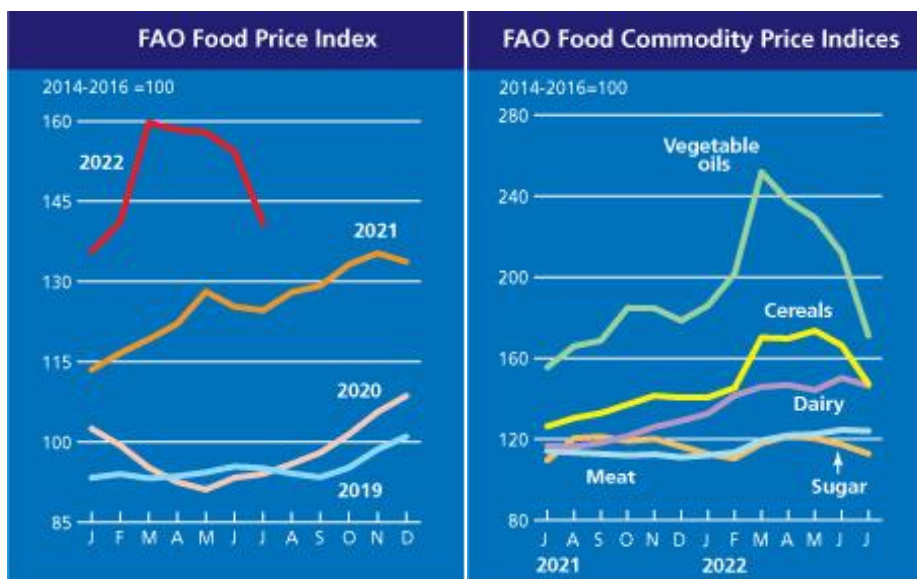
In many countries, communities are vulnerable to loss of land because collective forms of ownership lack formal recognition from governments. For instance, large scale acquisition of land by agribusinesses for production of bio-ethanol has been implicated in the forced dispossession of indigenous communities in Brazil.⁷

The negative social and environmental impacts of large-scale developments growing sugarcane for ethanol in the Chira Valley of Peru have been documented by Oxfam.⁸ Our analysis showed that demand for land from commercial investors was linked to both EU biofuel mandates and Peruvian government policies to encourage biofuel exports. Conversion of land in the Chira Valley to biofuel sugarcane plantations has contributed to deforestation, loss of communal land rights and resources, diversion of scarce water to irrigate the former dry forest land, and air pollution from field burning. Land acquired for the scheme was designated 'unproductive' by the government without consultation with local communities, despite the land being covered in dry forest that had been used and conserved by local communities for generations.

Inaccurate designation of marginal or unproductive land is a common problem associated with biofuel plantations. According to one widely cited claim, 386 million hectares of marginal land could be available for biofuel crops worldwide.⁹ But the definition of marginal land is controversial. A review of 17 studies of global bioenergy potential concluded that 'land reported to be degraded is often the base of subsistence for the rural population.'¹⁰ Even if it was the case that marginal land was available for biofuel crops, there is no way to ensure that biofuel production will use that land, rather than taking the easier option of displacing food crops and communities. Biofuel crop producers prefer to use the best land they can access, with good soil quality, adequate water supplies, transport infrastructure, and, preferably, proximity to refineries. The truth is that growing crops for biofuel is always likely to compete with food production and contribute to the displacement of local communities.

Crop-based biofuels increase competition for food in the midst of an already severe global crisis of hunger. In 2021, 193 million people across 53 territories were experiencing crisis or worse levels of food insecurity. Even more concerning, more than half a million of these people faced catastrophic food insecurity, at immediate risk of starvation and death. The overall severity of food crises covered by the annual report has nearly doubled since 2016.¹¹

In early 2022, the global food price index maintained by the UN Food and Agriculture Organisation showed a major spike to an all-time high. By July 2022, prices had come down from the peak, but remained 13 percent higher than a year earlier. These price movements were driven primarily by the cost of grain and vegetable oil, the food commodities that are most exposed to competition from the biofuel industry.¹²



Pressure on global food prices has been dramatically increased by disruption to supply chains by the Covid-19 pandemic, combined with the Russian invasion of Ukraine. Russia and Ukraine are responsible for about 12% of all food calories traded globally. That includes wheat, barley, maize and some 78% of the world’s supply of sunflower oil, in addition to inputs to fertilizers. According to calculations by World Resources Institute, if the U.S. and Europe halved the amount of grain used in the production of biofuel they could compensate for the grain exports lost from Ukraine.¹³

3. BIOFUELS AND CARBON EMISSIONS

The main justification given for biofuel mandates like the one proposed for New Zealand is that biofuels can reduce climate pollution from transport. But there is strong and accumulating scientific evidence that casts doubt on the claimed climate benefits of biofuels.

The impacts of direct and indirect land use change are key to determining the actual lifecycle emissions of biofuel production. Direct land use change is when new land is converted to grow crops for biofuels. Indirect land use change is when existing cropland is used to produce biofuel feedstocks, displacing crops grown for food and animal feed onto new land elsewhere. By its nature, indirect land use change can't be directly measured and can only be estimated using economic models.

The carbon emissions associated with indirect land use change are highest for biofuels made from palm oil, followed by other vegetable oils such as soy, and are significant for all crop-based biofuels.¹⁴

Most of the world's palm oil (around 90 percent) is produced in Malaysia and Indonesia, where plantations are established by clearing wetland forest.¹⁵ Illegal clearing of land to grow agricultural commodities for export is responsible for around half of tropical deforestation and is responsible for 1.47 gigatons of carbon emissions every year.¹⁶ Tropical wetland forests hold some of the world's most intense stocks of sequestered carbon. When the land is burned, the stored carbon is released all at once into the atmosphere. When emissions associated with land use change are included, biofuel produced from palm oil is significantly worse for the climate than fossil petrol.¹⁷

Because different kinds of vegetable oils can substitute for one another for most purposes, market prices for the different kinds of vegetable oils tend to track one another closely. Globally, demand for vegetable oils has drastically increased over the past several decades, for food, for livestock feed and for biofuel.¹⁸ When overall demand for vegetable oil increases, that demand ultimately results in an expansion of palm oil. Even when the direct use of palm oil is restricted, the indirect impact of increasing demand for vegetable oils overall ultimately drives palm oil expansion.¹⁹

Crops used to produce ethanol for biofuel, while less harmful than palm oil, may also produce carbon emissions comparable to fossil petrol when land use changes are considered.²⁰

Emissions caused by land use change are difficult to estimate with any certainty, but they are just as real and just as dangerous as any other climate pollution. There is strong evidence that, when land use changes are included, emissions caused by crop-based biofuels could be as bad or even worse than for fossil fuels.

4. BIOFUEL MANDATES

The biofuel mandate proposed for Aotearoa is modelled on similar policies that became common internationally from the mid-2000s. In the United States, a biofuel mandate was introduced as part of a Renewable Fuel Standard in 2005. Similarly, the European Union included a biofuel mandate in the Renewable Energy Directive of 2009. Aotearoa also introduced a

Biofuel mandate in 2008, but it was shelved after the change of Government, following advice from the Parliamentary Commissioner for the Environment that the mandate failed to distinguish between good and bad biofuels.²¹ Oxfam believes that the current proposals for a biofuel mandate in Aotearoa face the same problem.

By 2011, as the world faced a hunger crisis associated with soaring prices for staple foods, there was growing recognition that biofuel mandates were contributing to the problem. In response, there were calls from many NGOs and international organisations for governments to remove biofuel mandates and subsidies. As part of a joint policy report on food price volatility, a group of ten international organisations identified biofuel mandates as contributing to volatile food prices and recommended that mandates be removed.²²

As biofuel mandates have evolved in the United States, the EU and elsewhere, regulators have introduced sustainability criteria that attempt to avoid biofuels that contribute to social and environmental harm. New Zealand's proposals for a biofuel mandate adopt this approach. But it is doubtful whether any conventional crop-based biofuels can be considered truly sustainable. The latest updates to Europe's Renewable Energy Directive will require biofuels based on palm and soy oil to be phased out in 2023. Oxfam and other NGOs criticised the European Parliament for not going further to phase out all crop-based biofuels.²³

Targets have also been introduced to increase use of advanced biofuels, including those produced from waste products. However, advanced biofuels are not available in significant volumes and so those targets have had to be set very low.²⁴ This reveals a fundamental problem with biofuel mandates: advanced biofuels that would meet strict sustainability criteria are simply not available in the quantities required by the mandates.

Oxfam has been consistent in opposing the introduction of biofuel mandates, based on the evidence that they worsen global hunger and do little to reduce climate pollution.

5. CONCLUSION

Oxfam Aotearoa does not support the New Zealand Government's proposals for a biofuel mandate. Biofuel mandates increase competition between food and fuel, for limited supplies of crops and land to grow them.

Burning food to run our cars worsens global hunger and is not a solution to climate change. That's why Oxfam opposes any use of food crops as feedstock for biofuel. We also have serious concerns about the social and environmental sustainability of any crop-based biofuels, due to the effects of competition for farmland. Genuinely sustainable biofuels can be produced from waste products, but these are in short supply and will not be a realistic option at the quantities proposed for New Zealand's biofuel

mandate.

If the New Zealand government decides to proceed with a biofuels mandate, it must focus on quality over quantity. Any use of food crops for fuel should be ruled out. In particular, fuels produced from palm oil and similar food-oil substitutes should be excluded from the mandate. If any non-food crop-based biofuels are included in the mandate, strict standards of social and environmental sustainability should be required, including to account for human rights and land-use impacts. Preferably, a mandate would exclude conventional crop-based biofuels altogether and focus on advanced biofuels only. However, this approach would run into the problem that sustainable advanced biofuels are simply not available in the quantities required to meet the proposed mandate.

Better alternatives exist for reducing climate pollution from transport in Aotearoa. Rather than diluting fossil fuels with harmful biofuels, we should be reducing and replacing our use of internal combustion cars with genuinely sustainable alternatives. The best way for Aotearoa to support this shift, while also improving transport equity, is to invest in low-emissions options for public and active transport. Also, reducing our agricultural emissions will spread the load of emissions-reduction more fairly across Aotearoa society. This can be done by bringing agriculture into the ETS now and with a far reduced free allocation, and pricing nitrogen fertilisers.

NOTES

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