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Policy position on voluntary carbon and nature markets

Why does natural capital financing impact members and communities?

Community Land Scotland (CLS) has taken an active interest in natural capital financing, and in particular private investment in natural capital through voluntary carbon or biodiversity offset markets. This is due to the numerous impacts it can have upon communities and the wider land reform agenda in Scotland. The following are some key concerns from a Community Land Scotland perspective:

1. In Scotland private investment in natural capital has thus far focused too much on large-scale land acquisition, thereby reinforcing the scale and concentration of landownership. This risks undermining community autonomy in land use decision making and community benefit as there is an increase in offshore, remote and corporate ownership. This further entrenches existing global power structures and imbalances.

2. Many CLS members are undertaking climate and nature projects, but the majority have not engaged with biodiversity or carbon markets due to their complexity, volatility and uncertainty of long-term viability, alongside the risks and liabilities associated with these market mechanisms.

3. New corporate natural capital owners are beholden to the terms and liabilities of carbon or biodiversity credit systems rather than the realities of their land management context or the guidance for responsible landownership.

4. Public access rights under the Land Reform (Scotland) Act 2003 could be at risk if there are perceived significant impacts upon the permanence of accredited carbon or biodiversity sites when pathways to net zero become ever more marginal.

5. Voluntary market mechanisms lock up land use for long periods of time for limited purposes and further limit the space to achieve other sustainable land use outcomes as well as further land reform outcomes due to inflated land values and private investor competition for limited land sales.

6. These markets open significantly more land to commodification, for example crofting common grazings and rough grazings outwith the crofting counties. This has contributed to large land value inflation. Although there are signs of this reducing as the failure of the private investment market emerges, because of the activity in these nature markets over the past few years land prices remain disconnected from the actual economic value of the land.[1]

7. There is potential for these financial instruments to exacerbate the climate crisis due to use of offsets by various actors e.g., corporates, governments etc. for non-necessary production/utility, and continued greenhouse gas emissions and biodiversity depletion through land use change. This contributes to ever decreasing carbon budget to remain within 1.5-degree pathways, with communities facing the impacts of climate breakdown.

8. The inequity of global carbon budgets is especially true communities in the Global South and raises valid questions around climate reparations. Research suggests that the Global North has exhausted its fair share of carbon budgets (after disproportionately causing climate breakdown and benefiting from a carbon-

heavy development) whilst communities in Global South deal with the impacts of climate breakdown and a history of underdevelopment by the Global North[2].

9. Community landowners' reticence to get involved in these markets mirrors a wider scepticism from landowners about involvement in the offsets/voluntary natural capital markets. We need to see nature recovery happening across Scotland and the existing private finance mechanisms do not provide the confidence or robustness to deliver this.

Natural capital finance: Origins and development

Carbon and Nature offset markets have been around for more than 50 years. Examples include the US Wetland Mitigation Scheme in the 1970s[3], small scale philanthropic carbon offsetting projects in the late 1980s[4], and the scaling of carbon markets with the introduction of the Kyoto Protocol[5] and its Clean Development Mechanism[6] in 1997.

More recently, voluntary carbon and nature markets have been viewed as the solution to leveraging significant amounts of private capital into climate action and biodiversity recovery, thereby closing the apparent 'nature-finance' gap[7]. In Scotland, the credibility and purpose of stated nature-finance gaps are disputed, as we have published on: The Credibility Gap for Green Finance – Community Land Scotland. While there is clearly a need for investment in nature recovery, the scale of that investment, whether it is led by public or private investment, and the corresponding impact on other public priorities is an important topic of debate.

The interest in carbon and biodiversity markets appeared to balloon after the 2015 Paris Climate Agreement at COP21 and the introduction of the Kunming-Montreal Global Biodiversity Framework (GBF) at COP15 in 2022. The GBF for example states that it's seeking to close a global biodiversity finance gap of $700 billion per year and expects much of that value to come from private investment.[8] The announcement of a funding gap and an expectation that it should be met by private investment are decisions of a capitalist political economy that divests control and agency to the private sector. This is not decision making based on the challenging choices and actions that need to be made by national governments to address the pressing ecological and equality crises.

Market scaling failures

Evidently private investment at scale is not happening on either climate or nature fronts. According to the Ecosystem Marketplace report, annual global transaction values for the voluntary carbon market (VCM) reached a high of around $2 billion in 2021/2022, however the market dramatically fell in 2023 and 2024 with annual transactions value of $754.5 million and $535.1 million respectively.[9] A significant point is that these numbers represent the entirety of the global VCM, annual transaction values for nature-based VCM credits were just $1.4 billion in 2021, $1.2 billion in 2022, $381.5 million in 2023, and $240.8-$347.2 million in 2024. Looking at the UK context, a recent research report estimated that annual total nature finance was approximately £1.14 billion across the public and private sector.[10] Public funding through agri-environment schemes and grants accounted for over 60% of this total, while voluntary nature-related schemes including the UK Woodland Carbon Code and Peatland Code accounted for only £12.6 million.

The global biodiversity credit market is faring similarly; by the end of 2025 the market had only just surpassed $2 billion in cumulative transaction value[11]. Combined with private finance for compliance frameworks for biodiversity offsets and payments for ecosystem services the annual figure for private capital investment in climate and nature stands at around $23 billion. The voluntary biodiversity credit markets, that is non-

compliance frameworks, is essentially non-existent. Estimates for total cumulative value have a current upper limit of $10 million[12,13]. This demonstrates how seriously short of the stated $700 billion global biodiversity finance gap current market mechanisms are. This raises existential questions about the ability of private investment and the current financial mechanisms to deliver the outcomes needed.

The 2026 UN report on the State of Finance for Nature reported that in 2023, $7.3 trillion was invested in nature-negative activities while only $220 billion flowed to nature-based solutions[14]. Similarly to the UK picture, most of the latter investments were derived from public spend, with only $23 billion, mentioned above, contributed by private finance. That's approximately 33 times more money invested into nature destructive activities such as fossil fuel extraction, much of which is public money in the form of grants, subsidy, or de-risking for private capital.

The scale of these voluntary private markets should not necessarily be the only indicator of success if we also value positive outcomes for climate and nature. Failure of market scaling could be because these mechanisms are acting as effective disincentives to activities harmful for climate and nature. However, all the evidence currently points to increasing global greenhouse gas emissions and continued biodiversity loss despite the existence of such markets[15,16].

Natural capital market approach in Scotland

This voluntary market-based approach has more recently been adopted by the Scottish Government to fund Nature and climate commitments. In 2023, the then Minister for Green Skills, Circular Economy, and Biodiversity launched a £2 billion private finance deal stating, *"Leveraging responsible private investment, through valuable partnerships like this, will be absolutely vital to meeting our climate targets and restoring our natural environment."*[17].

Aware of the potential contradictions between a private investment led approach and commitments to land reform and community empowerment, in 2024 the Scottish Government developed a Natural Capital Market Framework to support "*responsible, values-led investment in natural capital through the expansion of high-integrity voluntary carbon markets, and the development of opportunities to invest in biodiversity."*[18].

The adoption of this market approach has resulted in significant investment of resources and time across government and civil society in Scotland to develop workable solutions for scaling private investment. Despite this, global markets in climate and nature finance are in freefall, and it was reported in early 2026 that the $2 billion private finance deal established by Scottish Government had fallen through after successive investors withdrew from the pilot[19].

The Scottish Government and NatureScot have spent considerable financial and human resource to try and support the development of a private investment market for Scottish natural capital, from blended finance pilot schemes for peatland restoration, the aforementioned Market Framework, funding through the Facility for Investment Ready Nature in Scotland (FIRNS), and the subsidy regimes for peatland restoration and woodland creation. It is now clear that despite these efforts natural capital financing is not going to be significantly delivered by the private sector through voluntary market mechanisms. It is perhaps time to refocus the significant amount of experience and expertise developed across government, public agencies, and wider civil society in nature-related monitoring and evaluation. Priority should be given to policies and funding mechanisms which are productive and primarily focused on measurable outcomes for nature and people, not propping up a failing private market.



Furthermore, much of the Scottish Government push toward private finance was driven by the now widely discredited £20 billion figure for Scotland's nature finance gap produced in 2021 by the Green Finance Institute[20]. Research commissioned by CLS found this figure was largely based on pricing unnecessary land acquisitions and when these assumptions are removed the figure is significantly smaller[21]. Future Economy Scotland has previously estimated that it could be as little as £118m per year, which amounts to around 0.2% of the Scottish Government's annual budget[22]. Whether the 'gap' is millions or billions has significant repercussions for the scale of private finance required and the corresponding action to be taken.

After more than 50 years of attempts the current market approach is undermining climate and nature – both internationally and in a Scottish context. Private capital is seemingly unable to innovate at the necessary pace to provide scalable, sustainable, and just solutions to the twin climate and nature crises.

Box 1 - Definitions

Natural capital

This is the stock of all of the Earth's natural resources including air, water, soils, geology, and all living organisms, which provide good and services that are essential to supporting human life and societies.

Nature-based solutions

Nature-based solutions are terrestrial, freshwater, and marine habitats and environments that provide ecosystem services such as carbon sequestration, water purification, flood management, and pollination amongst others. Project examples include peatland restoration for reducing carbon emissions or woodland creation for sequestration.

Additionality

Additionality means that any claims about emission reductions or removals, or biodiversity protection or enhancement wouldn't have occurred without the carbon or biodiversity finance. That is these gains wouldn't have happened otherwise; the projects are truly additional compared to the status quo.

Leakage

Leakage occurs where interventions to reduce or remove greenhouse gas emissions or protect/enhance biodiversity results in an increase in emissions or environmental degradation somewhere else.

Permanence

Permanence relates to how long a project is able to keep reduced/removed emissions or biodiversity protections or gains secure and either prevent loss of emissions back into the atmosphere or prevent degradation of biodiversity.

Value-chain

In the context of thinking about the role the climate and nature crises play in economic activities the value chain of a business or organisation can be thought of as the complete lifecycle of a product or process that includes material sourcing (supply chain), production (energy and labour use), consumption, and end of life disposal, waste, and recycling.

Structural barriers

Why have the markets failed to materialise at scale?

Why haven't these markets scaled as private investors and governments had hoped and widely championed? There are several reasons, some of which are practical implementation issues, whereas others are more structural in nature.

Monitoring and evaluation challenges and complexities

Key intrinsic barriers to scaling these markets are the challenges presented by developing effective and robust measurement processes, or monitoring, reporting, and verification (MRV) methodologies. In addition, there are considerable concerns about the additionality, leakage, and permanence of nature-based solutions (see Definitions box 1), especially regarding carbon sequestration and storage.

There has been difficulty in designing projects and establishing robust MRVs that sufficiently account for the issues around project additionality, leakage, and permanence across woodland, peatland, soil, and other nature-based carbon credits. In the case of permanence, buffer pools of credits to compensate for carbon losses through reversibility from factors such as fire, drought, or disease have been inadequate[23]. Even conservative and relatively robust carbon products such as the UK Woodland Carbon Code (WCC) have not been without their issues, including whether projects are truly additional compared with a counterfactual scenario (although improvements have been made after reviews[24]). Still, issues around accurately measuring carbon sequestration persist in the WCC, particularly with respect to estimating impacts of tree planting and regeneration on soil carbon loss[25,26].

MRV issues are broadly relevant to both carbon and biodiversity offset and credit markets, however biodiversity market products face the added complication of having to sufficiently capture the inherent complexity of Nature[27]. There have been attempts to develop standardised metrics to capture and simplify this complexity and ease reporting, commodification, and transactability. However, empirical research suggests that these can often fail to appropriately describe ecosystems and accurately track biodiversity gain or loss[28]. Fundamentally this is a question about how a unit of Nature is defined, and whether it is possible to do so across a whole suite of different species, habitats, and ecosystems, without creating perverse outcomes. For example, simplification and standardisation may select projects that maximise one measure of biodiversity, or for their ability to maximise carbon sequestration rates without taking a more holistic view of wider ecosystem function and benefits. This complexity and uncertainty are key barriers to biodiversity markets scaling as unitisation is a necessary pre-requisite to commodification and large-scale transactions.

Additionality and permanence risks and failures

Issues around implementing MRV frameworks have been a feature of carbon and biodiversity markets since their inception. Early voluntary carbon market offset products such as Verra accredited Reducing Emissions from Deforestation and Forest Degradation (REDD+) projects were reported to overinflate their stated emission reductions through inaccurate claims about the threat to subsequently 'protected' forests [29]. Not only were some of these REDD projects found to be non-additional, but they were also reported to cause leakage when forest harvesting intensified in non-accredited forests in the same region. Non-additionality has also been observed in Australian biodiversity offset markets where several studies have concluded that many native vegetation protection and regeneration projects deliver no net gains in biodiversity or carbon removals due to poor MRV frameworks[30,31,32].



Beyond the efficacy of MRV frameworks themselves, nature-based solutions are susceptible to the very thing they are being commodified to tackle – climate change. Climate risks become more prevalent as global warming continues apace, we are seeing an increase in the frequency and intensity of wildfires and storms both domestically and internationally[33]. These events present a clear threat to the permanence of these projects whether reversing carbon sequestration or exacerbating loss of habitats and biodiversity. A high-profile example of this occurred in 2021, when a wildfire tore through more than 153,000 acres or 11 million credits of forest in California's Forest Offset Program[34,35].

The issues around implementation highlighted here demonstrate the complexity and challenges of designing, monitoring, and evaluating effective natural capital market products that deliver real additionality and longevity.

Internalising climate and nature into our economies

Some of the bigger impediments to market scaling exist within the structure and function of the wider economic market itself and how it interacts with 'asset' classes like carbon, biodiversity, and ecosystem functioning. This is unsurprising considering the implementation and monitoring risks and because nature and carbon have only recently been invented as 'commodities', which have until now existed out with the sphere of mainstream finance (well-articulated in the Dasgupta review)[36]. If global governments, investors, and standards bodies want and need, to have confidence in these nature-based products they must be robust to provide the assurances that they're meeting expectations, as per guidance from the Taskforce for Nature-related Financial Disclosures (TNFD) and the Science Based Targets Initiative (SBTI).

Achieving this will necessarily cost significant sums of money to deliver products or interventions that positively impact on the climate and nature crises; demonstrating real carbon sequestration or reductions, enhancement of biodiversity, or improved ecosystem functioning against robust counterfactual scenarios[37].

Misalignment of Nature and private capital interests

These instruments will require investment that will not meet typically expected returns for private finance. This stems not only from current pricing and demand of nature-based products, but also from an investor's perspective, the opportunity cost of future cashflows given the timescales of these projects. The regeneration timescales of nature-based solutions do not align well with current liquidity expectations of investors[38]. Moreover, the novelty of these mechanisms, the likely necessary specialisation of MRV approaches for different ecosystems, and the permanence risks of nature-based solutions add further pressure for higher returns compared with alternative less-risky investments; particularly within a voluntary market framework.

The demand for higher returns – not lower – due to the risk profile of these products is neatly demonstrated by scandals like the Verra REDD example. Failure of Verra REDD projects led to a widespread loss of confidence in the market, evidenced by the reduction in global transactions and value of nature-based offsets (see above).

Greenwashing and costs

There is also ongoing public discomfort around how offsets are used. This is primarily concerned with whether offsets are for legitimate purposes, and therefore delivering real outcomes, or instead are simply a cost-effective and convenient way to greenwash. Thankfully it seems that the era of cheap, low-integrity offsets is behind us, however, given the current state of the voluntary carbon and biodiversity offset markets the cost and associated investments risks for producing higher quality products is simply not worth it.



Demand Drivers

Where is the demand to drive market scaling?

This is a key question in an era where cheap, low-integrity products and greenwashing are no longer publicly or professionally acceptable. Who is investing in or buying from these purported high-integrity frameworks (with stipulations for high-integrity project and MRV standards, supplier integrity, and community co-benefits) - when the resulting pricing of credits or offsets will necessarily be much higher than previously seen?

Before, carbon or biodiversity offsets could be bought, retired, and reported against impacts by multinational corporates, small and medium sized businesses, and even individuals for relatively little cost. This is no longer the case, and it is clear this approach has not resulted in significant investment in nature finance or positive outcomes for climate, nature, and communities.

This is where the voluntary market approach to carbon and biodiversity runs into serious difficulties. In the current economic framework, the drivers of demand simply do not exist, further undermining investor appetite. If there's no market, or unlikely to be one, why invest? Offsets within modern high-integrity frameworks are simply too expensive to be used by buyers in the way they have previously.

Behaviour change, not market scaling?

Looking at biodiversity offset markets like England's Biodiversity Net Gain framework. Academics have increasingly argued that low demand and failure of market scaling is not necessarily a failure in terms of environmental outcomes. If implementation and measurement issues are resolved, and MRV approaches are high integrity with appropriate pricing mechanisms, then failure to scale is potentially an indicator that the policy measure successfully disincentivises environmental degradation[39]. This would require rigorous evaluation to assess the causal role these policy drivers played relative to existing environmental protection frameworks.

In theory, high-integrity biodiversity offset markets (compliance or voluntary) should incentivise development on pre-existing poor-quality habitats and ecosystems, and redevelopment of brownfield sites for example. Larger-scale offsite offsets are only likely to be used by bigger regional or national infrastructure developments. Therefore, the proposal by many speculative developers and others in the nature-based solutions sector that these financial instruments will leverage in significant sums of money for nature restoration appears naive.

Indeed, evaluation of BNG approaches of local site prioritisation in England has demonstrated most developments deliver offsets on site and produce relatively low-quality habitat, failing to channel finance at scale into critically important off-site areas for biodiversity nationwide[40]. This work identified the need for a more strategic spatial nationwide approach to deliver robust net gain outcomes as well as concerns about the impact of the current framework on disadvantaged communities.

Is perfect the enemy of the good?

A common counterpoint to many of these concerns is that 'the perfect shouldn't be the enemy of the good, and any money flowing into these activities ought to be welcomed'. However, this is a potentially dangerous mindset. Critically, these biodiversity and carbon products are being used to offset emissions/biodiversity loss which are accounted for against climate or nature targets, which need to be delivered in a robust and rigorous manner to prevent planetary collapse.

Arguing for imperfect investment using these financial products misses the ultimate purpose of preventing climate breakdown and biodiversity collapse and instead falls in line with the needs of capital, not the planet.

Going above and beyond

Even if a corporation wanted to go above and beyond and accelerate their trajectory to becoming net-zero and reducing their material and environmental impact, there is a critical cost trade off decision. Buy high-integrity high-cost offset products or instead invest that money into decarbonising and dematerialising their value-chains? Value-chain investment is the priority in voluntary standards and frameworks such as TFND and SBTI, which advise the use of offsets as a last resort for necessary residual emissions as part of a mitigation-hierarchy[41,42].

Within value-chain investments there is a clear opportunity for directing private finance toward real, meaningful outcomes for climate and nature by minimising and mitigating the impacts of business and organisational activities, through mechanisms like payments for ecosystem services. Ongoing partnership work in Scotland focussing on potential opportunities for a variety of nature finance models and their impacts on nature and communities has identified these types of projects as being some of the most impactful and feasible to deliver[43].

While these residual emissions are still poorly defined – coming at the end of cost optimisation exercises rather than optimisation to reduce emissions as fast as possible to prevent climate breakdown – these residuals are typically expected to be somewhere in the region of 5-10% of current emissions[44]. If this is the direction of travel, then future demand is likely to be far lower than proposed by some speculative developers of current offset projects.

Ultimately this approach (using offsets as a last resort) is fundamentally required to meet our climate and nature ambitions for a net-zero future, where offset credits are allocated based on necessary residual emissions post-2045/2050. Even for these necessary residual offsets, government regulation and international cooperation will be necessary to drive demand and allocate for necessary, hard to abate sectors in order to manage the finite resource that is land. Voluntary markets won't suffice.

The role of future compliance frameworks?

Moving from voluntary offset markets to compliance offset markets imposed by governments and international agencies would solve the demand issues for credits. However, it is vital that these compliance markets are regulated in such a way to optimise pathways for decarbonisation and dematerialisation in a net-zero economy. In regulating these compliance markets, we must not repeat the mistakes of the past and instead ensure high-integrity outcomes for climate, nature, and communities, based on principles of environmental and social justice.

Current Net-Zero pathway scenarios such as those produced by the UK Climate Change Committee (UKCCC) project that some form of offsets – both NbS and engineered removal offsets – will be needed to mitigate residual emissions post-2050 (post-2045 in Scotland's climate change legislation)[45,46]. The UKCCC's Seventh Carbon Budget's "Balanced Pathway" estimates these residual emissions to be in the region of 60-65 MtCO2e for the UK as a whole. Scotland's Carbon Budget estimating residual emissions in the region of 8-10 MtCO2e, across agricultural, industry, waste, aviation, and other sectors. While there is clearly scope for debate about what is considered to be necessary residual emissions in a net-zero future - and more aggressive reduction

pathways are physically possible - what is key is that carbon and biodiversity offsets, and critically the land used to deliver them, are used in the most judicious manner as possible.

Legitimate offsetting: Environmental and social justice

Land is a finite resource and its use for offsetting purposes cannot be squandered on sectors, businesses, or individuals that are able to meet net-zero climate commitments through value-chain investments. Instead, these offsets should be banked and allocated as equitably as possible according to strictly defined sectoral need compatible with a net-zero future and global justice. This could be done through widening the UK Emissions Trading Scheme to set clear targets and pathways for all sectors of the economy to decarbonise and minimise material consumption as much as possible[47]. This could follow a typical cap and trade approach that ramps up over time, giving business and other organisation time to adapt and invest in the necessary change. The hope would be to reduce climate and nature negative impacts at an accelerated rate and minimise as much as is feasible the need for offsets in a 1.5°C net-zero economy. Participatory approaches to climate budgeting could be integrated in these approaches, embedding principles of equity and justice, and improve public support for the net-zero transition.

Critically, where there is an absolute necessity for climate and biodiversity mitigation through NbS offsets, land-use for these purposes must not overturn existing land rights or undermine efforts to further land reform, in Scotland, the UK, or internationally. There are alternative approaches that will deliver more equitable and just outcomes. This could potentially come in the form of some sort of government regulated land banking or strict regulatory criteria for purchasers or recipients of offsets – importantly this would have to be planned, and sectors identified prior to the net-zero deadline, and in line with participatory approaches suggested above. This could in theory go part of the way to mitigate some of the issues observed in the land market where financial speculation on natural capital has driven inflationary land values in the past.

Alternative approaches

Shifting focus toward the use of offsets for residual emissions from necessary production in a net-zero economy, draws sharp focus on the rhetoric and policy agenda in Scotland and beyond to de-risk private finance to enable the scaling of these markets. As Future Economy Scotland (FES) have pointed out previously, de-risking private investment for these purposes does not necessarily save money for the public purse and could in fact exacerbate public liabilities in the future[48]. FES have instead proposed alternatives such as low- or no-interest public financing through mechanisms such as the Scottish National Investment Bank, or refocusing public spending on agricultural, forestry, and other land management subsidies, new regulation aligned with sustainable land management e.g., deer management, tax reform, and community-led approaches[49].

We should be exploring all opportunities to reorient our collective productive capacities to invest in activities that deliver a just transition to a net-zero future with sustainable wellbeing outcomes for climate, nature, and communities.

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