Description of NCS Barriers

Barriers	Constraint name	Description
Material inputs	Planting stock or other materials for the NCS	Limited or uncertain availability or quality, or high or uncertain cost of planting and related inputs
	Labor (external or own) for the NCS	Limited or uncertain availability or quality, or high or uncertain cost of labor (for land managers or NCS project). Includes lack of sufficiently skilled labor.
	Suitable land for the NCS	Limited or uncertain availability or quality, or high or uncertain cost of land. Includes instances where the NCS in question cannot be implemented due to biophysical constraints (e.g., due to size of farm machinery; steep slopes; lack of accessibility; water-logging; lack of soil depth or quality)
	Water for the NCS	Limited or uncertain availability or quality, or high or uncertain cost of water for establishment or maintenance of the NCS; includes insufficient precipitation, lack of water for irrigation, and lack of irrigation infrastructure
Finance	Land manager access to credit for NCS	Limited or uncertain availability, or too high or uncertain cost of credit for land managers for the NCS
	Land manager access to other funding for NCS	Limited or uncertain availability, or too high or uncertain cost of other (non-credit) funding for land managers for the NCS
	Land manager insurance for NCS assets or outputs	Limited or uncertain availability, or too high or uncertain cost of NCS insurance for land managers
	Project access to credit for NCS	Limited or uncertain availability, or too high or uncertain cost of credit for entities that implement or support NCS; includes institutional entities such as communities and private entities that implement or facilitate NCS
	Project access to other funding for NCS	Limited or uncertain availability, or too high or uncertain cost of (non-credit) funding entities that implement or support NCS; includes institutional entities such as communities or government agencies, and private entities, that implement or facilitate NCS
	Burdensome reporting requirements	Limited or uncertain capacity to manage demanding donor/creditor relationships or reporting requirements, or high or uncertain cost of such reporting
Markets	Markets for NCS outputs produced by land managers	Limited or uncertain availability of output (e.g., food or wood) markets, or high or uncertain costs associated with accessing output markets (due to lack of transport infrastructure or services, or high transaction costs in general)
	Markets for carbon sequestered by the NCS	Limited or uncertain availability of carbon markets, or high or uncertain costs associated with accessing carbon markets (due to lack of needed intermediate service providers or high transaction costs in general)
	Markets for ecosystem services or biodiversity provided by the NCS	Limited or uncertain availability of relevant ecosystem services (e.g., water quality or flow regulation) or biodiversity markets, or high or uncertain costs associated with accessing such markets

Barriers	Constraint name	Description
	Prices for NCS outputs produced by land managers	Low or uncertain prices of NCS outputs (e.g., food or wood)
	Prices for carbon sequestered by the NCS	Low or uncertain prices of carbon
	Prices for ecosystem services or biodiversity provided by the NCS	Low or uncertain prices of ecosystem services (e.g., water quality or flow regulation) or biodiversity
	Greater profitability of alternative land uses	(Uncertainty about whether) Alternative land use generates higher net profits than NCS, or alternative land use has preferred cash flow structure (e.g., where delay in NCS income is considered to be too long)
Adverse NCS impacts	Negative side effects (resource use, human health, property damage, wildlife conflict)	Reductions in yields of existing crops, both subsistence or commercial (regardless of whether overall profitability of NCS is higher); negative impacts on human health; property damage; increased complexity or difficulty of land management; negative biodiversity impacts; conflict with neighbors; conflict with wildlife attracted by the NCS
Knowledge	Land manager literacy, numeracy, or technological capabilities	Land manager reading, calculation, or technological abilities constrain NCS adoption (e.g., inability to read NCS educational or instructional materials; lack of ability to apply on-farm yield or profit calculators); or high or uncertain cost associated with improving land managers' literacy, numeracy or technological capabilities
	Information about how to design or begin the NCS	Limited or uncertain availability of NCS design or installation information for land managers, NCS project staff or government employees; or limited or uncertain quality of this information, or high or uncertain cost associated with accessing this information
	Information about how to manage the NCS	Limited or uncertain availability of NCS operations or management information for land managers, NCS project staff or government employees; or limited or uncertain quality of this information, or high or uncertain cost associated with accessing this information
	Availability of technical advice for land managers	Limited or uncertain availability or quality, or high or uncertain cost of NCS technical advice or extension services for land managers
	Information about yields, inputs, or profits	Limited or uncertain availability or quality of information about NCS yields, inputs, or profits. Includes both absence of evidence, and lack of access to evidence.
	Information about market access or prices	Limited or uncertain availability of information about NCS market access or prices (for NCS outputs, carbon, ecosystem services or biodiversity)
	Information about on-site benefits of NCS	Limited availability or high uncertainty, or limited or uncertain quality of information about NCS performance (e.g., restoration success and associated climate mitigation; yield) and "co-benefits" (e.g., improved soil fertility or moisture, temperature

Barriers	Constraint name	Description
		mitigation for people or livestock, crop yield, or income diversification)
Social and behavioral	Local preferences for non-NCS land uses	Preferences of land managers or local residents for non-NCS land uses. Preferences of govt officials or other influential parties are captured in separate constraint "Politically influential interests favoring non-NCS."
	Aversion to trying new land uses	Generic dislike of any change in current land uses
	Skepticism or disinterest in NCS or lack of trust in NCS promoters	Land managers or local community or leaders are skeptical of or disinterested in NCS, or mistrust NCS promoters. Most cases involved disinterest rather than mistrust. Includes cases where NCS are hindered by concerns over lack of transparency of NCS implementation or planning
	Social norms favoring non-NCS land uses	Cultural, religious, or other norms lead land managers to prefer non-NCS land uses (e.g., view of non-crop uses as 'unproductive' or otherwise less acceptable). Includes community pressure preventing land managers who are otherwise interested in NCS from adopting NCS.
	Concerns over negative equity impacts of NCS	Land managers', or local community's or leaders' perception of actual or potential undesirable equity outcomes of NCS that inhibit NCS adoption or continuation
	Lack of opportunity to participate in or influence the implementation of NCS due to gender, race, ethnicity, or other dimensions of identity	Identity-based discrimination that prevents certain racial, ethnic, religious, gender, or other groups from adopting NCS or from shaping the implementation of NCS
	Limited social learning or exchange networks for NCS	Lack of, or lack of access to, formal or informal networks or programs that facilitate mutual learning or sharing of experiences about NCS among implementers, communities or government officials
	Difficulty identifying, engaging, or coordinating with relevant actors	Challenges in identifying, engaging, or coordinating with actors whose support or lack of opposition is required to make NCS implementation feasible in a given case, due to the large number, wide geographic dispersion, or conflicting attitudes of actors.
	Lack of dispute resolution	Absence of formal or informal mechanisms for resolving conflicts among individuals or groups that negatively impacts the establishment or maintenance of the NCS
Rules and laws	Insecure or uncertain rights to manage or sell property	Lack of de jure, de facto, or perceived tenure rights – specifically, the right to manage or sell the land
	Insecure, uncertain, or lack of rights to use natural resources	Lack of de jure, de facto, or perceived tenure rights – specifically, the right to use, harvest or sell specific components of the land (e.g., trees)

Barriers	Constraint name	Description
	Regulatory barriers to production, transport, or sale of NCS outputs	Permits, licenses, or other administrative conditions that must be met for legal adoption of NCS or for production, harvest, transport or sale of NCS outputs (e.g., transport permits for wood)
	Insecure or uncertain NCS benefit sharing	Lack of, or doubts about, desirable distribution of benefits from NCS among relevant parties (e.g., land managers, other community member, funders, technical service providers, local authorities, or government representatives or agencies)
	NCS-related corruption	Illegal rent-seeking by government officials or private actors that affects NCS management or effectiveness but that may not be particular to the NCS (e.g., corruption among government forest or transportation department officials)
	Unclear laws and policies related to NCS outputs/markets	Uncertainty about laws, policies or regulations that govern or may pertain to the adoption of NCS or the sale of NCS outputs (e.g., carbon, wood, food crops)
	Financial or other incentives for non-NCS	Subsidies, reduced taxes, preferential access to credit or insurance, or other government incentives for non-NCS land uses that are not provided for NCS
Government and organizations	Lack of policy coordination or implementation capacity	Uncoordinated, conflicting, or duplicative (and thus compliance burden-raising) policies (among economic sectors, different administrative units, different organizations, or combinations thereof) that negatively affect NCS adoption and deployment; or lack of capacity (technology, human resources) to implement NCS-relevant policies
	Uncertain, or lack of, enforcement of environmental laws	Complete or partial lack, or unpredictability, of enforcement of environmental laws that affect the NCS
	Weak monitoring or enforcement of NCS agreements	Absent or insufficient compliance monitoring of formal or informal agreements underlying NCS implementation (e.g., in payments for environmental services [PES] programs for restoration, conservation, or changes in land management)
	Violent conflict or perceived threat of violence	Presence or fear of civil strife or military conflict, or perception of lack of government's ability to guarantee individuals' physical safety
	Politically influential interests favoring non-NCS	Individuals or small groups (private or government) with the ability to meaningfully affect policies favor non-NCS land uses. Includes political prioritization of competing goals and lack of urgency for NCS implementation.