Postcards from the future
Agriculture and associated risks
Introduction

In the last five years, farms have become more complex diversified businesses than the traditional single enterprise farms of old. Glamping, farm shops and open farm Sundays are now considered to be the norm; however, 2030 will look very different from now as our farms continue to diversify and incorporate technological innovations into their daily production. Our ‘Crawford Future Agriculture’ team is always looking at the continuing developments in global agriculture and the potential risks insurers face to ensure we remain at the fore and are here to assist our valued clients and their customers when needed. One thing is clear, knowledge is key: without understanding the farming sector, the risks at play and the supply chain demands agriculture faces, insurance will struggle to maintain the pace and remain fit for purpose.

Trends, habits & market forces

The UK left the EU on 31 January 2020. Post Brexit, the key driver for policy reform is “public money for public goods,” which informed the Agriculture Bill 2021. Farmers will be regulated by a more onerous level of environmental obligations in order to receive available government subsidies. What precise form this will take is still not clear, but payment of subsidies will be based on a natural capital valuation approach, with benefits based around an improvement in air, water and soil quality, increased biodiversity, climate change mitigation, cultural benefits and increased protection of historic environments.

Broad acre farming will only fit this narrative if it is able to offer a more diverse range of habitats – we will cover this in more detail further on.

Global population is set to increase from nearly seven billion today to over eight billion by 2030. The UK population alone is projected to increase to more than 74 million by 2039. This will correspond with an increase in demand for food production, albeit from smaller areas of land as
urbanisation increases. The way we use our land will have to change, using a multi-layered and infill approach.

This global population increase raises questions into what we will be eating; currently the world relies on just 15 plants to provide 90 percent of its food, with four billion people depending on just rice, maize and wheat, giving rise to an obvious vulnerability of those food sources. Recent scientific research has identified that there are approximately 7,000 edible and genetically robust plants, only six percent of which are currently being eaten. These are avenues yet to be explored in farming, and will be dependent on the climate to determine their viability.

In terms of the need for livestock, we do not believe that this will decrease significantly. Although there has been a rise in vegetarianism and veganism, the majority of British diets are flexitarian, and the global pandemic saw an increase in sales of red meat, with beef sales in particular up 29 percent during the national lockdown. In this new normal, with the next pandemic potentially somewhere on the horizon, these trends will continue fuelled by an increase in time availability for the average household to prepare meals.

Consumers are becoming increasingly invested in food stories – field to fork and the brand’s social media offering which shows the families behind the farms.

The export market is increasing; the UK will be exporting beef to the USA for the first time in twenty years, bringing an estimated £66 million to the UK beef industry. The focus will be on our world renowned high welfare systems, and
high quality products. This has been the case for UK imports of beef and pork to China, where we are their largest external country supplier due to our high welfare standards – something which has become increasingly important to the Chinese market due to their increase in wealth, urbanisation and focussed population densities. There is a huge market in China for all edible pig produce that the UK market (currently) doesn’t consume outside of the standard pork cuts. We don’t see this changing, and believe it will only increase over the next decade.

The increase in demand for protein can be answered in part by utilising different sources of protein. Insect farming and multi-trophic fish farming are just two of the ways in which we can maximise protein production.

Vegan activism has been problematic over the last few years and in order to safeguard future livestock farming operations a push to improve on farm security, both physical and cyber must be undertaken. There is a place for both traditional and vegan markets to co-exist and even complement each other in the future of sustainable agriculture.

Rewilding has become more than a buzzword, with many supporters of this controversial conservation concept convinced of its relevance to the UK countryside. Examples such as Knepp Wildland in West Sussex – with whom Crawford Agriculture has an active involvement - aim to deliver the benefits of enriched biodiverse habitats through a hands-off approach, with great success so far, both environmentally and financially. Rewilding as a large scale approach is the polar opposite of the more intensive systems which will be required to sustain the growing population – which may lead to more disparity between landowners. The Knepp Estate are able to achieve an improved revenue from doing ‘nothing’ compared to generations of intensive arable farming in difficult heavy clay soils.

The push to be carbon neutral as we move into the future, with the NFU aiming for agriculture to be “net zero” by 2040 will also change the shape of farming. There are obvious improvements that most farms can undertake, such as reduction in soil compaction and the planting of more trees. More specialised areas such as hydroponics and methane powered tractors will become more mainstream, certainly upon larger farming systems.

### Changing shape of farming and the landscape

The farms of the future will not look like traditional farms as we know them. A diverse, mixed use approach is essential in order to survive, let alone progress. An example of this is more than one crop or land use on the same area, such as agrivoltaics: an increased height solar PV with a combinable crop underneath. Mixed uses increase land use, productivity, yield and profit, but will give rise to multi layered claims due to the increase in risk over one area. Looking at the summer of 2018 which saw a dramatic rise in claim spend for standing crop fires at harvest, imagine the difference with several hundred thousand pounds of solar PVs above each field!

Leading the way in forward thinking agriculture is a large Crawford Agriculture-nominated client in the south-west of England for whom the planting of sorghum between apple and pear orchard rows creates cover to prevent grass and weeds, reduces the frequency of mowing requirements
and then becomes an organic matter mulch when mown to the base of the trees to create extra direct input nutrients. The root base and rhizome structure is better for soil health; providing more organic matter when mowed than grass, increased photosynthesis and can inject nutrients direct to the base of the trees and root structure. Other alternatives to sorghum are legumes which will capture the nitrogen from the air and store them in their root nodules to be slow released for future crops, thus reducing the requirements for fertiliser or other inorganic feeds whilst still improving photosynthesis, the reduction of carbon dioxide and the production of oxygen. This forward-thinking environmentally sensitive farm is just one of many progressive quality UK fruit farms; best practice which in itself could be exported and replicated both nationwide and overseas. Trials are ongoing but initial studies show that fruit yield could be boosted in excess of 10% through the use of grass alternatives in non-productive rows.

The world grows 95 percent of its consumable produce in just the top five inches of soil, making our reliance on soil based farming another vulnerability. Soil can be used to sequester carbon dioxide and other greenhouse gases, making the protection and sustainability of our soils even more important. Farmers routinely soil test and protect soils now, but this will become more targeted with the use of different technologies enabling applications to be more efficiently targeted to certain soil areas.

More tree planting in the form of shelter belts will help to prevent shifting soils in exposed areas and better agricultural practice will aim to prevent
run-off incidents and reduce environmental claims and Insurer’s outlay.

Tree planting and establishment has been increasing year on year in the UK, and this will continue in greater numbers with the new Environmental Land Management Scheme post-Brexit. The planting of trees is one of the largest and cheapest ways to offset carbon and save the planet. Methods of planting and establishment are changing too. Tree bombs; formed of species specific seeds within a hard outer case, which will break down when it hits the ground at 200mph, can be used to rapidly plant even the most hard to reach areas using drones or helicopters. Thousands of trees can be planted in minutes, offering exciting possibilities for re-forestation. Tree bombing is common place in areas of the Amazon, Mexico and Africa. Why not the UK? How would insurance cover work for a plane shelling out thousands of trees in areas where the public (or livestock) could be roaming free?

Vertical farming is a growing phenomenon. Vertical farms are fast becoming common place in key cities across the globe. The total control systems provide almost total food security in a supply chain, inputs are minimal and adapted throughout the growing cycle to ensure a uniform growth, and some sites are even achieving yields up to 160% of those where the same crops are grown on a field-scale. ‘Weather recipes’ serve as a financial bi-product, we are aware of several Crawford Agriculture-nominated clients who actually market their weather recipes for certain varieties for optimum yield achievement, with sales stretching from Dubai to Russia to Canada.

In conjunction with vertical farming, urban farming will be more commonplace in the future. The use of dead spaces such as office block roof tops in city centres can be used to install small scale vertical farms in the heart of any city. London currently has one underground farm in Clapham, similar to Grow-Up in Bristol; these systems are environmentally friendly, completely reducing food miles. The interesting part will be claims in the future – material damage claims will be fairly straight forward but understanding the nature of the business is paramount when cover is placed to ensure for example that the business interruption indemnity period or AICOW are adequate to allow for debris removal from underground in the centre of London and for parts to be sourced from worldwide to get a unit up and producing again, before we even mention good and suppliers extensions or liability cover.

Insect farming is key to food security in the future and wholly in an environmentally friendly way. Currently there are two known insect farms in the UK with onsite cafes, one in Wales and one in Cornwall. Insect farming has little burden on the environment, food conversion is incredible in species such as crickets, from ten kilograms of the same feed insects will achieve nine kilograms of protein gain where a bovine animal will only achieve one kilogram. To achieve the same one kilogram of protein gain a bovine animal will use 26 times the amount of water than the crickets.

If you have attended any Crawford Agriculture events, you will have seen us dishing out Crawford-branded salt and vinegar crickets, chocolate mealworms or barbecue scorpions; there is science behind the madness. A large proportion of Asian countries use insects as their staple diet and protein source, why shouldn’t we? In the same vein what will insect farm claims look like? Standard farm cover can be adapted to
cover the farming production element, assuming the core business and production cycles are clearly understood but one element to seriously consider is disease.

We strongly believe the initial market would be strong if consumer demand/public knowledge was there. The nutritional benefits from insects arguably far outweigh those of common comparisons such as beef, chicken, pork and even fish (and certainly protein substitutes such as Quorn or tofu).

If the thought of eating insects turns your stomach then they can be thought of in other ways, such as Aquaculture. Currently large scale aquaculture production interferes with the multi-trophic system that naturally occurs in the wild; it is commonplace for smaller fish fry to be farmed and turned into fish meal for large commercial farms, such as off-shore salmon pens. Instead, commercial seaweed production combined with insect production would provide a more nutritious fish meal mix, higher protein levels and all the required omega oils naturally occurring in seaweed such as kelp, which is relatively easy to farm in our climate, would leave an increased fish production for trade and human consumption, in a much more environmentally friendly way.

**Technological advances**

Methane powered tractors are another technological advance which not only cuts down on carbon, they are also quiet to run, making them advantageous on livestock farms. The risks when something goes wrong however are greater, as there are still issues around storage of enough fuel / battery life to keep them going for a day’s work as well as keeping cool enough. Transfer and collection of fuel can be problematic, and
as they are still so new they are an unknown entity to most agricultural mechanics they will need specialist parts and servicing. A suitable replacement vehicle would have to be sourced if one were out of action for a prolonged period. They will require specialist policy coverage and policy extensions. The same applies to hydrogen powered tractors, which are also under development with various teething problems, but will surely become mainstream in the future.

Modern farm machinery can be used to further reduce soil compaction in order to protect and sustain soils. Tracked tractors instead of wheeled tractors have been growing in popularity, particularly on larger farms. There are added benefits in terms of reducing soil compaction but coupled with logistical problems due to the size of gateways and culverts which would prevent large farms and estates with detached land plots scaling up the size of their machinery. Not to mention the added initial cost and maintenance expense having a direct impact on the requirement for substantial insurance cover.

Agricultural drones and robotics can remove any soil impact altogether, and can be used to great effect in many agricultural situations. Innovative start-ups are using robotics to produce and monitor crops from seed to harvest autonomously. Is this the farming of the future, will the requirement for machinery straying be commonplace? Will motor cover be required as we have unmanned robotic farm vehicles on UK roads?

Drones are used globally in agriculture and this is ever growing in the UK. The use of NDVI technology to monitor crop health and assist with yield predictions, treatment requirements
can boost yields and simplify crop husbandry. Drones are used in Australia for cattle herding and monitoring, a drone can be programmed to fly the farm at set intervals and report back to the software in a farmer’s phone with head counts, animal temperatures, exact locations and any ill-health markers.

Automation of farming systems will be common place, farmers and farm labourers will not be replaced entirely however. Automation will assist with streamlining the business but employees will still be required just deployed differently. Max Perris (co-author) previously farmed in France, after the installation of two robotic milking parlours the herd was increased from 60 cows to 95 in under a year thanks to the two independent robotic parlours. One MORE employee was required and yield increased by 13 percent over the year whilst reducing on farm running costs.

The installation of automation and robotics on farm completely changes an already diverse risk for Insurers, as referenced elsewhere in the document cyber cover is paramount as threat levels and occurrence increase.

With a year on year rise in rural crime, security will be a major factor in future farm risk. Physical security improvements such as gates and barriers can be monitored remotely through the use of CCTV, infra-red, motion detecting and various other computer controlled security technologies.

More on-farm technological advancements can be covered in the term Agriculture 4.0, which refers to the way in which smart technology, precision farming, the internet of things, and big data can be used to inform growers and their supply chains. Yield monitoring and computer modelling thoroughly utilise GIS to make the most of a farm. Farms are going to be managed smarter in order to work harder, and all this data will require skilled handling and storage.

Key examples of automation are: GUSS automated sprayers, JD StarFire/GreenStar/ AutoTrac, Lely robotics. The latter two already prevalent in the UK agricultural space.

**Threats and vulnerabilities**

One of the greatest threats to the planet, and agriculture in particular in the immediate future is water availability and scarcity. There is already a marked difference in those farms with irrigation and/or land drainage, and those without. Large scale infrastructure such as on-farm reservoirs will become more common as smaller farms are snapped up into bigger enterprises which can afford the necessary investment. UK agriculture accounts for 10 percent of all non-residential water use. Human water use has increased since the pandemic by 25 percent, some of which is down to small changes such as a doubling in hand washing times.

Meanwhile climate change has given us some of the driest months on record, and it is a known fact that we will have to mitigate for a reduction in available water, as well as working to protect the health and integrity of the water we do have.

Another vulnerability is the global reliance on just a few main crops to feed the majority of the population. As science advances and more plant types become part of a staple diet, we may become more reliant on our import markets, due to our wet climate being unsuited
to growing many of these plants. This raises an environmental question around food miles and the resulting carbon footprint.

Social trends such as fad diets, activists, and the public’s desire to see more rewilding all provide more acute threats, which in turn will give rise to changing habits and different risks.

Another large threat which will require serious consideration is data protection and cyber security. Reliance on precision agriculture and the creation of essential field data including highly sensitive yield information which would be of value to competitors will give rise to hacking and theft of data.

Robots are also vulnerable to hacking – dairy robots could medicate cows, or, if hacked, poison them. GPS on tractors could be hacked to cause them to drive off course, causing a real danger. The farms of the future must protect their data as well as create it, and be constantly vigilant to prevent data falling into the wrong hands.

Conclusion

Whilst world-renowned and highly productive, the current UK farming sector is merely a gateway into the future of farming as outlined in this document. Great Britain is at the forefront of technological innovation in agriculture, environmentally friendly farming and the changes in our farming landscape and associated markets. It is of vital importance to keep abreast of new developments in agriculture as the change of pace is rapid, and what is developmental today will become mainstream very shortly.

Crawford Agriculture continues to look ahead to the insurable threats posed by such developments to ensure we are on hand to assist our farmers and Insurer clients as new risks arise and become common place in our market. If you could benefit from working with our experts, then do not hesitate to contact us as detailed overleaf.
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