SAC CONSULTING

International context for agricultural carbon markets

The need for carbon markets

Carbon markets are considered an essential part of achieving net zero emissions globally—More than two thirds of all nations have expressed an intention to use carbon markets to help meet their nationally-determined contribution (NDC) set in the Paris Agreement. If successfully deployed in these countries, carbon markets are projected to reduce the cost of meeting NDCs by more than half, a $250 billion reduction by 2030. These markets do this by creating a route for private participation in emissions reductions and removals, decreasing costs for the public sector and taxpayers. Carbon markets mobilise resources and capital for countries, corporations and communities to transition to low-carbon technologies and practices.

At COP26 in Glasgow, the parties approved Article 6 of the Paris Agreement, which allows different countries to trade carbon credits amongst each other under supervision of the Conference of Parties (COP). Selling credits generated by domestic projects to international buyers has benefits and drawbacks: It allows developing nations (with large natural capital stocks and potential to generate credits but few emitters and buyers) to funnel investment from developed nations into impactful avoided emissions or removals projects. Up to now, the prevailing thinking has been that offsetting emissions close to their source (either keeping markets domestic or 'insetting' them within value chains – (for definition of insetting, see Carbon Markets Glossary)) allows for a more transparent and accountable system. This is an idea that is especially relevant to the emerging biodiversity credit market.

International carbon markets are a necessary part of achieving net zero as a planet and can be entirely robust and accountable, given certain checks are in place. Chief among these is 'corresponding adjustment,' (see Glossary) or making sure credits traded across borders are accounted for on both countries' carbon balance sheets. This avoids double-counting: avoided emissions, reductions and removals cannot be counted against both the national inventory and used to offset the emissions of international credit buyers. There is ongoing work to develop the infrastructure necessary for a central, secure, digital carbon marketplace using blockchain and distributed ledger technology. These solutions will hopefully allow for transparency across nations, simplify measurement, reporting, and verification (MRV), and make corresponding adjustments simple, reducing transaction costs and increasing the revenue to be spent on projects themselves.

State of play for international carbon markets

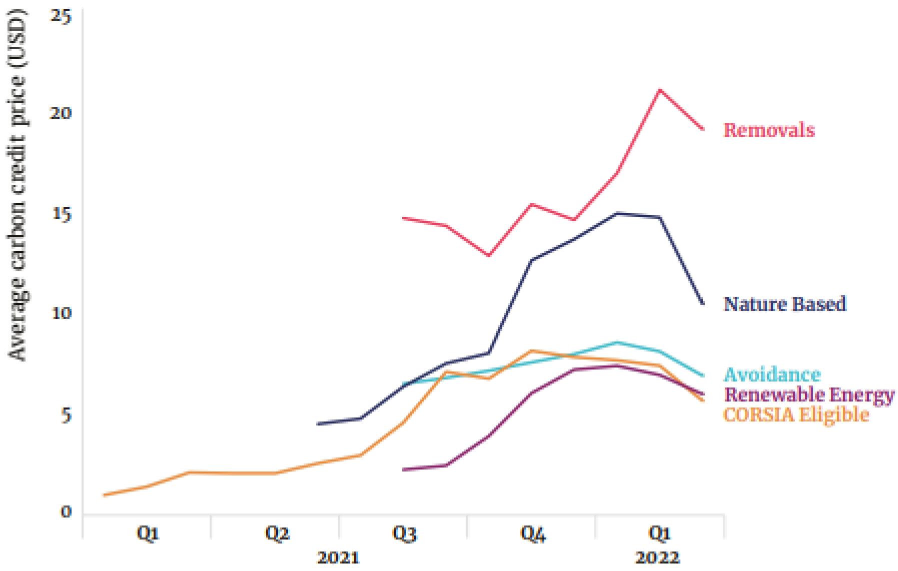
As of 2021, there are 68 carbon pricing instruments (CPIs) worldwide, including carbon taxes and emissions trading systems, which cover 23% of global GHG emissions. These instruments have achieved a cumulative $84 billion in carbon pricing revenue, with the voluntary market exceeding $1 billion in annual value for the first time. The price of carbon is expected to rise and markets to continue to grow, driven by policy reforms, corporate commitments, speculative investment interest, and global energy commodity markets. Clarity from Paris Article 6 and the integration of blockchain has increased engagement from financial actors and may accelerate this process. The World Bank indicates that carbon prices need to rise to assist in meeting Paris temperature goals, as less than 4% of global emissions are currently covered by a direct carbon price. As nations successfully decarbonise, all carbon markets will become redundant and will be mostly phased out of use by the action of the market, as there will be no need to funnel investment into reductions and removals once businesses and nations have achieved a steady state system where emissions are removed at the same rate as (net zero) or quicker than (net negative) they are produced. It is hoped that reductions and removals will be fully inset within supply chains and consistently paid for by emitters.

Implications for agriculture

Credits generated from renewable energy projects remain the most abundant on the market and offer some of the cheapest prices. Forestry and land use credits are becoming more prevalent and are closing the gap (159% inc. in 2021), generated primarily from avoiding deforestation and land use conversion in Asia (Cambodia, Indonesia, China) and Latin America (Brazil and Peru). Removals contributed to a fifth of this growth and are commanding higher prices as mentioned above.

International carbon market trends interface with agriculture in several ways. A rising carbon price will continue to increase the value of land with potential to host carbon removal projects. Increasing incentives to use land differently may increase concerns and conflicts over 'land sparing,' food security, and rural livelihoods. Climate policy needs to be integrated with social and economic policies to protect citizens during nations' just transitions to net zero.

However, for farmers and other land managers who are able to accommodate 'land sharing' by adding enterprises and/or modifying their practices, these trends represent significant opportunity to gain revenues from sale of carbon credits. While all carbon credit prices have risen, credits from certain sectors and with certain characteristics carry a premium due to buyers' preferences and needs: Credits generated via carbon removals and nature-based projects have had their prices increase above other credits, with forest and other land use credits seeing especially increased interest in the past year. Removal projects (incl. afforestation and sequestration in agriculture) are a necessity for many buyers who need to offset emissions which cannot be reduced. Credits generated on farmland could be highly valuable and managers can increase the value of their carbon credits by highlighting their origins (e.g. type of activity, geography, age/vintage, and co-benefits).



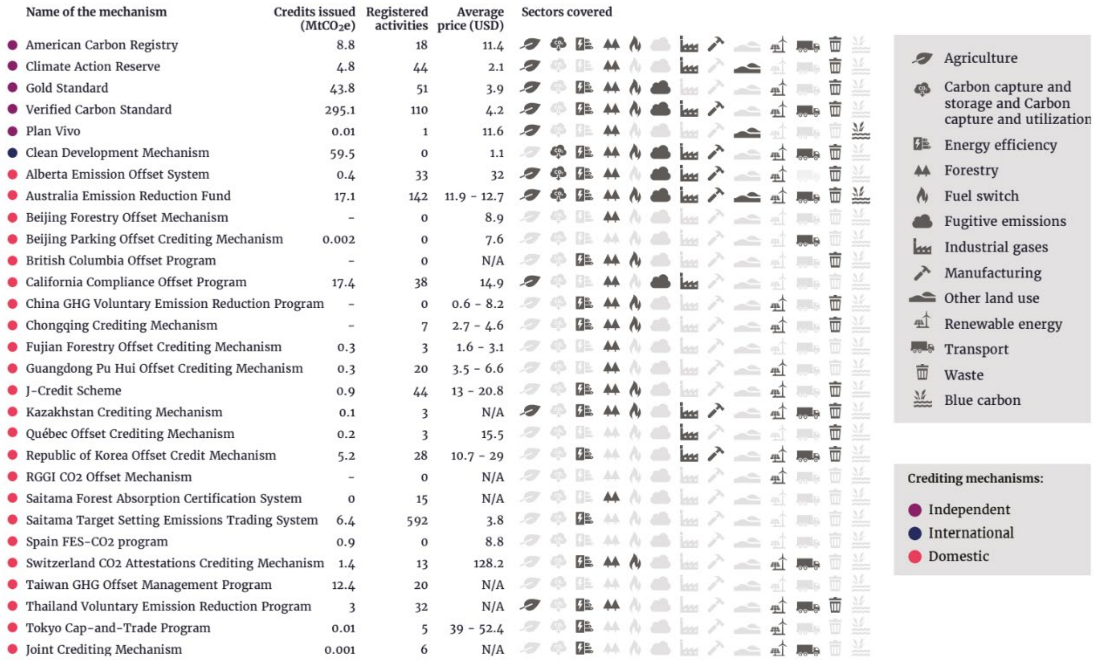
xliv Source: Based on data from S&P Global Platts, 2022 by S&P Global Inc.

Fig. 1 *Prices of standardised carbon credits, 2021-22.*

Agricultural soil carbon code outlook

In the UK, the options for generating carbon credits are restricted to the codes that exist, which to this point has been restricted to the Woodland Carbon Code (WCC) and Peatland Code (PC). A code (also called a framework, methodology, or other) sets the rules for how to measure carbon and generate credits for a certain project type (e.g. hedgerow and salt marsh codes also in development) and must be in place before credits can be issued or sold. The farming community has been anticipating the advent of a soil carbon code for the UK, which is predicted to have the most wide-ranging impact due to interest from investors and the range of benefits for farmers. If farmers could sequester 1-2 tonnes of CO2 equivalent per hectare per year across the UK's 17.7 million hectares of farmland, this could attract £265-531 million per year in private investment to the sector.

Codes and registries are being developed in parallel around the world and within the UK. Figure 2 gives an overview of the range of crediting mechanisms available in other countries and which sectors these mechanisms include. In the UK, several small operators are offering schemes, each with their own technologies, platforms and methodologies behind them. A recent paper in Carbon Management reviewed twelve soil carbon codes from around the world to explore different aspects were being addressed, including governance, scope, rules, methods and marketplace. For example, allowable methods for quantifying soil carbon stocks (e.g. IPCC emission factors, measurement, modelling, or a combination) was found to have significant influence on all other aspects of the codes' operation.



Type	Name of the mechanism	Credits issued ($MtCO_2e$)	Registered activities	Average price (USD)	Sectors covered
Independent	American Carbon Registry	8.8	18	11.4	Agriculture, Carbon capture and storage and Carbon capture and utilization, Energy efficiency, Forestry, Fuel switch, Industrial gases, Manufacturing, Renewable energy, Transport, Waste
Independent	Climate Action Reserve	4.8	44	2.1	Agriculture, Forestry, Industrial gases, Other land use, Waste
Independent	Gold Standard	43.8	51	3.9	Agriculture, Energy efficiency, Forestry, Fuel switch, Fugitive emissions, Renewable energy, Waste
Independent	Verified Carbon Standard	295.1	110	4.2	Agriculture, Energy efficiency, Forestry, Fuel switch, Fugitive emissions, Industrial gases, Manufacturing, Renewable energy, Transport, Waste
Independent	Plan Vivo	0.01	1	11.6	Agriculture, Forestry, Other land use, Blue carbon
International	Clean Development Mechanism	59.5	0	1.1	Carbon capture and storage and Carbon capture and utilization, Energy efficiency, Forestry, Fuel switch, Fugitive emissions, Industrial gases, Manufacturing, Renewable energy, Transport, Waste
Domestic	Alberta Emission Offset System	0.4	33	32	Agriculture, Carbon capture and storage and Carbon capture and utilization, Energy efficiency, Forestry, Fugitive emissions, Industrial gases, Manufacturing, Renewable energy, Waste
Domestic	Australia Emission Reduction Fund	17.1	142	11.9 - 12.7	Agriculture, Carbon capture and storage and Carbon capture and utilization, Energy efficiency, Forestry, Fuel switch, Fugitive emissions, Industrial gases, Manufacturing, Other land use, Renewable energy, Transport, Waste, Blue carbon
Domestic	Beijing Forestry Offset Mechanism	-	0	8.9	Forestry
Domestic	Beijing Parking Offset Crediting Mechanism	0.002	0	7.6	Transport
Domestic	British Columbia Offset Program	-	0	N/A	Energy efficiency, Forestry, Fuel switch, Waste
Domestic	California Compliance Offset Program	17.4	38	14.9	Agriculture, Forestry, Fugitive emissions, Industrial gases
Domestic	China GHG Voluntary Emission Reduction Program	-	0	0.6 - 8.2	Energy efficiency, Forestry, Fuel switch, Renewable energy, Waste
Domestic	Chongqing Crediting Mechanism	-	7	2.7 - 4.6	Energy efficiency, Forestry, Fuel switch, Renewable energy, Waste
Domestic	Fujian Forestry Offset Crediting Mechanism	0.3	3	1.6 - 3.1	Forestry
Domestic	Guangdong Pu Hui Offset Crediting Mechanism	0.3	20	3.5 - 6.6	Forestry, Renewable energy
Domestic	J-Credit Scheme	0.9	44	13 - 20.8	Energy efficiency, Forestry, Fuel switch, Renewable energy, Waste
Domestic	Kazakhstan Crediting Mechanism	0.1	3	N/A	Agriculture, Energy efficiency, Forestry, Fuel switch, Industrial gases, Manufacturing, Renewable energy, Transport, Waste
Domestic	Québec Offset Crediting Mechanism	0.2	3	15.5	Industrial gases, Waste
Domestic	Republic of Korea Offset Credit Mechanism	5.2	28	10.7 - 29	Energy efficiency, Industrial gases, Manufacturing, Renewable energy, Transport, Waste
Domestic	RGGI CO2 Offset Mechanism	-	0	N/A	Renewable energy
Domestic	Saitama Forest Absorption Certification System	0	15	N/A	Forestry
Domestic	Saitama Target Setting Emissions Trading System	6.4	592	3.8	Energy efficiency
Domestic	Spain FES-CO2 program	0.9	0	8.8	
Domestic	Switzerland CO2 Attestations Crediting Mechanism	1.4	13	128.2	Energy efficiency, Forestry, Fuel switch, Renewable energy, Transport
Domestic	Taiwan GHG Offset Management Program	12.4	20	N/A	
Domestic	Thailand Voluntary Emission Reduction Program	3	32	N/A	Agriculture, Energy efficiency, Forestry, Renewable energy, Transport, Waste
Domestic	Tokyo Cap-and-Trade Program	0.01	5	39 - 52.4	Energy efficiency, Renewable energy
Domestic	Joint Crediting Mechanism	0.001	6	N/A	Energy efficiency, Renewable energy, Transport

Fig. 2 *Credits issued, registered activities, average 2021 price, and sectors covered by crediting mechanisms. The agriculture sector (leaf icon) is included within a number of international crediting frameworks. The number of frameworks has increased but these should be consolidated and merged as best practices continue to develop ([World Bank](#)).*

This analysis paves the way for the deployment of agricultural soil carbon codes in the UK. The paper gives a detailed analysis of the important differences between the codes in the study and created a framework to help carbon credit buyers and sellers navigate the still-developing landscape of soil carbon credits and ensure any given code is robust and meets their needs. Regarding what will come next for an agricultural soil carbon code, the authors indicate that their analysis could be taken forward to create a best-practice, national code which aligns with other UK codes and land uses; Alternatively, it is possible to stop short of this step and adapt the framework that they have developed to become an approval and certification process for existing codes in the UK domestic carbon marketplace. This space is developing quickly and farmers should remain vigilant—As robust codes begin to gain traction and deploy across the UK in the coming months, early data will hopefully indicate both what reasonable expectations for returns may be, as well as highlight any dangers or pitfalls involved in engaging with this process.

For any further comments, clarifications or information, please contact the project team:

Anna Sellars, Senior Rural Business Consultant – anna.sellars@sac.co.uk

Brady Stevens, Rural Business & Economics Consultant – brady.stevens@sac.co.uk

Seamus Murphy, Senior Environment Consultant – seamus.murphy@sac.co.uk

Luisa Riascos, Food & Enterprise Consultant – luisa.riascos@sac.co.uk