POLICY BRIEF

Addressing Impermanence Risk and Liability in Agriculture, Land Use Change, and Forest Carbon Projects

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Greenhouse gas (GHG) mitigation projects in Agriculture, Land Use Change and Forestry (AgLUCF) involve contracts between farmers/landowners (sellers) and other parties (buyers) to reduce GHGs below some baseline level. The buyers may use these credits to meet compliance obligations under a GHG cap-and-trade program or as part of a voluntary obligation to reduce GHGs. The driving principle is that the AgLUCF projects create real reductions that can offset emissions elsewhere in the system.

Within the broader category of AgLUCF projects, carbon sequestration projects create value by removing CO_2 from the atmosphere and storing it in terrestrial carbon stocks such as soils and vegetation. The stored carbon, however, is subject to re-emission or "reversal." The potential for reversal stems from natural risks such as fires and floods, man-made risks arising from the ease with which a farmer can simply switch back to conventional emitting practices, and contractual risk if projects have a finite life and the contract expires with no further incentive for keeping the carbon stored. This aspect of biological carbon sequestration (or creation of carbon "sinks") is referred to as the potential impermanence of greenhouse gas (GHG) mitigation benefits.

If the sequestered carbon is returned to the atmosphere as CO_2, the original benefits of the project have been negated. Clearly, such a project does not have the same climate protection benefits as another AgLUCF project that keeps the carbon permanently sequestered in biomass or the soil layer, or a project in another sector that permanently reduces GHG emissions through a change in technology. Therefore, some mechanism will be necessary to account for the possibility that the sequestered carbon will be released and the terms of the contract may need to be adjusted accordingly.

Ensuring that GHG release is debited and GHG sequestration is credited is critical to the integrity of the offset program. Therefore, intentional or accidental releases to the atmosphere of biologically stored carbon should, in principle, enter the program accounting system as debits. However, there are a number of factors involved with AgLUCF projects that may make such comprehensive treatment difficult:

- Natural disturbances are highly unpredictable and the damage done may not be under the control of the project
- Catastrophic loss of carbon could cause catastrophic financial losses for an investor
- Landowners may only be willing to undertake sequestering practices temporarily and may therefore establish temporary contracts, thereby reducing the value of the project

The first two factors deal with the risks of reversal when the project is underway. The unpredictability of risk complicates project planning and decisions on actions that might be taken to reduce risks. By and large, the prospect that the investor might suffer catastrophic loss of the carbon asset, plus loss of the normal accompanying economic asset, such as crops or timber, makes the investment riskier and therefore reduces its attractiveness. If the risks are large enough, investors may seek ways to cover these potential losses if they proceed with the investment. Specific instruments for covering these risks (insurance policies, pooling projects with similar or dissimilar characteristics, and holding credit reserves) are discussed further below.

Another critical issue whether the project will involve a contract that expires after some period of time. The questions then arise: (1) Are temporary contracts acceptable, and if so (2) How does one account for risks of reversal at the end of the project period? By and large, temporary contracts for biological sequestration have been acceptable for voluntary and compliance programs that have emerged to date. If the contract has ended, literally this means that the parties (e.g., farmers) are no longer required to perform. However, this does not mean that the reversal risk can be ignored, since reversal will negate what was accomplished by the project. Some provision for how this is handled is necessary.

EXAMPLES OF CARBON REVERSAL IN AGRICULTURE AND FORESTS

Table 1 provides examples of carbon reversal in the four main types of AgLUCF carbon project activity: soil carbon management, grassland conversion, afforestation/ reforestation, and forest management. It is helpful to view unintentional reversal separately from intentional reversal, as the risks are driven by fundamentally different factors and the solutions for dealing with each risk type may be different. Unintentional reversals are those due to fire, floods, and other acts of nature. While landowners can take some actions to reduce the probability and extent of damage associated with these risks, the incidence and severity itself is largely out of their control. On the other hand, reversals can stem from intentional actions taken by the landowner, such as the decision to revert from conservation tillage back to conventional tillage or to harvest timber from a stand that has accumulated carbon since its time of establishment.

Table 1. Agricultural, land use, and forestry carbon activities: examples of reversal

Activity	Description	Unintentional reversal	Intentional reversal
Agricultural soil carbon management	Reducing or eliminating conventional tillage practices to increase carbon content in soil	Flooding, , pest infestation	Reversion to conventional tillage practice
Grassland conversion	Converting cropland to pasture or other grassland to increase soil content and permanent above-ground biomass cover	Flooding, fire	Reversion to crops
Afforestation/ Reforestation	Planting trees on current cropland to increase carbon content of biomass and soils	Fire, pests, disease, storm damage	Harvesting
Forest management	Increasing stocking, lengthening harvest rotations and engaging in reduced impact logging to increase the carbon density of forests over time	Fire, pests, disease, storm damage	Reversion of conventional forest management, rotation lengths, harvesting practices

Although all of the reversibility risks inherent in AgLUCF endeavors cannot be eliminated, steps can be taken to lower them through proper project design. WRI-WBCSD (2003) has proposed that a “Carbon Reversibility Management Plan” be developed for any project intended to store carbon in biological or geological systems. In order to promote transparency and increase confidence in a project, the plan would include information on components that might be reversible, an assessment of any reversibility on the project’s ability to achieve expected GHG reductions, and documentation of measures to monitor and offset reversibility that occurs.

ACCOUNTING AND LIABILITY OPTIONS FOR CARBON REVERSAL

Even if a particular AgLUCF project has been designed to reduce carbon reversal risks, residual risks associated with the project are unavoidable. Therefore, reversal must be captured within the program's accounting system and liability must be assigned for reversals.

Carbon stock change measurement, reversals, and crediting

For an AgLUCF sequestration project, the standard approach is to take carbon stock measurements at regular time intervals, ideally based on field or aerial measurements,[1] and compute the net credit (or debit) quantities as the change in stock between periods, adjusted for leakage and possibly other factors (Murray et al. 2007). In this approach any carbon reversals are directly worked into the accounting. For example, carbon that was sequestered, measured, and credited in a previous period but is subsequently released through natural or management disturbance will contribute negatively to the carbon stock change measure during the next measurement period. If the positive changes in carbon stock from the undisturbed area outweigh the losses from reversal, credits are still generated, but their number is reduced by the reversal. The more challenging situation is when the carbon reversals outweigh the gains, causing a net decline in carbon stocks and a system debit. This raises the specter that some sort of adjustment may be necessary to resolve the net loss in previously credited carbon that has since circulated through the offset market.

The policies determining the rules of the market will dictate whether and what type of an adjustment must be made to account for the reversal debit. The most straightforward adjustment that will maintain system balance would be to require that the reversed credits be replaced with "good" credits. This creates a liability for some party and the need to cover the associated financial risks, as discussed below.

AgLUCF example of previously credited carbon storage with subsequent release

Box 1 provides an example of an afforestation project that accumulated carbon, generated credits that were sold into the market, then suffered a catastrophic loss of carbon from a fire.

> **Box 1. Reversal Example: Afforestation followed by a fire**
> Farmer Jones undertakes an afforestation project, planting trees on 1,000 acres of former cropland. After the first 5 years of the project, field measures are taken indicating that the activity has increased carbon storage by an amount equal to 20,000 tons of CO_2 equivalent. The authority issues Farmer Jones 20,000 credits, which he sells in the carbon offset market. During the period following the issuance and sale of the credits, a major wildfire destroys a significant portion of his standing forest (and carbon). Field measurements for the next 5-year period indicate a net loss of carbon storage of 15,000 tons during the second period. Much of the carbon storage that generated the credits in the first place has now been re-emitted to the atmosphere.

How do you rectify the shortfall that has now arisen with previously issued credits? Suppose the program authority cancels 15,000 credits that were previously issued and

[1] Modeling based on field or aerial measurements can be used as well if uncertainty in these models is low enough or if crediting is adjusted to take the uncertainty into account.

are now considered reversed or “defaulted.” This then becomes an issue of who holds the liability for the defaulted credits.

Who is liable for the reversal?

Whoever carries the liability must rectify any unmet performance of the credit, and thereby pay the debit. Four options to handle this liability are:

- *Offset producer (seller) liability*
- *Offset user (buyer) liability*
- *Explicit contracts between buyers and sellers*
- *System liability*

Each approach is assessed below.

Seller liability

If the producer of the offset credits (the initial seller) assumes liability, they directly suffer the loss of credits and assume the responsibility of replacement. In this case, the seller is Farmer Jones, who must make good on 15,000 credits by replacing them with other verified credits which are then passed on to the buyers of the original credits. The advantage of this approach is that it provides strong incentive for Farmer Jones, who is in the best position to manage risk, to take preemptive action and reduce the risk. However, whatever residual risk remains carries a liability that cuts into the project’s net return. In this case of catastrophic loss of previously credited carbon by fire, the financial impact could be quite severe for an individual farmer. The potential for catastrophic loss provides a disincentive to project investment. The market may provide some risk management options such as insurance and financial derivatives, as discussed further below.

One concern with seller liability in the U.S. agricultural setting is that land tenure and ownership can be relatively fluid over time. Many farmers operate on land that is owned by other parties and may shift properties from time to time. When the landowner and producer are not the same person, it will need to be established by contract how liability risks and profits will be distributed. One way would be for the liability for storage to remain attached to the land and thereby become the responsibility of the landowner. But the landowner and farmer could work out an alternative arrangement if they so choose (see below).

Given that landowners and agricultural/forest producers are often small entities, they may have limited means to absorb these liabilities. This raises the threat of foreclosure or bankruptcy and the inability to recover these liabilities.

Buyer liability

An alternative is to have the liability transfer with the ownership of the credit. This can take a couple of forms, depending on whether the credit is being banked or has already been used for compliance. If a reversal were to occur, any credits being banked for future use would not be useable for future compliance and would thus be deemed worthless. Any credits already used to meet regulatory obligations must be replaced by the user. In the example in Box 1, if 15,000 of the original 20,000 tons of credit generated by Farmer Brown were used for compliance (e.g., industrial facilities subject to an emissions cap), these users are now out of compliance, having relied on "defaulted" carbon credits.[2] The buyers must find replacements for any defaulted credits used to meet compliance requirements.

Box 2. Liability nuances

Expanding on a point raised above, as long as the carbon offset credits issued are based on observed net changes in carbon stocks, then some form of reversal liability is implicitly established throughout the project. Carbon stock accounting will capture both the positive accumulation and negative reversal of carbon over the measured period. Since the latter reduces the number of credits generated, it is implicitly a liability imposed on whoever owns the rights to the stream of credits generated (the farmer or the buyer, if under contract).

Return to the case of Farmer Brown illustrated in Box 1. Suppose that the fire occurred early in the second period and that it had actually released all 20,000 tons that had been credited in the first period. But suppose that there was some revival of the forest after the fire, leading to a re-accumulation of 5,000 tons on-site. The net loss of carbon in the second period is 15,000 tons. This reflects the total loss of the original 20,000 tons, but also a subsequent on-site *replacement* of 5,000 tons. The replacement tons were automatically applied to the on-site crediting process rather than made available for sale in the market, so this part of the liability is imposed on the producer regardless of who owns the rights to the stream of credits.

This means we can have hybrid situations where, for instance, the explicit liability may be assigned to the buyer or the system but the seller maintains some liability for replacement if they own the rights to the stream of credits as they are generated. As the credit stream owner, they "replace" some of the lost credits (5,000 tons in this case) when the next period's carbon stock measurements and crediting are performed.

With buyer liability, risk will be priced into the value of the credit much like default risk is factored into the price of a bond. Like bonds, this means that different blocks of credits could trade at different prices to reflect different levels of risk (see Kim et al. 2008). For example, credits from forestry projects, with attendant risk of fire, disease, and human intervention might trade at a discount to methane digester manure management projects whose emission reductions are essentially permanent once they occur. Some parties are concerned about such limitations on the fungibility of a credit, preferring a system where "a ton is a ton" regardless of the source. There are, however, many examples of similar but differentiated commodities trading in a common market, whether they are different grades of beef, risk-rated bonds, or preferred versus common stock. Rather than limit fungibility, these price adjustments reflect the market's efforts to ensure that a ton is a ton once the price adjustments are taken into account. This price adjustment makes a risk-adjusted ton equal to another risk-adjusted ton. These types of adjustments are found in GHG trading markets in the EU, where Clean Development Mechanism (CDM) offset credits are traded at a discount to "regular" allowances.

[2] Default, for instance, could be determined via a chain of custody back to the source, tracked by serial number on the credit.

Keohane and Raustiala (2008) make the case for buyer liability in the context of GHG allowance trading across countries, but their logic applies in this setting as well. They argue that in most cases, monitoring and liability enforcement is easier when buyers are the liable party. In the case of offset trading, this would seem to be true. The buyers are already liable for producing enough allowances to match their emissions to demonstrate compliance with the law. For example, a power plant subject to an emissions cap emitting a million tons of CO_2 per year must match the emissions with a million tons' worth of allowances and credits. Compliance liability could simply be extended to include the liability to replace canceled offset credits to ensure that the million ton balance still holds. One of the advantages of this system, Keohane and Raustiala argue, is that buyers have a strong financial interest in buying high-quality offsets, thus enforcing quality on sellers. So while sellers may not face the risks of reversals directly, they will still have strong incentive to mitigate risks if it means they can sell their offsets at a higher price on the market. Moreover, if risk discounts are assigned by project class, rather than to each individual project explicitly, then all credit sellers in that project class will have an incentive to monitor the actions of other sellers since any shirking on their part will diminish the value of all credits in the class. Keohane and Raustiala argue this provides a measure of self-enforcement on sellers.

Negotiated: Explicit contracts between buyers and sellers

Forms of exchange such as long-term contracts between buyers and sellers or direct investment by buyers into a farm project could involve negotiated agreements between buyers and sellers, including the assignment of liability. Suppose, for example, that an industrial facility enters into a long-term contract with a farmer. The industrial firm fronts the money to the farmer and obtains rights to the stream of credits generated. The contract between the two parties can address what happens in the case of reversal. The buyer/investor might bear the risk of natural disasters such as that faced by Farmer Brown's forest fire, while the seller might bear responsibility for neglectful or intentional actions that cause reversal. There are plenty of examples of these types of arrangements, for example, in livestock and poultry contracts between farmers and meat processors.

Most transactions will not likely involve a direct bilateral contract between a specific farmer and a specific emitting entity; rather, some form of aggregation and open market exchange of credits will occur. In such cases, since there would be no direct contact between the original seller and the ultimate buyer, liability could be assigned in a consistent manner with standard contracts in order for credits to flow smoothly through the market. An example is the secondary market for mortgages, where the initial mortgage contracts between the borrower and lender are relatively standard, thereby allowing for their aggregation and bundling into larger groups of securities to enable broader market exchange.[3] This does not rule out the possibility of unique non-standard contracts for liability; however, these may require more direct monitoring and may be difficult to aggregate with other transactions for market exchange.

[3] Of course, the financial crisis of 2008 has shown that securitizing mortgage contracts, even in contractually homogeneous bundles can create large unobservable risks that can undermine the integrity of the system. That is important to consider in general for risky assets such as AgLUCF project credits, but the main point of this example is that individual contracts can be standardized and bundled for wider exchange.

System liability

Another option would be to not explicitly place liability on either the buyer or the seller and instead work it into the broader system. With this approach, you can essentially ignore reversal at the transactional level, live with an underperforming offset system, periodically monitor the performance of the overall program (i.e., at a national level) and perhaps adjust the aggregate cap over time to cover the shortfalls generated by incomplete offsetting. This approach, however, is not liability-free. The liability shifts over time either to the entities covered by the cap, who will face a tighter cap to make up for the shortfall, or if the cap is not tightened, to society, who will bear the costs of any climate damages caused by an underperforming cap-and-trade system. Also, high-performing projects will subsidize low-performing projects.

System liability need not mean that liability goes completely unaddressed or that underperformance is the ultimate outcome. With this approach, one can make provisions for resolving systemwide losses over time using buffers or discounts as discussed below.

Liability Options Summary

Table 2 summarizes the advantages and disadvantages of the four different liability options.

Table 2. Liability options summary

Liable party	Description	Advantages	Disadvantages
Seller	Originator responsible for replacing reversed credits	Strongest reversal prevention incentive	Small sellers may not be able to bear risk
Buyer	Liability travels with the credit holder – like default risk	Natural extension of compliance performance – easier to monitor	Complicates transaction by keeping unresolved liability on books for buyers
Negotiated between seller and buyer	Liability specified explicitly in contract between seller and buyer	Flexible. Can be assigned more efficiently	Adds transaction and monitoring costs, though can be minimized if standard contract terms used
System	Liability shifts from transactions to system, possibly absorbed/ ignored	Risk-pooling, reduces transaction costs	Moral hazard potential, inefficient cost-shifting

Managing liability risks

Liability for carbon reversal is like other forms of risk and can be managed with similar tools.

Market instruments: Insurance and financial instruments

If private parties are assigned liability, a standard option to resolve it is third-party insurance. Insurance involves a private contract between the party bearing the liability (seller or buyer) and entities willing to underwrite the risk in exchange for a premium payment by the liable party. If reversal occurs, the insurer pays for the cost of replacement credits or other sanctions. Alternative ways to cover risk could include derivatives such as futures contracts or options for delivery of usable replacement credits to the liable party, but these too require enough information for the market to process and price the risk.

Reserve buffer

It is possible that market instruments such as private insurance and derivatives may not emerge, at least for a while, due to the nature of the risks, asymmetric information, or the perception of low demand for the instruments. Private timber insurance, for example, has been largely unavailable to landowners in the U.S. until recently. In lieu of these options, policy could establish a reserve buffer requirement wherein a certain percentage of allowances must be set aside from trading and held to cover reversal losses. This type of buffer system is similar to what was proposed in the Lieberman-Warner climate bill of 2008 (S. 3036) for a compliance offset market and is similar to the protocol developed by the Chicago Climate Exchange (CCX) and the Voluntary Carbon Standard (VCS 2008) for voluntary markets. The buffer could be established at the individual liable party level (seller or buyer) or at the system level. Each is briefly discussed.

<u>Individual party buffer</u>: For individually liable parties, the buffer can serve as an individual account to deal with reversals. This could work one of two ways. The buffer could define the limits of any individual party's liability; once it has been depleted, no further liability is imposed on the party. Or it could be simply a standard of due diligence to ensure that parties have some provision to cover risks, but any liabilities above the amount in the buffer are still held by the party. If no private options such as insurance are available, the buffer requirement could be mandatory, much like a reserve requirement is for banks or other forms of bonding to insure contract performance. Another option is not to make the reserve buffer mandatory, but to offer it to parties as a form of public insurance that parties can opt into if private insurance is unavailable and self-insurance is not desirable. If policymakers want to rule out self-insurance as an option but still provide this form of coverage, the mandatory risk buffer could be waived if the liable party provides proof of insurance or other risk management provisions.

<u>Systemwide buffer</u>: A systemwide buffer goes a step further than the individual party buffer in that the reserve buffer is pooled across all parties in the system and set aside from trading as protection against reversal at the system level. The buffered credits could be used to explicitly cancel out losses observed at the system level. This requires systemwide monitoring to measure the losses. Monitoring will show either the system is overperforming (the buffer is larger than actual losses) or underperforming (actual reversals are greater than the buffer pool).

Performance could be reconciled with the broader cap-and-trade system in one of two ways:

- **True-up:** If the system over-performs, the extra buffer credits are released into the allowance market; if the system under-performs, a corresponding number of allowances are obtained from the allowance market.
- **Roll-over:** The buffer balance is rolled from one period to the next and the buffer withholding requirement is adjusted accordingly. An over- (under-) performing system one period will reduce (increase) buffer requirements the next period. This effectively becomes a form of cap adjustment over time, as the fewer credits one withholds in a buffer, the more that can circulate in the market, and vice versa.

The system buffering approach is in essence a form of mandatory public insurance for all parties in the system. Based on observed performance, buffer reconciliation keeps things in line with the actuarially correct level of protection, which helps ensure market efficiency. Otherwise, over-buffering will keep too many credits out of circulation, while under-buffering will provide too little protection. However, public insurance of this nature raises some classic concerns about moral hazard, namely that farmers might not take the necessary actions to mitigate risks under their control. This increases the carbon default potential and could put the solvency of the system at risk. This may necessitate (1) the establishment of certain due diligence standards to prevent against natural risks covered by the buffer, and (2) the exclusion of protection against losses incurred by intentional actions such as timber harvests or reversion to conventional tillage, unless these actions were approved as part of the initial management plan.

A modified approach for the “systemwide” pool might be for sizeable subgroups such as agricultural cooperatives to create their own pool and manage accordingly. This may help address some of the monitoring issues and provide a form of self-enforcement against moral hazard if farmers can observe the behavior of others in the cooperative who might be underperforming and drawing down the pool, negatively affecting all in the group.

SPECIAL CONSIDERATIONS

Intentional reversals during the contract

In most situations, when one party takes intentional action to create a risk that becomes the liability of another party—whether in this case it is a buyer, insurance company, or a government-run reserve buffer pool—some sort of remedy is imposed to shift the liability back to the party taking the action. This would seem to be an appropriate strategy here as well, especially when these actions are clearly at odds with the goal of long-term carbon accumulation. But there are some applicable nuances to consider. First, some project types in agriculture and forestry might allow for reversal to occur as part of operations. For example, forest management regimes allow for rotational harvesting to occur. Harvesting is intentional, yes, but as long as it is part of a management plan that times harvests to increase carbon storage over time, it becomes part of the mechanism for generating carbon storage rather than a scuttling of it. Likewise with rotational tillage practices in agriculture, where occasional and distributed reversion to conventional tillage may occur within a plan that largely emphasizes zero- or low-tillage operations. As long as the overall changes in carbon stocks are accounted for, this is just part of the process. And as discussed above, the crediting process can and should take these periodic reversals into account automatically and liability concerns may only surface if there are extended periods of net carbon loss on-site.

Resolving carbon liability at the end of a project

By and large, the expectation is that most farmers and forest owners will not want to make permanent commitment to carbon practices and forgo the opportunity to respond to other future economic opportunities. Therefore, most of these contracts will likely have a finite life. What, then, is done about the carbon storage liability when the contract ends? There are a few alternatives:

1. Require replacement of all credits generated by the project (temporary crediting)
2. Establish a new form of "maintenance contract," such as a permanent easement
3. Ignore it altogether, and have the system adjust as necessary

Temporary crediting

The most straightforward way would be to cancel the credits at this point and require them to be replaced. This is typically referred to as *temporary crediting*. Several studies show that temporary credits can be expected to trade at a sizable discount to permanent credits, depending on the length of the contract and the discount rate of money (Kim et al. 2008; Keeler et al. 2005; Richards 1997) Under temporary crediting, short contracts will have heavily discounted credits, since the replacement requirement will be near at hand. Longer contracts should have lower discounts, but this depends on the expectation of future prices of replacement credits—if the price of replacement credits is expected to be much higher in the future than it is today, then temporary credits may have little value.

The Kyoto Protocol's Clean Development Mechanism (CDM) establishes a fairly restrictive form of temporary crediting for forestry-based sequestration projects, essentially canceling the credit at the end of the first five-year commitment period. CDM experience shows temporary credits trading at a significant discount to a permanent credit, and the number of forestry projects undertaken has been quite low. Agricultural carbon sequestration projects are not included in the CDM at this time (only afforestation/ reforestation projects are), but they would presumably face the same deep discounts if temporary crediting were applied. Mandated short-term temporary crediting under CDM is a fairly conservative way to address permanence risk, essentially truncating the life of a credit in lieu of continued monitoring of permanence. However, if rules are flexible enough to allow temporary credits to be re-issued after they have been canceled, pending verification that the carbon is still stored, then a repeated cycle of temporary credits with re-verification can simulate the characteristics of a longer term "pay as you go" system that captures credits and debits when they actually occur. The periodic renewal of temporary credits, however, could entail higher transaction costs depending on the requirements of the re-verification process.

In the case of CDM, the length of the temporary credit contract is set by rule. In a more flexible system, the private market could feature temporary credits of varying contract length priced to meet the diversity of needs of credit buyers and sellers.

Maintenance contracts

Another option is to generate a pool of funds for post-project carbon maintenance payment to farmers to keep their carbon intact. Part of the reason that farmers may not want to continue with an explicit crediting contract for a long time period is that carbon sequestration rates slow down over time as a higher carbon equilibrium is reached. This can happen after 10–20 years with changes in tillage practices, or several decades more than that for forestry projects. If there are few credits being generated, the farmer has moved to a situation where little revenue potential is realized, yet liability may exist for maintaining the previously stored carbon. If the farmer opts out of the sequestration contract at this time, they may still be willing to accept retention payments in order to maintain the stored carbon over time. This maintenance scheme will need to operate outside of the offset crediting system. Since the project will no longer be sequestering new carbon, it cannot produce new offset credits. Maintenance would have to be funded in some other way.

Ignoring post-project reversal

Finally, if post-project reversal is ignored and no replacement requirement is imposed, then the rest of the cap-and-trade system may end up bearing the cost of what could be substantial reversal of previously credited carbon, e.g., by imposing a tighter cap on regulated entities or otherwise expanding the scope of the program.

SUMMARY

Reversal risk in AgLUCF carbon projects is a solvable problem as long as there is consistent monitoring over time to detect reversals and rules in place to determine how to account for reversals and who is responsible for remedying shortfalls caused by them. In principle, this could be addressed by setting up the AgLUCF offset program to require permanent monitoring and contractual requirements and assign full liability to the seller (farmer) for replacing any reversed carbon that occurs after a credit has been issued. But such strict requirements will likely deter many farmers and landowners from participating in the offset program which is, at its core, voluntary even under a mandatory GHG compliance regulation capping GHGs from other sectors.

If expanding participation in the AgLUCF sectors is a goal, then some flexibility may be necessary, such as allowing temporary contracts for carbon storage, shifting some or all of the liability for carbon replacement to the buyer or to the overall system, and setting aside funds for maintaining carbon stocks over time. Increased flexibility could involve efficiency and system integrity tradeoffs that need to be factored into policy decisions. If flexibility means that every project is contractually different than every other, it may be hard to aggregate these credits into a smooth and liquid market. If flexibility means that the system accepts a certain amount of unresolved reversal (e.g., ignoring reversals at the end of the contract) then the integrity of the offset system may be eroded. In a word, flexibility needs to be constrained to protect other aspects of the program.

No single best way for handling liability clearly emerges from the group of options. Some form of *seller liability* for certain types of reversal seems necessary to ensure that farmers do what they can to prevent the reversal of carbon from credits they have already been paid for. Offsets are driven by compliance with mandatory (or voluntary) GHG targets;

thus, it does not seem unreasonable for those who *buy* the credits to meet these obligations to bear at least some of the liability for replacement if reversal occurs. There may be logistical difficulties associated with buyer liability keeping unresolved liabilities on the books. But this type of default risk has been dealt with in other markets. One way forward might be to allow buyers and sellers enough flexibility to establish contracts between themselves that can range in terms of contract length (e.g., 10, 20, 30+ years, permanent) and spell out the liable party for certain types of anticipated reversal risks. The market can essentially dictate how diverse these contracts are in terms of length and treatment of liability. The latter could well be standardized by common practice and law, as is the case with mortgages, futures contracts, and other “boilerplate” contracts for delivery, thereby enabling aggregation into marketable bundles. Recent experience with the global financial crisis of 2008, however, underscores possible serious difficulties associated with bundling assets this way if the underlying risks within these packages are not transparent to the market.

To conclude, AgLUCF sinks are technologically viable and potentially cost-effective sources of GHG mitigation, but their biological and contractual characteristics add an element of risk (reversal) that most other options do not possess. The risks are real and cannot be ignored, but they are addressable (at a cost). With monitoring and clear, enforceable rules, these risks can be factored into the exchanges and priced accordingly. However, these risks could impose substantial discounts on the price paid for credits from these reversible activities. Whether this will leave an attractive enough incentive for farmers and other landowners to invest remains to be seen. Reversals and permanence are elemental to offset system integrity because if dealt with incorrectly, they lead to an effective undermining of the emissions cap. If dealing with these factors substantially undermines their value as an offset, policymakers may want to consider whether there are other ways to incentivize these activities outside of the cap-and-trade program.

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