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Food and agribusiness newsletter

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Editorial

Welcome to the 19th issue of Norton Rose Fulbright's flagship journal for the food & agribusiness sector, Cultivate. In this edition, we focus on climate change. Businesses and governments around the world are working together to find and fund solutions, reduce carbon emissions, ensure clean water and air, and produce food more efficiently in an increasingly volatile environment.

Our first article looks at the impact of risks caused by climate change in the food and agribusiness sector. We examine both the physical risks arising from climate change and the impact of food production on the environment, before briefly touching on the ways these risks can be mitigated and reduced to help protect the environment and the food and agribusiness sector.

This leads onto our feature pieces which are focused on innovation in agricultural infrastructure and technology in the fight against climate change. We look at every stage of production to examine the ways that new technologies and methods can to help mitigate the effect of agricultural practices on the environment. The problem now facing the industry is what motivates businesses to implement these often more expensive techniques?

The following article looks at New York State's new Climate Leadership Act. As the US federal government has in recent years has de-emphasized climate change as a priority, a number of individual states have increased their focus in this area. We take an in-depth look at the new legislation adopted by the State of New York generally, and its specific impact on agriculture.

Next, as climate change becomes more important to companies they are constantly looking for new ways to make their businesses 'greener'. This has led to the creation of the transition bond and more sustainable financing. These new concepts look to help put agriculture and commodity companies on the road to a more sustainable future.

As the risk for food and agribusiness companies continues to increase, so do the disputes which arise from these risks. Our final climate change article looks at how people and businesses are actively pursuing litigation around the world to try and protect their homes and livelihoods.

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Calendar

October

Hawaii, October 18-20, 2019

International Conference on Sustainable Environment and Agriculture

Niagara Falls, October 28-29, 2019

Advancing Women in Agriculture

December Las Vegas, December 2019 MJ BizCon

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Climate change and the food and agribusiness sectors – adaptation, mitigation and innovation

By Elisa de Wit, Sydney and Cara Dowling, Vancouver

The recent Intergovernmental Panel on Climate Change (IPCC) Report on the Impacts of Global Warming warned that the world is already seeing the consequences of global warming of 1°C, with more frequent and extreme weather, rising sea levels, diminishing Arctic sea ice, ocean acidification, land degradation and desertification, among other changes.¹ It also warned that to limit global warming to 1.5°C requires “rapid and far-reaching transitions in land, energy, industry, buildings, transport and cities”. Change of this nature will impact every commercial, public and private endeavour. In coming years, the entire food and agribusiness value chain will likely be disrupted – not just because land is vulnerable to the physical effects of climate change and other stressors, but also because the industry is interdependent with the other sectors identified above. There will be significant changes and challenges to navigate. But there will also be significant opportunities.

Climate change, changing land use, and food and agribusinesses

The growth and intensification of human land use

Land use and services are critical to human livelihoods, well-being and development. We are dependant on the land for our supply of food, clean water, construction materials (timber), energy, and many other ecosystem services (air purification, soil formation, climate management, pollination, to name but a few). However, it is already under pressure.

Global population has increased at a staggering rate – in the 20th century alone, it grew from 1.65 billion to 6 billion, and in just the last 50 years, it almost doubled. A 2017 United Nations report predicts global population will reach 9.8 billion in 2050.² Global per capita consumption rates of food, feed, fibre, timber and energy are also higher than ever. Per capita supply of calories has increased by approximately one third, and per capita supply of vegetable oils and meat has more than doubled, with 25-30 percent of total food produced being lost or wasted.³

The food and agribusiness industry is unsurprisingly big business – it is a US \$5 trillion industry, representing 10 percent of global consumer spending, and employing around two billion people.⁴ It has a very important role in the economies and societies of many nations. With current forecasts predicting overall calorific demand to increase by between 50-70 percent and crop demand for human consumption and animal feeds by at least 100 percent by 2050, the industry’s role will only become more essential.⁵

Meeting the demands of a larger and more resource hungry population has resulted in unprecedented rates of use of land and clean water. A dramatic increase in agricultural production has been enabled by rapid land use intensification and land use changes (expansion of areas under agriculture and forestry). Today, more than 70 per cent of global ice-free land is directly affected by human use, and agriculture uses nearly 50 per cent of global vegetated land and 70 per cent of global freshwater use.⁶ Unfortunately the scale and intensity of land use has contributed to land degradation and desertification. Human-induced land degradation impacts about a quarter of global ice-free land. It has also contributed to loss of ecosystems and declining biodiversity.

1 Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

2 World Population Prospects: The 2017 Revision <https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html>

3 Climate Change and Land. An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems <https://www.ipcc.ch/report/srcl/>

4 Pursuing the Global Opportunity in Food and Agribusiness, 2015, McKinsey & Company <https://www.mckinsey.com/industries/chemicals/our-insights/pursuing-the-global-opportunity-in-food-and-agribusiness>

5 Creating A Sustainable Food Future: Final Report, July 2019. (The report is the result of a multiyear partnership between World Resources Institute, World Bank Group, UN Environment Programme, UN Development Programme, Centre de coopération internationale en recherche agronomique pour le développement, and the Institut national de la recherche agronomique) https://wrr-food.wri.org/sites/default/files/2019-07/WRR_Food_Full_Report_0.pdf; and Pursuing the Global Opportunity in Food and Agribusiness, 2015, McKinsey & Company <https://www.mckinsey.com/industries/chemicals/our-insights/pursuing-the-global-opportunity-in-food-and-agribusiness>

This has had measurable effects on land-based industry. For example, pollinators are among those species impacted; a matter of significant concern to food and agribusinesses given three out of four of the leading crop types grown commercially rely on animal pollination for yield and quality.⁷ Insurers of the food and agribusiness sector are warning that a “global pollinator crisis” is “putting the global agriculture supply chain at risk”.⁸

Human land use is also a major contributor to climate change, with significant drivers being agriculture, food production, and deforestation.⁹ According to the IPCC Special Report on Climate Change and Land, between 2007 and 2016 agriculture, forestry and other land use produced approximately 23 per cent of total human caused GHG emissions (N₂O, CO₂, CH₄). This makes land use one of the leading emitters of GHG, with some commentators warning that it may eventually surpass even fossil fuels. Complicating the equation is that, in addition to being a source of GHGs, land is also a sink and sustainable land management practices can mitigate the impacts of stressors, including climate change.

However, the significance of the stressors described above cannot be ignored. The IPCC Special Report on Climate Change and Land warns that the level of climate change risk, depends not just on the extent of warming but also how population, consumption, production, technological development and land practices evolve.

Climate change risks for food and agribusinesses

The climate change risk profile of the food and agribusiness industry is complex. The industry is highly vulnerable to the effects of climate change, and yet also well-placed to mitigate those risks and also benefit from opportunities that the transition to a more sustainable future presents.

Physical risks of climate change

Land ecosystems and biodiversity are vulnerable to the physical effects of climate change. These include a warmer and more volatile climate with increased frequency, intensity and duration of extreme climactic and weather events – heat waves, droughts, periods of low rainfall, dust storms, permafrost thaws, rain storms, floods, severe wind and wave activity, coastal erosion, rising sea levels, amongst others. Although land-based industries are accustomed to dealing with difficult weather conditions, climate change has the potential to increase the number and duration of acute weather events and disasters with often immediate impacts on production and profitability. The IPCC Special Report on Climate Change and Land predicts with high confidence that the stability of global food supply will decrease as the magnitude and frequency of extreme weather events that disrupt food chains increase.

In addition, climate change has the potential to cause more complex, longer term problems. It has led to shifts of climate zones in many regions, it exacerbates land degradation and desertification, soil erosion rates now vastly outpaces that of soil formation, coastal erosion is intensifying, and sea levels are rising and becoming increasingly acidic.¹⁰ For land-based businesses in affected regions, these changes can seriously impact productivity and profitability (or even viability) over the mid-longer term.

It is important to also consider the cascading impacts (indirect and direct, short term and longer term) as other sectors with key roles in the food and agribusiness value chain, such as energy, infrastructure and transport, are affected by the physical effects of climate change. It is easy to envisage the impact on food and agribusinesses if, for example, essential utilities or infrastructure are damaged by flooding, or a hurricane disrupts transportation of soft commodities.

Food and agribusinesses must understand and anticipate these risks to their businesses and prepare accordingly. There will be costs of responding to physical events and disasters, as well as costs associated with mitigation, adaptive measures, and investment in infrastructure and resources to increase the resilience of operations and supply chains. However, the benefit is clear – if adaptive measures are taken, many risks may be mitigated and in some instances baseline productivity and profitability may also improve.

6 IPCC Special Report on Climate Change and Land

7 Assessment Report on Pollinators, Pollination and Food Production, IPBES <https://www.ipbes.net/assessment-reports/pollinators>

8 Making a beeline for disaster? The decline of pollinators puts agriculture at risk, Swiss Re: Institute https://corporatesolutions.swissre.com/insights/knowledge/the_decline_of_the_pollinators.html

9 United In Science- High-level synthesis report of latest climate science information convened by the Science Advisory Group of the UN Climate Action Summit 2019 <https://wedocs.unep.org/bitstream/handle/20.500.11822/30023/climsci.pdf?sequence=1&isAllowed=y>

10 IPCC Special Report on Climate Change and Land

Case Study on the Australian agriculture sector

A recent climate scenario analysis of risks and opportunities in Australian agriculture undertaken by Commonwealth Bank of Australia, paints a clear picture of the need for assessment and adaptive measures.¹¹ On the worst case scenario model basis, the CBA risk report anticipates significant (between 40 – 60 percent) loss of productivity and farmer profitability by 2060 across all three sectors studied; grains, livestock and dairy cattle. Key risks for those sectors, respectively, include changes in predicted rainfall, deterioration of pasture growth and quality, and the incidence of consecutive days of significant heat stress (which causes cows to stop lactating, ceasing production). Yet, for each sector, the scenario models showed that adaptive measures could significantly preserve or even increase productivity and profitability. These included measures such as breeding (or genetically modifying) crops or livestock to better tolerate drought, heat and humidity, or advances in monitoring and management technology to maximise water and other resource efficiencies and to provide greater shade and cooling. However, adaptive measures are not a panacea – in some instances the costs of adaptive measures may outweigh the benefits or there may be undesirable side effects, or some trends (e.g. declining rainfall) may prove beyond current adaptive measures such that some regions will be significantly less viable for current agribusiness uses in the long term.

Transition risks of climate change

Food and agribusinesses will need to transition to mitigate, adapt and become more resilient to the physical effects of climate change. There will be other drivers of change, including risks of: changes in laws, policy and regulation (including in respect of reporting of emissions and/or climate-related financial risks); shifts in public perception leading to different consumer habits or customer behaviours; reputation risks or stigmatization of sectors; litigation or activism (see also our article on Climate change disputes – a food and agribusiness perspective); changes in investment or lending appetites and commercial strategies; new emerging competitors, markets and technologies; uncertain markets; and uncertain macroeconomic conditions. Some will lead to additional costs for businesses or reduce productivity or profitability, such as new tax regimes, loss of market share, difficulties obtaining finance or insurance at attractive rates (or at all). However, there will also be opportunities.

Opportunities for the food and agribusiness sector

Transition opportunities

Some of the changes to the industry will lead to new resource efficiencies, technologies or management practices that increase production or profitability. New markets and customers will open up for those that develop low emission and sustainable products, as will access to new lines of green finance or subsidies. Investors are predicting gains in these areas; as an example, investment in agritech and foodtech start-ups has increased significantly in recent years, reaching over US\$ 10 billion in 2017.

Of course, implementing any new business practice or entering a new market carries risk, but those willing to invest strategically and carefully in new technologies may see significant efficiency gains and profits.

Adaptive measures and activities that mitigate climate change

Better land management can help tackle climate change. As an added benefit, many land-based responses that adapt to or mitigate climate change also combat land degradation and desertification, and enhance food security, sustainable development and other societal goals. These include sustainable food production, sustainable forest management, soil organic carbon management, ecosystem conservation and land restoration, and reduced deforestation and degradation.¹² Non-land based options in food and agriculture value chain management, include reducing post-harvest losses and food and water loss and waste, or different dietary choices which can lower emissions or reduce pressure on land.

Land-based options can also deliver carbon sequestration in soil or vegetation, though with varying degrees and duration of efficiency and effectiveness, and sequestered carbon is at risk of loss if disturbed (for example by flood, fire or pests) or managed poorly.

For land-based solutions to be effective, an integrated response across multiple sectors (agriculture, forest, water) and across local, regional and national levels will generally be needed. Successful implementation also depends on local environmental, ecological and socio-economic conditions. Similarly, barriers to adaptation and mitigation efforts,

11 Commonwealth Bank of Australia Annual Report FY19, Risk report – climate scenario analysis – risks and opportunities in Australian agriculture <https://www.commbank.com.au/content/dam/commbank/about-us/shareholders/pdfs/annual-reports/CBA-2019-Annual-Report.pdf#page=57>

12 IPCC Special Report on Climate Change and Land

and risks of side effects are tied to the regional and local environs – in particular the environmental and cultural contexts.

It is also important to consider if and to what extent land-based options compete for available land. Many do not (such as improved management of crop and grazing lands, or sustainable forestry). However, some do (such as afforestation, reforestation, or use of land for biochar or bioenergy feedstock). Increased land demand can lead to land degradation and desertification. There will accordingly be limits to land-based options. It cannot be the only solution. It is essential to reduce GHGs and implement adaptation, mitigation and resilience measures across all sectors.

Having briefly touched on innovative ways to mitigate the effect on the environment caused by agribusiness the following, feature article, discusses in more depth the innovative solutions being used throughout the agricultural production process.

Conclusion

Winston Churchill once said *“There is nothing wrong with change, if it is in the right direction.”* One hundred years ago, transitions in industry, energy and transport led to fundamental societal change. The automobile, for example, allowed for faster and safer travel over larger distances, which transformed industry and trade, and reshaped our cities as well as our private lives. The modern transitions to adapt to or mitigate global warming, including in the food and agribusiness sector, call for an equally significant reorganisation of the way our societies, industries, businesses, and lives are ordered and run – even to the way we produce and consume food. Savvy food and agribusinesses will undertake early stage assessments of the risks posed by climate change (physical and transition), and implement resilience plans and adaptive measures. In doing so, they will be well-placed not only to ride out the coming changes to the sector and to society as a whole, but also to identify and exploit the opportunities that change presents.

Agricultural infrastructure for resilience against climate change

By Kellie Johnston, Calgary and Doug Buchanan, Vancouver

Climate change is a significant challenge for agriculture. Climate change is creating obstacles to healthy and productive growth in an industry where large and small agricultural businesses are challenged in their effort to release less greenhouse gases into the atmosphere and consume less water resources. In this article, we look at innovations in the agricultural industry that improve resiliency and adaptability in agricultural infrastructure in a time of ever increasing global climate change concern. We also touch on the advantages of PPPs for paying for climate change resilient agribusiness infrastructure.

Agriculture is a substantial contributor to greenhouse gases and uses a significant amount of freshwater. The global focus on climate change and the growing number of climate catastrophes, such as extreme flooding in Ontario and Quebec in spring 2019 and catastrophic hurricanes in the US, show that we need to change our natural environments to adapt to the effects of climate change and change our built environments to effectively mitigate the effects of climate change. The infrastructure that we require to respond to climate change will have to be innovative and timely to respond appropriately. Some initial agribusiness infrastructure projects may be the expected ones, such as sourcing more energy from renewable alternatives, but others will rely on science, cooperation and innovation to ensure economic and ecological benefits, and food security, for the future.

The ecological and geographical diversity of the agricultural industry means that there are a number of potential resiliency structures that could be utilized to adapt to climate change. The Intergovernmental Panel on Climate Change has defined

adaptation as an adjustment in natural or human systems in response to climatic stimuli or their effects which reduces vulnerability, moderates harm, or exploits beneficial opportunities. With the diversity of agriculture and the breadth of adaptation techniques in mind, this article aims to summarize some of the infrastructure which can be used to make agriculture more resilient to climate change.

Pre-Production Infrastructure

Water and soil are critical for agricultural development. There are many ways to increase agricultural sustainability through climate resilient infrastructure that protects water and soil, on both a small and large scale. One natural form of infrastructure which can protect both water and soil is a riparian buffer. This is a area which surrounds a body of water to create a natural filter for the water.

The area is zoned for different vegetative growth, which often contains forestry. The plants and supported soil act to prevent an accumulation of agricultural chemicals in the water source. The riparian buffer also serves to minimize erosion, ensure more even water drainage and decrease the impact of adjacent agricultural uses. A riparian buffer may also serve as a wildlife corridor. Riparian buffers increase plant and animal diversity by ensuring access to clean water and allowing natural vegetative growth.

Climate change is expected to cause variations in precipitation, including increased and exacerbated periods of rain and drought. Canada's Changing Climate Report, published in April 2019, speaks to these changes in rainfall and snowfall in Canada. During times of increased rainfall, there will be more runoff of fertilizers and chemicals. Having natural bodies of water protected with riparian buffers will mitigate the effect of agricultural activity on the surrounding water sources. An alternative to riparian buffers could be grade stabilization infrastructure which are man-made structures that control the grade of the land by creating artificial barriers, steps and channels between the agricultural activity and the body of water. These structures reduce erosion which can cause negative impacts on water quality.

Farming operators can also build retention ponds to accept rain and storm water during periods of increased precipitation. Diversion channels may also help to keep water sources

clean and free of toxic runoff from agricultural operations. The farmland can be landscaped so as to divert water to different areas and allow for a greater distance between agricultural activities and water sources which could also minimize negative impacts on water quality.

Another natural form of resiliency infrastructure are shelterbelts. Shelterbelts are most commonly trees planted to protect agriculture from extreme weather. The trees minimize the effects of strong winds and rainfalls which cause erosion to crops. Trees also provide protection for wildlife which in turn creates more biodiversity. Ultimately, shelterbelts help to mitigate the effects of extreme weather while also allowing for carbon sequestration and improved crop yields.

Both riparian buffers and shelterbelts are pre-production infrastructure projects that protect water quality and soil quality in the face of extreme weather conditions and changes. Wind and flood damage can be mitigated by building these infrastructure projects into agricultural plans. This infrastructure also helps to restore natural ecosystems, which are naturally more resilient to climate change, around agricultural land use for ecological and economic benefit.

On a more macro scale, climate resilient water management is a key component in creating sustainable agribusiness. Water management is critical especially as it relates to floods and droughts as these extreme events create significant impacts on the agri-food business.

Production

There are a number of ways for the agricultural industry to improve their farming techniques to create more sustainable enterprises. These techniques improve soil health, reduce water and energy consumption, reduce chemical and fertilizer dependency, and reduce a farm's ecological footprint and effects on climate. Organic agriculture farming techniques result in increased use of renewable energy, improved soil health practices, proper irrigation access and improved water management. These practices also encompass efficient or no use of fertilizers and chemicals which has a positive knock on effect for the ecology surrounding the farming operation. Zero tillage or low tilling farming allows nutrients to remain in the soil and improves carbon sequestration. Farming operations may also consider switching to crops and livestock that are more resilient and suitable for future conditions. Micro, drip or precision irrigation can be manually or automatically controlled, even down to individual plants, and thereby significantly increases irrigation efficiency and provides substantial water savings.

In the wake of changing climate, energy use will be difficult to monitor and will be highly variable in response to changing weather patterns. Installing alternative energy sources may mitigate some of the issues with traditional energy sources. Alternatives are less likely to contribute to climate change, in the long term, and may be more affordable. Wind turbines, solar panels and hydro are example of alternative energy sources that are promising for creating resilient agribusiness infrastructure.

Livestock will be impacted by changing global temperatures and experience increased temperatures and heat stress. Changes to their body temperature

negatively affects their ability to produce eggs, milk, fur and meat. To adapt, animal enclosures and infrastructure will benefit from modifications to allow for more air circulation, greater access to foraging, and reduced livestock density. In addition, livestock will increasingly require structures to protect them from climate extremes. For example, barns with air conditioning will give animals greater resiliency to increased temperatures.

Vertical agriculture is another opportunity to create more resilient growing operations as it may use less resources and have less impact on the land. Vertical agriculture may also be less susceptible to the changing climate and degraded soil conditions. Similar to vertical agriculture, hydroponic and aquaponics may increase growth efficiency and adaptability of crops. Finally, mixed crop-livestock farming allows operations to mix their investments of time and resources into a number of different revenue sources which will decrease risk from climate change as each type of agricultural product provides a different revenue stream that may or may not be affected by climate change in a given year. Mixed farming is also akin to indigenous knowledge which uses local and communal resources to adapt to challenges in farming. Such mixed farming or enhanced crop rotations may also improve carbon sequestration and protect the health of the soil.

Resiliency may also be achieved through 'Climate Smart Agriculture' such as synthetic biology which can increase crop yields and combat climate change through biological engineering. The engineering creates synthetic life forms that are more resilient to the effects of climate change. Such examples are drought-resistant plants and seeds and reversing pesticide resistance so that the use of chemicals may be decreased.

Post-Production Infrastructure

Cover crops can be used after harvest to reduce soil erosion by wind and water, as well as maintain the farm ecosystem. Cover crops will also sequester carbon in the plants and soil.

Capture technologies for animal manure include developing alternate energy sources such as gas capture technologies for stored livestock manure to utilize wasted energy and reduce greenhouse gas emissions. Waste reduction and sanitation systems will need to see technological and innovative advances in the coming years to appropriately address climate concerns.

Technology

Technology has a role to play in creating economic and ecological benefits in the agribusiness value chain, including resilient infrastructure to mitigate climate change impact. Advancements in artificial intelligence, system design solutions (e.g. circular economy) and orchestration technologies (e.g. creating efficient supply chains) can enable new agribusiness models and lead to increased food security through more productive, efficient, sustainable and resilient food production globally. Technological innovation is a key driver in the push for solutions to address some of the environmental, social and economic challenges and opportunities in the agribusiness industry.

Funding

High levels of investment are needed to develop, construct, operate and maintain resilient infrastructure, in every area, including agribusiness. Various governments, including the Government of Canada, has programs in place to support and promote resilient agriculture projects. For example, Agriculture and Agri-Food Canada (AAFC) has grant programs to help agricultural operations reduce their climate impacts and become more resilient. The Agricultural Greenhouse Gasses Program is funded by cost sharing with both the applicants and the AAFC. Support from the government may come as a cash contribution or as an in-kind contribution. Alternative energy infrastructure will also often be subsidized by the government.

International support through the UN National Adaptation Plans Program may also provide in-kind assistance to develop resiliency infrastructure. Similarly, New York state released a new climate change policy to reduce emissions which has grant programs associated to it. Such grants may be tied to achieving certain amounts of green technology, low emission levels or developing clean energy.

Green organizations insist that costs should not only be publicly covered but that action and costs should be taken on by the individual producer. As some of the larger agricultural businesses are significant contributors to greenhouse gas emissions and realize profits, many climate proponents argue that they should be incurring the costs of resiliency infrastructure. New York state recently released a climate plan which shares the burden of cost to reduce emissions between government and producer.

Public private partnerships (PPPs) can be a result of cost-sharing initiatives for resilient agriculture infrastructure. There have been many PPPs around the world that have shown the effectiveness of these partnerships in mobilizing funds to create resiliency in agriculture and long-term economic and ecological benefit. Thailand, India and Russia have shown good results from these partnerships and have reported on the benefits and lessons learned. As climate resilience becomes more and more an imperative around the world, it is likely that PPPs and innovative ways to partner to create value and long-term benefits while increasing climate resiliency will become more and more common.

Ultimately funding for climate resilient infrastructure will likely come from all areas – the individual, the corporation, researchers and government. All sectors should be on board to mitigate and adapt to the changing global climate.

Innovation in sustainable agricultural practices

By Jackie O'Brien, Helen Macpherson and Ben Kende, Sydney

Climate change is a critical and emotionally-charged issue. The motivation for addressing climate change is varied, ranging from the purely environmental perspective or a key risk management issue to that of an incredible opportunity for organizations to gain a competitive advantage.

In *Agricultural Infrastructure for Climate Change Resistance* we discussed how climate change is a significant challenge for agriculture and the potential resiliency structures that could be utilized to adapt to climate change.

In this article, the authors discuss how the causes and impacts of climate change are driving both incremental and ground-breaking innovations in agricultural practices; and the role of intellectual property in incentivizing organizations to innovate and as a key risk management issue.

The causes and impacts of climate change have again been highlighted in the "Climate Change and Land, an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems" issued by the Intergovernmental Panel on Climate Change on 8 August 2019.

What is clear is that these issues are driving both incremental and ground-breaking innovations in agricultural practices to:

- reduce or mitigate the contribution of agricultural practices to greenhouse gas emissions;
- reduce food loss and waste, so reducing the contribution of food loss and waste to greenhouse gas emission; and
- ensure food security and the continued viability of agricultural practices in regions where the natural environment has been altered as a result of changing climatic conditions.

In this article, we provide a brief snapshot of some of the many and varied innovations being developed to address these issues, in addition to those discussed in *Agricultural Infrastructure for Climate Change Resistance*. We then discuss the central role that intellectual property, and specifically patents, can and are playing in fostering this much-needed innovation and the need to ensure that intellectual property is front of mind when seeking to commercialize these innovations.

Agricultural innovation: a snapshot

It is no surprise that the many and varied impacts of agricultural practices on the world's climate and the impact of food loss and waste has resulted in a wide array of agricultural innovations.

Greenhouse gas emission reduction and mitigation

Fundamentally, a key focus of innovation has been on reducing the climate-related footprint of agricultural practices.

In this context, we have seen innovation in the energy sources used in agriculture, with a push to reduce the fossil fuel usage through the development and greater use of renewable energy technologies such as electric vehicles and large-scale batteries. Innovation in this context has also centred on developing agricultural practices which either reduce greenhouse gas emissions or mitigate against such emissions by for example sequestering carbon.

There has also been innovation directed to more efficiently using the world's natural resources. Increased efficiency in water usage, for example, through precision irrigation minimizes the amount of water lost to other plants and to evaporation. Many specialist companies design and implement precision irrigation systems and have obtained patents in relation to this technology.

For example, Netafim, a world leader in precision irrigation technology, has numerous patents in relation to precision irrigation technology.

Food loss and waste

Food loss occurs at each stage of the food production process, through for example, losses due to poor crop harvest and animal death and losses due to insufficient storage facilities. In many countries, on-farm food waste is also often caused by wholesales/retailers rejecting produce based on actual or perceived consumer expectations.

The need to reduce food wastage and the economic incentive to do so has driven innovation in product development, resulting in new products and in some cases resulting in the development of new industries that can use the food that would otherwise be treated as waste. Notably, one such industry is the Tasmanian gin industry, which originated from a desire to find a market for “second grade” potatoes.

Viability of agricultural practices in a changing world

With average temperatures on the rise and changes in rainfall patterns and salinity levels in many parts of the globe, there has been a change in the crops and livestock that can be sustainably grown and raised in many regions. Concomitantly, increasing temperatures and changes in rainfall patterns has caused changes in insect pest populations, including for example in relation to the numbers and size of the insect pests typically present and the types of insect pests present.

The cumulative effect is a decrease in the viability of crops and livestock traditionally grown and raised in different global regions and an increased risk of crop destruction and livestock disease from pest insects.

As a result, innovation has been focussed on developing new crop and livestock breeds that can tolerate the climatic changes such as drought-resistant crops and salinity-tolerant plants.

We have also seen the development of innovative farming practices to harness extreme weather events for agricultural benefit. One example here is the use of aquifer storage and recovery (ASR) systems to provide seasonal or yearly water storage. ASR systems work by storing water during the wet season/years and recovering it during the following dry season/year.

Intellectual Property’s Role

Intellectual property is front and centre, whether your motivation for addressing climate change causes and impacts is purely environmental or is based on risk management principles or the desire for gaining a competitive advantage.

While there continues to be a debate as to the role that intellectual property can play in fostering innovation to address these issues, it is important to remember that intellectual property, and specifically patents, were created as a type of legally recognised property to encourage and reward those who invested in innovation. Those who innovated could seek to recoup their investment through applying for and being granted a patent. A granted patent provided a statutory monopoly which could then be monetised by directly selling the patented innovation or by licensing third parties to sell the patent innovation.

The *quid pro quo* was that the patentee published their innovation to the world, meaning that third parties benefited from the publicly available knowledge of the innovation and could practise the patented innovation once the statutory monopoly ended.

The patent system is ideally placed to assist in fostering the much-needed innovation in agricultural sustainability and food security for the following reasons:

- Patents incentivize organizations to innovate to reduce their risk profile in relation to food sustainability and food security. And from a risk management perspective it is also vital that organizations are aware of the patent landscape to ensure that their current practices and any future innovations in relation to these practices do not impinge on a third party’s patent rights.
- Patents also incentivize organizations to innovate for the purpose of seeking a competitive advantage.
- While the patent system grants exclusive rights to the patentee, the patentee is required to publish their invention to the world. So, as already stated, this means that third parties benefit from the publicly available knowledge of the innovation and can practise the patented innovation once the statutory monopoly ended.
- The patent laws of most countries include mechanisms designed to ensure that innovation can continue throughout the term of the patent. These mechanisms take the form of infringement exemptions. For example, the patent laws of many countries exempt any acts which might otherwise constitute exploitation (and so infringement) of a patent where those acts are done solely for purposes connected with obtaining regulatory approval or for experimental purposes. Critically, this means that research can continue during the life of the patent leading to further innovation during the life of the patent.

- A patentee is also able to ensure that the patented innovation is widely disseminated and integrated where required with other technologies. Subject to any competition issues, this can be done by the standalone licensing of the patent innovation or as part of a cross-licensing or patent pool arrangement.
- Where the free market does not lead to the necessary dissemination of innovative practices, this gap can be addressed by compulsory licence provisions. While not perfect and not often used, compulsory licence provisions provide a statutory mechanism to ensure the dissemination of innovations. For example, in Australia, the Patents Act provides that a compulsory licence may be granted where: 1. the applicant has tried for a reasonable period, but without success, to obtain from the patentee an authorization to work the invention on reasonable terms and conditions; 2. the reasonable requirements of the public with respect to the patented innovation have not been satisfied; and 3. the patentee has given no satisfactory reason for failing to exploit the patent.

Conclusion

The contribution of agricultural practices and food loss and waste to greenhouse gas emissions and the concomitant changes in global environmental conditions cannot be ignored. The big question is what will incentivize individuals and business to innovate to address these issues. The intellectual property system, and specifically the patent system, is ideally placed to provide the required incentive whether your motivation is purely environmental, or arises because climate causes and impacts present key risk management issues or alternatively an incredible opportunity to gain a competitive advantage.

New York State's Climate Leadership Act presents new challenges and opportunities for agriculture

By Christopher Hilbert and Steven Bovino, New York

On July 18, 2019, Governor Anthony Cuomo signed New York State's ambitious Climate Leadership and Community Protection Act (the "Act") into law. The Act calls for a dramatic decrease in greenhouse gas emissions to combat the grave threats posed by climate change identified by the law. During New York Energy Week in June 2019, the New York office of Norton Rose Fulbright hosted and moderated a discussion by a panel of renewable energy experts on the challenges and likely impacts of the Climate Leadership Act and some of the measures required to meet the aggressive timeline and formidable challenge of complying with the most far-reaching U.S. climate change legislation to date.

New York's Climate Leadership Act establishes mandatory and aggressive targets to reduce greenhouse gas emissions and sets out procedures and a consultation process to transform New York to achieve those targets. New York intends to take a leadership role (at least in the United States) in developing a way to achieve *net zero* greenhouse gas emissions.

While agriculture is not New York State's primary industry or business sector, farm production reportedly contributed nearly \$2.4 billion to New York State's gross domestic product in 2017, and agricultural production, support services, and manufacturing contributed more than 145,300 jobs to New York State's economy in 2014, according to a Cornell University research study cited by the New York State Department of Labor.

New York State's top agricultural commodities by sales are, in descending order: milk; corn; hay; apples; and cattle and calves. In 2017, New York State was among the top three U.S. states with respect to milk production and was the top ranking producer among U.S. states for cottage cheese production (accounting for nearly 27% of the U.S. total). Given the importance to the state of agriculture (by which we mean the raising of plants, animals and by products), New York's treatment of agriculture in the process of implementing the new Climate Leadership Act may be a relevant precedent for other jurisdictions.

The Climate Leadership Act: targets, timeline and process framework

The Act sets certain goals:

- **Renewable energy systems** (defined broadly as "systems that generate electricity or thermal energy through use of solar thermal, photovoltaics, on land or offshore wind, hydroelectric, geothermal electric, geothermal ground source heat, tidal energy, wave energy, ocean thermal, and fuel cells which do not utilize a fossil fuel resource in the process of generating electricity")
 - Should generate 70 per cent of statewide electricity by 2030
 - Should generate 100 per cent by 2040.
- **Reduce statewide greenhouse gas emissions** (carbon dioxide, methane, nitrous oxide and other substances emitted into the air) that may contribute to anthropogenic climate change (caused by human activity). The maximum allowable level of statewide greenhouse gas emissions in a given year from human activity:
 - should be reduced to 60 per cent of 1990 levels (the baseline measurement levels) by 2030

- should be reduced to gross greenhouse gas emissions of no more than 15 per cent of 1990 levels by 2050 and net zero greenhouse gas emissions by 2050. The 2050 target requires that the up to 15 per cent of permitted emissions in approved activities will be fully offset by approved carbon capture, carbon sequestration, reforestation and other designated carbon removal projects, discussed further below (collectively, the “Targets”).

The calls for an initial two-year consultation and study process during which the state must generally consider:

- impact of the changes on communities
- protection of lower income parts of the population
- protection of disadvantaged communities generally against the costs of the efforts to meet the new emission requirements, looking at many possible ways to view “disadvantaged”
- prioritizing disadvantaged communities to receive public investments required to achieve the new goals
- creation of new or replacement jobs, jobs that deemed to be quality opportunities
- standards and a floor for compensation, safe working conditions and labor conditions generally
- training needed for the workforce, including retraining for displaced workers

- impact on the competitiveness of New York businesses and the New York economy
- treatment of businesses that will no longer be relevant or economical
- support for businesses facing massive conversion costs
- impact on tax revenues and who will bear or receive tax incentives or tax surcharges
- consumers, as far as costs and availability of energy and other goods and services
- subsidies or incentives to attract needed investment, in what amounts, for whom and where located
- improving the state’s resiliency in dealing with unavoidable climate change risks (such as severe storms)
- and other social issues.

The Act establishes a New York state climate action council (the “Council”) which is ultimately tasked with developing a plan to meet the Targets. The Council, co-chaired by the commissioner of the New York Department of Environmental Conservation (“DEC”) and the president of the New York State Energy Research and Development Authority, will consist of 22 members including New York state agency commissioners, the chairperson of the Public Service Commission, the presidents of the New York Power Authority and the Long Island Power Authority, the New York Secretary of State, two non-agency expert members appointed by the governor and eight members appointed by leaders of New York’s legislature (the state senate and the state assembly). The Council will have advisory panels and will be aided by

a “just transition working group” that will help the Council deal with some of the considerations discussed above regarding the impact of the transition on jobs, workers, businesses and communities.

Within two years of the Climate Leadership Act’s enactment, the Council must develop and approve a scoping plan (the “Scoping Plan”) outlining the Council’s recommendations and providing a path for New York to meet the Targets. Within three years, the Council must submit the final Scoping Plan to the governor and the state legislature and make it available to the public via the Council’s website. Within four years, the DEC must promulgate rules and regulations to ensure compliance with the Climate Leadership Act and assist state agencies in promulgating additional rules and regulations as necessary.

In addition to setting out actions to achieve the Targets, the Scoping Plan must, among other things:

- identify measures to achieve specified levels of distributed solar capacity by specified target dates
- identify land-use and transportation measures designed to minimize emissions from motor vehicles
- identify measures to limit the use of certain chemicals, support the growth of forests and achieve high air quality
- take into account the adverse effects on disadvantaged communities and small businesses, including establishing a de minimis greenhouse gas threshold exempting those below such level from the related emission reduction requirements.

The Council's recommendations will not be based solely on the industry experts and government officials that make up the Council and its advisory panels. The Act requires that in preparing the Scoping Plan, the Council must solicit *public comments* and hold at least six *regional public comment hearings* on the draft Scoping Plan. These meetings are to be split geographically between upstate (which are more rural areas) and downstate (which includes New York City).

While the Council will not itself promulgate rules or regulations, the New York State Energy Planning Board is required to incorporate the Council's recommendations into its annual state energy plan beginning with the first energy plan issued following the Council's approval of the Scoping Plan. Once adopted and made effective by state rules and regulations, the plan to achieve the Targets must be continually reviewed and must be updated at least every five years.

The Climate Leadership Act provides for periodic reassessment of interim goals, the methods to achieve those goals and consideration of relevant developments (including best practices and new technologies) from around the world.

This new law could have had a lot of different names – calling it the “Climate Leadership Act” shows it is trying to take a bold step forward, but the second part of the title – “and Community Protection Act” – should be paid attention to as well.

The word “community” as used here has a broad meaning covering how and where people live and work, so there is certainly room for people to forcefully argue to protect not just local physical surroundings but also jobs, industry, wages and communities of all sizes, and New York State recognizes that its agriculture business is something that is important to its economy and many of its residents for many reasons.

Meeting the Climate Leadership Act's targets and New York's energy needs

The text of the Climate Leadership Act provides few specifics when it comes to meeting its aggressive specified Targets, although the Scoping Plan does require the Council to establish measures to achieve Targets of:

- 9 GW of offshore wind by 2035
- 6 gigawatts (GW) of solar energy capacity by 2025
- 3 GW of energy storage capacity by 2030
- a specified reduction of 185 trillion BTUs of electric energy consumption by 2025 below the existing 2025 forecast.

In support of the efforts that will be required to satisfy the Targets, New York announced the approval of two offshore wind projects simultaneously with Governor Cuomo's signing of the Climate Leadership Act into law. The 880 mega-watt (MW) Sunrise Project, developed by Bay State Wind (a joint venture between Danish firm Orsted and Eversource Energy), and the 816 MW Empire Wind project, developed by Danish firm Equinor, will both begin construction off the coast of Long Island in 2022, with both wind farms scheduled to begin commercial operations by May 2024.

The Act is clearly relying to some extent on wind and solar energy, but also recognizes the need for other sources, in particular hydroelectric, which can provide a substantial baseload source of electricity. Hydropower, largely from the Canadian province of Quebec, already supplies a substantial amount of renewable energy to upstate New York, and the Mayor of the City of New York has announced plans to bring available hydropower from Quebec to satisfy a substantial portion of the future clean energy needs of New York City, thereby substantially helping New York State meet its future clean power needs.

The Climate Leadership Act and New York agriculture

The impact on New York's agriculture industry is difficult to gauge and will depend greatly on the details of the Scoping Plan, the rules promulgated by the DEC thereunder, and on any potential amendments that might be made to the existing text of the Act. The Act addresses agriculture expressly in several of its provisions:

- The Climate Leadership Act requires that greenhouse gas emissions from all human activity be specifically restricted (or prohibited) by type of source, with one exception. Agricultural *emissions from livestock* will *not* be directly restricted.
- The types of carbon offsets that can be designated to offset future greenhouse gas emissions include, among other things, forests, grasslands and wetlands that can be carbon sinks, as well as methods of carbon sequestration plus anaerobic digesters (used on farms to allow organisms to digest livestock manure, particularly for dairy and beef livestock, with the biogas produced able to be used as a local energy source).
- The Act also requires the Council to gather information on negative impacts of anaerobic digesters, garbage incinerators and biomass combustion.
- The Council, which will develop the Scoping Plan to carry out the Act, is required to establish advisory boards to address specific industries, one of which is agriculture and forestry.
- In looking at the New York economy in developing the implementation plan for the new law, the New York economy is divided into five sectors, one of which is agriculture.
- One of the many objectives to be observed in developing the plan and actions to carry out the Act is to foster long-term carbon capture and best practices in land use, agriculture and forestry and in the use of chemicals that may contribute to climate change.

Agriculture presents its own special issues regarding greenhouse gases in the U.S.:

- The main greenhouse gas emissions from agriculture are not carbon dioxide but instead methane and nitrous oxide. Nitrous oxide is emitted primarily by soil management practices. Methane is produced by the digestive processes of cows and sheep. Manure management practices release nitrous oxide and methane.
- Agriculture also offers substantial possibilities for carbon capture and sequestration in soils through use of carbon dioxide in photosynthesis by plants.
- Variations in land, crop and livestock management can have significant impacts on greenhouse gas emissions and on carbon capture.

Farmers throughout New York are already utilizing many techniques to control greenhouse gas emissions, in part due to existing economic incentives that could be expanded by the Council and the DEC. For example, New York recently announced an additional \$2.3 million round of funding to the Climate Resilient Farming Grant program, which has provided New York farmers with grants totaling over \$8 million since 2015 to implement projects to mitigate greenhouse gas emissions, promote energy savings and better cope with extreme climate change-related weather events such as flooding. These grants have supported projects such as:

- silvopasture practices (combining forestry and grazing to improve water quality, mitigate soil erosion and increase carbon sequestration)
- installing manure storage cover and flare systems to capture methane emissions
- installing solar-powered irrigation systems
- implementing cover cropping, intercropping, and forage and biomass planting.

One area of New York's Climate Leadership Act has already drawn attention for the way it treats agriculture – the limitations on what can be considered an acceptable carbon offset. While the Targets mandate that 85 per cent of New York's total energy needs must ultimately be supplied by zero-emission sources, the remaining 15 per cent can be met via approved projects which offset greenhouse gases. Many developing agricultural practices such as those outlined above might be used in this regard.

But the Climate Leadership Act: (1) excludes from offset programs waste-to-energy technologies such as biofuels and (2) requires that any offset program must generally be located near the source of emissions being offset, preventing farmers from profiting from offset programs that are not needed to offset local emissions. Biofuels are also excluded from the definition of “renewable energy systems” and therefore will not be considered an acceptable source of electricity in meeting the Targets regarding generation of electricity.

Potentially hampering the implementation of such offset mechanisms further is the exclusion of any offset program (such as increased cover crops) that would have been undertaken in any event within five years. This has already attracted negative comments and may be an issue for possible future amendments because various agriculture lobbying groups will want farmers to obtain benefits from these emissions offsets. The exclusion of biofuels is also being questioned.

Watching how New York addresses these questions should be fascinating. Over the years, as New York implements and refines its plans to achieve the Targets set by the Act, numerous choices will be confronted, some unique to agriculture and some inevitable as new technologies develop and new problems arise.

There are the relatively simple questions of:

- What impact will new electric equipment and new technologies have on costs, efficiency, productivity, safety and labor in agriculture? It appears that many equipment suppliers are making good strides in developing efficient and affordable electric options.
- To what extent will New York’s moves to reduce greenhouse gas emissions and to move all electrical power to generation by renewables such as wind, hydropower and solar require new transmission lines for increased electricity demand and will those new transmission lines need to be subsidized for less populated, agrarian areas? Or will those areas be served by dispersed generation where renewables will be used to produce electricity locally near the ultimate use?
- Will New York agriculture face increased competition for attractive temperate land that receives reasonable sunlight? The Climate Leadership Act has created increased interest in renewable energy investments in New York and that is leading to conflicts between energy developers and the interests of rural communities and farms, as for example, solar developers seek to purchase existing farmland in order to convert it to locations for solar power plants.

Then there are some more difficult choices:

- To what extent will agriculture as a way of life be protected in New York, whether it is on a large scale or a small scale? To what extent will farms be subsidized to allow them to survive?
- As with any industry dealing with new technologies, how will the new technologies applied to agriculture actually improve the quality of life rather than just making some workers unnecessary?

The implementation of New York’s Climate Leadership Act over the coming years will produce an interesting precedent for how other parts of the U.S. and the world might deal with similar issues, impacting agriculture and all aspects of life and will provide many opportunities for new technologies and new ideas to be developed and appropriately applied.

Transitioning from brown to green – the use of transition bonds and green bonds, and sustainability-linked financing, in agribusiness

By Jacqueline Heng, London

Two of the most pressing issues currently facing our planet are rising carbon emissions and increasing global food demand. The agriculture industry is challenged to increase food production while decreasing its carbon footprint.

A fresh concept which may help to put agriculture and commodities companies on the road to a more sustainable future is that of the transition bond.

In July 2019, AXA Investments Managers called for a new class of bonds known as transition bonds which are designed to allow companies which currently could not offer traditional green bonds to issue bonds that are linked to permit their companies to gradually transition to a greener business model. Transition bonds also help to prevent ‘greenwashing’ of the traditional green bonds market as it allows industries and companies which have difficult environmental management records to begin managing sustainability in their supply chains without necessarily using the green tag.

However, transition bonds have recently come under scrutiny and have been criticised on the grounds that brown industries such as cattle and soy farming cannot ever be environmentally sustainable due to the very nature of their business and that a gradual shift to greener practices is insufficient to combat the rate of climate change. Despite this criticism, transition bonds are growing

in popularity and alongside traditional green bonds do have the potential to assist in leading to a more sustainable and responsible supply chain in the agriculture industry as well as lowering the carbon footprint of commodities traders.

Another financing avenue for agribusiness is sustainability-linked financing (which may take the form of loan facilities or bonds). Rather than the funding itself being earmarked for a particular sustainable project, as is the position with a transition bond or traditional green bond, it is the pricing of the facility which is linked to certain sustainability targets evidencing the issuer’s commitment to a greener future for its business and helping companies to make a gradual shift away from fossil fuels. For example, if environmental and sustainability targets such as reducing food waste or cutting carbon emissions are met, a decrease in the interest rate on the financing may follow, or if the targets are not met, the interest rate may ratchet up. ENEL has just issued the first sustainability-linked bond in September 2019 at an issuance size of US\$1.5 billion, and this may pave the way for further sustainability-linked bonds to be issued in the future. ENEL will be able to use the money for any

purposes, including for more than half of its power generating business which is currently not green. There was US\$4 billion in demand for the bonds and ENEL said that the deal had saved it 20 basis points compared to a conventional bond. In this case, if ENEL fails to hit its set target of increasing its renewable power generation fleet from 45.9 per cent now to 55 per cent by the end of 2021, it would have to pay 25 basis points of coupon step-up.

Why do investors invest in transition bonds?

Transition bonds can be marketed to investors who are pursuing environmental, social and governance (ESG) integration strategies but also want to diversify their investment portfolios away from the traditional green bond projects such as renewable energy projects. As is perceived that a wider range of issuers may issue transition bonds, investors are provided with a wider pool of companies to invest in. When making their investment decisions, investors can then decide whether they believe the issuer is moving fast enough in combatting climate change.

Why do lenders provide sustainable finance?

As at July 2019, over US\$30.7 trillion of funds was held in green or sustainable investments globally, according to the Global Sustainable Investment Alliance and according to Bloomberg Corporation figures, lending linked to measurable sustainability initiatives such as reducing emissions, increased nearly seven-fold to US\$36.4 billion in 2018.

Sustainable financing may help in lowering financing costs for lenders as companies with robust ESG strategies often have good records for debt repayment. Lenders are also being encouraged by regulators to pay more regard to the ESG impact of their financing arrangements.

Why do agriculture and commodities companies issue transition bonds or enter into sustainability-linked financings?

Transition bonds can help to boost supply chain sustainability and help companies to publicly demonstrate a commitment to moving towards a more responsibly sourced supply chain. Transition bonds also have the potential to incorporate broader social and economic benefits as well as environmental ones. Additionally, there is also usually an associated drop in the cost of sustainability-linked facilities such as paying a lower rate of interest if sustainability targets are met. A number of sustainability-linked financing programs have recently been entered into in the farming and agriculture sectors.

Case study: Sustainable beef farming practices

Beef production is associated with deforestation of natural grassland areas in Brazil in order to rear cattle as well as being one of the world's most carbon-intensive forms of food production. Many suppliers are beginning to acknowledge the need for more sustainability in their supply chain. For example, the world's largest supplier of ground beef, Cargill has voluntarily pledged to achieve a 30 per cent. reduction in the greenhouse gas emissions intensity of its North American supply chain by 2030.

In August 2019, Marfrig, the world's second largest beef producer, also announced a US\$500 million sustainable transition bond with the funds raised used to purchase cattle from farms in the Amazon which meet all of Marfrig's best practice conditions such as not encroaching onto indigenous lands, not having deforested their land since 2009 and not being censured by government agencies.

Marfrig's Vice-President of finance and investors relations, Marco Spada stated that the transition bond was intended to "give investors more visibility" on the company's implementation of sustainability strategies such as the traceability of its cattle.

Case study: Sustainable soy production in Brazil

In July 2019, a sustainable commodities financing program, known as the Responsible Commodities Facility and backed by the UK government and the United Nations Environment Program (UNEP) was announced on the London Stock Exchange. This financing programme is aimed at preventing the clearing of forests and grasslands by pasture farmers, instead encouraging them to use degraded pasture as an alternative. Corn and soya farmers who commit

to using degraded pasture will benefit from low-interest credit lines as an incentive to prevent further clearance of Brazilian grasslands.

The target for commodities traders is to allow increased production and protect farmers' income without clearing the natural forest and grasslands. Over a four-year period US\$1 billion of green bonds will be arranged through the facility which hopes to produce 180 million tonnes of sustainably sourced soy and corn and reduce carbon dioxide emissions by 250 million tonnes through the restoration of 1.5 million hectares of natural forest and grassland.

China's largest agriculture company, COFCO International also announced in July 2019 that it had secured a US\$2.1 billion loan with the interest rate linked to its sustainability performance such as investigating whether its soyabean supply emanates from deforestation in Brazil. It has also pledged to invest any interest savings which it makes into further improving its environmental and sustainability practices.

Case study: Sustainable energy, water consumption and waste management

Facilities linked to water and electricity consumption have also recently been used by agribusinesses to demonstrate a commitment to increasing environmental awareness and transparency.

For example, in May 2019, one of the world's four largest commodities traders, Louis Dreyfus, announced a revolving credit facility (RCF) linked to 4 areas of sustainability – water usage, electricity consumption, solid waste and CO2 emissions. Louis Dreyfus will benefit from a reduction in the interest rate on the RCF for every year that it improves on its sustainability record in the 4 areas listed above.

Case study: Sustainability in transporting goods and distribution chain

Agricultural products and commodities need to be distributed to end-consumers which also contributes heavily to global emissions.

Commodities traders can also look to use transition bonds and green bonds, or sustainability-linked financing, to improve their delivery practices.

For example, in 2019 Electricite de France SA signed two bilateral sustainable revolving credit facilities, taking the total of its sustainability-linked loans to over €5 billion which were linked to the adoption of electric vehicles in its delivery fleet and CO2 emissions targets. The company also has €4.5 billion in outstanding green bonds used to finance the construction of renewable energy sites including wind and solar projects.

Conclusion

In conclusion, the case studies laid out above demonstrate the potential uses of green and transition bonds, and sustainability-linked financing, to encourage the agricultural sector to move towards more sustainable practices. They provide agribusiness the opportunity to clean up their supply chain and ensure that their products are sustainably sourced as well as publicly demonstrating their commitment to a greener future.

Green and transition bonds, and sustainability-linked financings, can be a useful tool for stimulating debate about how to move brown industries to more sustainable practices given the pressing need to address climate change. Companies involved in carbon-intensive industries may look to these financings to begin to reduce their environmental footprint and use them as a stepping stone in the transition from brown to green.

Climate change disputes – a food and agribusiness perspective

By Cara Dowling, Vancouver, Elisa de Wit, Sydney and Christian Dargham, Paris

As scientific consensus over the evidence of climate change and humanity's causal impact continues to mount, the scrutiny of state and corporate action, or inaction, as contributors to climate risk is intensifying. As mentioned in my previous article land use has an indispensable and essential role in contributing to basic societal and economic needs. But it is also a major emitter of greenhouse gas emissions (GHGs) which contributes to climate change. Complicating that equation, land use can be a mitigator of the effects of climate change; as a carbon sink and/or via sustainable land management practices. Moreover, it is itself vulnerable to the effects of climate change (physical and transitional) and other stressors. This combination of factors results in a complex analysis when considering the climate change disputes that might impact food and agribusinesses. On the one hand, such businesses may be exposed to risk of climate-related litigation, but on the other hand they may wish to themselves bring climate-related proceedings if necessary to protect their livelihoods.

Climate change disputes

Globally, climate change litigation continues to grow at pace. Claimants are now better funded, resourced and organised. They are actively tracking global climate change litigation trends to identify innovative causes of action and arguments that might be replicated domestically, as well as new targets. According to one count, the number of climate-related cases now stands in excess of 1,300, with cases having been brought in at least 28 countries¹. The United States, Canada, Australia, New Zealand, the United Kingdom and the EU are particular hot spots. Numerous different and often novel causes of action have been tried over

recent years, and in some instances, the courts are being invited to step in to develop law where there is an absence of legislation. In the main, claims still face significant legal hurdles, including issues around standing, justifiability, causation, remoteness and evidential issues. However despite these hurdles, there have been a number of very significant decisions in favor of claimants, a few of which are discussed below. More recently, there have also been significant settlements by defendants of climate-related damages claims.

Most cases fall beneath the radar, such as routine skirmishes over statutory permissions or breaches, but the fact that climate change arguments are being raised, sometimes successfully, is having an impact. In addition, in recent years a number of high stakes claims are being fought very publicly before the highest courts, as well as in the courts of public opinion. The majority have been argued before national courts, which brings with it public relations and reputational pressure. Activists readily admit that the publicity alone is often a significant win, even if the case is lost on legal merits. A number of claims are however also playing out in other forums such as international commercial arbitration, investor-state or state-state disputes, and under other dispute resolution mechanisms provided for in various treaties, conventions and regulation.

Many claimants use these cases as a tool for driving changes to policy and conduct (state, governmental, or corporate), or for compelling better enforcement of existing policies. The *Urgenda Foundation v The Netherlands* case is a notable example. Urgenda successfully sued The Netherlands and obtained a court order compelling the government to implement more stringent climate change policies. The claimants won again on appeal, and the case is under further appeal to the Dutch Supreme Court. The *Urgenda* case was a landmark decision and

¹ Setzer J and Byrnes R (2019) Global trends in climate change litigation: 2019 snapshot. London: Grantham Research Institute on Climate Change and the Environment, and Centre for Climate Change Economics and Policy, London School of Economics and Political Science.

spawned copycat proceedings across the globe, with mixed rates of success.

Climate change litigation is not always aimed at driving so-called ‘pro-climate’ changes: a number of claims have been brought (largely by industry pressure groups or corporations) seeking to challenge pro-climate decisions or regulation, or drive deregulation. An example is the Australian mining company’s (albeit unsuccessful) challenge to the refusal of planning consent for the Rocky Hill Coal Mine Project in New South Wales. Development consent for the open-cut mine had been denied on planning grounds. The mining company sought and was granted permission to appeal in court. A community activist group was also permitted to intervene. The court upheld the denial of the application, ruling that the public cost of the mine outweighed the economic and public benefits and that it would impact existing land uses (including farming and residences). Significantly, the decision also cited climate change grounds, with the court noting that “*will be a material source of GHG emissions and contribute to climate change. Approval of the Project will not assist in achieving the rapid and deep reductions in GHG emissions that are needed now in order to balance emissions by sources with removals by sinks of GHGs in the second half of this century and achieve the generally agreed goal of limiting the increase in global average temperature to well below 2°C above pre-industrial levels.*” New projects that will emit significant GHGs may likewise be at risk of negative decisions or challenges on similar grounds. As in the Rocky Hill case, food and agribusinesses that would be impacted by such projects may look to bring challenges or lawsuits. However, the other edge to that sword is that GHG intensive food and agribusiness related projects (potentially including *those involving*

land use changes for agricultural or forestry use) may face similar challenges.

Claimants have also brought damages claims against high GHG emitting corporate entities and their directors and officers, seeking compensation for direct or indirect effects of climate change (often in conjunction with other relief). One example is *Lliuya v RWE AG*, in which Saúl Luciano Lliuya, a Peruvian farmer is suing Germany’s largest electricity producer, RWE, seeking a financial contribution towards costs of putting in place flood protections in his village in Peru. This claim is notable for its fact profile – Mr. Lliuya is suing RWE before the German courts for emissions it released in Germany which he alleges contributed to climate change and ultimately the melting of a Peruvian glacial lake above his village thereby necessitating flood defences. It shows the truly global nature of climate change disputes risk. The case is ongoing, but survived an initial challenge with the court of appeal finding that, in principle, a polluter can be liable for impacts of climate change. The various high profile lawsuits commenced by US cities and communities against carbon majors, before both federal and state US courts, are other examples of this type of claim. As is the case brought by Pacific Coast Federation of Fishermen’s Association against oil and gas majors, seeking to hold them accountable for major losses suffered by crabbers as a result of shellfish being poisoned by algae blooms attributed to global warming. The claimants are seeking financial contribution towards changes needed to sustain their industry.

As in the *Lliya v RWE AG* and *Pacific Coast Federation of Fishermen’s Association* cases, food and agribusinesses impacted by the effects of change may look to bring claims to prevent or mitigate damage to their

businesses. Again, however, significant GHG emitters in that sector may face their own claims. A significant number of high profile reports have been published assessing the impact of agriculture, forestry and other land use on climate change – most recently, the 2019 IPCC Special Report on Climate Change and Land which reasserted that agriculture, forestry and other land use produced approximately 23 per cent of total human caused GHG emissions, making those sectors combined some of the leading GHG emitters. This potentially marks out the leading individual emitters in those sectors as potential targets for actions – whether regulatory or litigious. But unlike the sectors currently targeted by activists (such as oil and gas majors, cement producers, and coal plant operators), the situation is complicated by the fact that land use can act as a carbon sink and sustainable agricultural practices may mitigate the negative effects of climate change and other stressors. It may be that, at least for now, activists continue to focus on easier targets.

Disclosure is another key battleground, particularly in the wake of more stringent reporting and disclosure requirements (such as recommended by the Task Force on Climate-related Financial Disclosures). A number of claims have been brought against corporates and decision makers for allegedly failing to consider and/or disclose climate change financial risks faced by their businesses. Securities and financial regulators have also commenced investigations over corporate disclosures (or more accurately, lack thereof) of material climate-related financial risks, and there is increasing levels of investor and shareholder activism. Corporates have also faced claims that they have failed to take appropriate steps to adapt to climate change or adequately increase the resilience of their operations, leading to damages. Again,

recent high profile reports have noted the exposure of land use sectors (such as food and agribusinesses) to physical and transitional risks of climate change and other stressors, which makes these businesses potential targets of such actions.

The fact that climate change law and regulation is in flux globally compounds the risks for businesses. Over the last ten years, legal and regulatory responses to environmental issues have been implemented at an unprecedented rate, at international and domestic levels. The number of these will increase as states introduce measures to meet the Paris Agreement commitments, and (importantly) seek to reallocate or recover some of the financial costs of dealing with the effects of climate change. The claims brought against carbon majors by the US cities and states are an example of the latter. But there have been many other disputes off the back of such legislative change. A prime example is the significant number of claims (40 at last count) brought against Spain under the Energy Charter Treaty following reforms to Spain's renewable energy policies. Looking again at the US, many of the Obama-era environmental and climate change policies have been challenged, as have the legislative changes under the Trump Administration that seek to wind back those policies.

Where new risks manifest, parties invariably seek to mitigate and allocate such risks between them contractually. Unsurprisingly, many contracts (including international investment agreements) now include obligations to comply with and/or warrant compliance with environmental, human rights or sustainability obligations, as well as commitments to put in place back-to-back arrangements with counterparties further down the line. Disputes over those provisions will eventually arise.

In addition, corporate and investor conduct is changing. With financial and prudential regulators increasingly focussed on climate change risks to regulated entities and financial markets, banks, pension funds, investors and insurers, among many others, are seeking to assess and mitigate their own exposure to climate change disputes as well as to stranded assets via their portfolios. This means that it may become increasingly difficult to obtain finance or insurance (on good terms or at all) for businesses or projects that are either substantial causes of GHG emissions or significantly exposed to risk of the effects of climate change. There may also be more stringent terms imposed, particularly as sustainability standards become stricter. Again, potentially leading to disputes or new exposures (for example, if certain parties increasingly take on responsibility for events that would have previously been deemed unforeseeable and out of their control).

Of course, new and innovative products, technologies and markets will bring many opportunities – and there is no doubt that there will be very significant new opportunities. In 2017, the OECD estimated that \$6.3 trillion of investment is needed annually until 2030 to meet climate goals, of which only a small proportion will be met by states. The gap will be filled by private investment, including foreign direct investment (FDI). Reports are already showing a significant rise in FDI in low carbon initiatives and climate financing. In the food and agribusiness sector, there has been a notable (albeit somewhat slower) increase in research and development as well as investment in agritech and foodtech. However, any sensible businessperson knows there are risks – including that of disputes – associated with implementing new business strategies or innovations, as there are when trading with new counterparties or investing in new markets.

Conclusion

For food and agribusinesses, climate change litigation may offer ways of preventing or mitigating risks to their businesses. Conversely, however, they may find themselves defending climate change actions. To mitigate the risk of *climate litigation*, businesses will need to assess their risk exposure to the effects of climate change including physical, transition, and legal/regulatory risks. This will necessarily involve a holistic assessment of business operations in all jurisdictions, and planning and implementation of mitigation and adaptation strategies (including appropriate policies and strategies around appropriate disclosure of climate-related risks as well mitigation and adaptive measures, and transitioning to more sustainable operations). Businesses must also be prepared to implement defensive strategies in the event such risks fail to be managed effectively. *As the saying goes, “an ounce of prevention is worth a pound of cure” – or in the case of climate litigation, prevention is worth many dollars of cure.*

The USMCA and its impact on agriculture

By Kathy Krug, Calgary

The United States-Mexico-Canada Agreement (USMCA) is projected to replace the North America Free Trade Agreement (NAFTA) on January 1, 2020. Mexico is the sole party of the trilateral agreement to ratify, which they did on June 19, 2019. Canada's International Trade Minister Chrystia Freeland had expressed that Canada would quickly ratify as well, but on October 21, 2019 Canadian federal election has complicated these efforts. On June 20, 2019 the bill had its second reading in the House of Commons and the bill was referred to the Standing Committee on International Trade. The politics of the United States has made their ratification of the treaty a bit more of an open question as well. Opening markets in agricultural and agri-food products will continue to represent a significant area of challenge for each party in the trilateral trade deal, given the impact on certain producer groups.

All agricultural products that have zero tariffs under NAFTA will remain at zero tariffs under the USMCA. While generally preserving and maintaining its supply management system, Canada

made a number of concessions which provide the U.S. additional market access, particularly in the dairy, poultry and egg products sectors. These concessions will result in Canadians seeing more U.S.-origin poultry and eggs on store shelves, but as the changes are being implemented over 10 years the impact is expected to be gradual with Canadian products still dominating the market.

To mitigate the effect of these concessions on producers, the government of Canada has promised affected producers and processors certain compensation to ensure the industry remains strong. The extent to which the parties to the agreement will take advantage of more open trade in these sectors and whether the government-supply management working groups can negotiate arrangements which meets the needs of farmers and processors, remains to be seen.

In the following pages is a high-level summary of how the USMCA will affect agriculture products in Canada.

Tariff changes on dairy, poultry and egg products

Some agricultural products will eventually be allowed to enter Canada duty-free in the prescribed quantities, including:

- milk (50,000 metric tonnes, 85 per cent of which is for milk in bulk to be processed into dairy products used as ingredients for further processing)
- cream (10,500 metric tonnes, 85 per cent of which will be dedicated to cream for further processing)
- skim milk products (7,500 metric tonnes)
- butter and cream powder (4,500 metric tonnes, 50 per cent of which will ultimately be for further processing)
- cheese for industrial use (6,250 metric tonnes) and cheese of all types (6,250 metric tonnes).



In five years there will be a tariff elimination on American margarine destined for Canada, including American margarine which uses palm-oil which did not originate from the United States.

Pursuant to the USMCA, Canada will also implement increased tariff rate quotas for U.S.-origin yogurt and buttermilk, whey powder, concentrated milk, milk powders, powdered buttermilk, products of natural milk constituents, ice cream, other dairy, chicken, turkey, egg and egg products, and broiler hatching eggs and chicks.

Canada's milk pricing system will undergo changes when the USMCA goes into effect. Many technical rules under the milk pricing system will change or be removed. Canadian prices for skim milk solids (such as those used in protein concentrates and infant formula) will be no cheaper than the American prices for nonfat dry milk. Canada has also agreed to use excess skim milk products in their domestic animal feed. Canada's skim milk powder and milk protein concentrates will ultimately be limited to 35,000 metric tonnes.

It is important to note that under the Canada-European Union Comprehensive Economic and Trade Agreement (CETA), Canada already agreed to the following market access by European-origin products: for cheese of 16,000 metric tonnes and for industrial cheese of 1,700 metric tonnes.

In return for opening U.S. access regarding dairy, poultry and egg products, the USMCA provides increased U.S. market access for Canada's sugar beet producers. With regards to grain, both countries are afforded national treatment of wheat as it relates to the assignment of quality grades.

The Canada-US Bilateral agreement sets out specific notice requirement, whereby Canada is required to provide notice to the U.S. before introducing proposed changes to tariffs on dairy, poultry or egg products and the U.S. must provide notice to Canada for any proposed changes to tariffs on dairy, sugar and sugar containing products (SCP). Also, on request of the other party, the two countries must discuss the measures or policies before any changes can take place. In addition to any consultation, the parties must meet five years after the implementation of the USMCA and every two years thereafter to consider any changes to be made to dairy pricing.

Prior to signing the USMCA, the United States exported US\$619 million worth of dairy products and US\$600 million worth of poultry and egg products into Canada in 2017. With the decreased restrictions on tariffs for these products coming into Canada, we expect to see more American products in Canadian grocery stores and these export numbers to increase.

Agricultural biotechnology

As for agricultural biotechnology, there are measures in the agreement to promote trade in this area in ways which protect consumers. More information on authorized products of agricultural biotechnology will be made available to the public and the authorization process will be streamlined so as to ensure a timely and transparent decision-making and communication. Each party must create policies for managing low-level presence ("LLP") of genetically modified organisms (GMOs). Exporting parties must provide risk assessments of the LLP upon request, and the importing party will also have to provide the same in return if it exists. A "working group" of the parties will be established to exchange information, collaborate, and work on policy and trade issues for agricultural biotechnology.

Pre-packaged foods and food additives

The section in the USMCA on proprietary formulas for prepackaged foods and food additives reflects efforts to increase the protection of confidential information and proprietary formulas. Parties are only allowed to request information if it is necessary to achieve a legitimate objective. The party requesting the information will also be obliged to treat the confidential information in the same manner as such confidential information of a similar nature would be treated domestically by the disclosing party.

Alcoholic beverages annex

The Distilled Spirits, Wine, Beer and Other Alcohol Beverages Annex (“Alcohol Annex”) reasserts the importance of national treatment. The exemption in this annex applies to wine sold in Quebec grocery stores – allowing Quebec to limit wine sold in the grocery stores of that province to be limited to the ones bottled in Quebec only, as long as foreign wines have alternative retail outlets available. Similar discriminatory measures in Ontario and British Columbia are only allowed as per any measure that was in place on January 1, 1989. This Annex provides protection and recognition for distinctive national products – Canadian Whiskey, Tennessee/ Bourbon Whiskey, Tequila and Mezcal, which cannot be produced out of their respective areas. Ice-wine is also limited to wines made from grapes which experienced natural freezing on the vine. Labelling laws have been modernized as well, requiring truth and accuracy, and allowing for supplementary labels. No date marks may be required on any wine or distilled spirits container unless they have a shorter date than would be normally expected by the consumer. Labelling laws around alcohol products are expansive and require specific legal advice.

Promoting cooperation and integration

The agriculture chapter continues cooperation and increased market access and integration between the three countries. It endeavours to create opportunities to discuss disputes and address possible and potential trade-distortions and to further trade among the three Parties.

It will be interesting to see how successful the committees for the trade of agricultural products, to be created under the USMCA, are at promoting collaborative solutions for the already highly-integrated agriculture and agri-food sectors.

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