Order Code RL34042

CRS Report for Congress

Environmental Services Markets: Farm Bill Proposals

Updated January 23, 2008

Renée Johnson
Analyst in Agricultural Economics
Resources, Science, and Industry Division

Prepared for Members and
Committees of Congress

Environmental Services Markets: Farm Bill Proposals

Summary

Environmental goods and services are the benefits society obtains from the environment and ecosystems, both natural and managed, such as water filtration, flood control, provision of habitat, carbon storage, and many others. Farmer participation in providing these types of goods and services began in earnest in the 1990s with the development of watershed approaches incorporating nutrient credit trading and wetlands mitigation banking, as well as the more recent development of voluntary carbon credit markets. These efforts have triggered further interest in the possibility of developing market and trading opportunities for farmers and landowners as a source of environmental offsets. These services would be in addition to the food and fiber services traditionally supplied by the agriculture and forestry sectors. Congress is expressing growing interest in developing such market-based approaches to complement existing federally supported programs that promote conservation in the farm and forestry sectors, as well as to complement existing and/or emerging environmental regulations or natural resource requirements that may affect the agriculture and forestry sectors.

Both the House and the Senate versions of the 2007 farm bill (H.R. 2419) include provisions that seek to facilitate the development of consistent standards and processes for quantifying environmental services from the agriculture and forestry sectors; however, these provisions differ in approach. The House bill would establish an Environmental Services Standards Board, chaired by the U.S. Department of Agriculture (USDA), which would provide contracts, cooperative agreements, and grants to develop consistent standards and processes for quantifying environmental benefits from the farm and forestry sectors, thus establishing a framework to develop consistent standards and processes for quantifying offsets from the farm and forestry sectors. The House bill covers a range of farm and forestry sector services associated with improved water and air quality, increased carbon storage, and habitat protection, among other services. The Senate bill also directs USDA to develop a framework to facilitate the participation of farmers and landowners in environmental services markets, but calls for a "collaborative" process involving both governmental and non-governmental representatives. The Senate bill also differs in that it specifically requires the initial focus of this effort to be on the development of carbon markets involving the agriculture and forestry sectors.

Among the possible questions that may emerge as these provisions are considered for inclusion in the 2007 farm bill are: Can agricultural interests effectively provide environmental services along with traditional food and forestry services? How would uniform standards address differences within different production areas, types of resources, and ecosystems? What is the role of USDA as the lead federal agency? How would collaboration work between other participating federal agencies? How would the agreed-upon decisions and standards work within existing regulatory authorities? How would the agreed-upon decisions and standards work within possible forthcoming regulatory authorities, such as in proposed climate change options currently being debated in Congress? What role should federal agencies play in establishing environmental services markets?

Contents

List of Tables

Environmental Services Markets: Farm Bill Proposals

Both the House and the Senate versions of the 2007 farm bill (H.R. 2419) include new provisions in the conservation title that would promote market-based approaches to conservation, including the development of environmental services markets involving the agriculture and forestry sectors. Although the House and Senate provisions differ in approach, the addition of such provisions in the farm bill would establish a framework to develop consistent standards and processes for quantifying environmental goods and services in these two sectors. This could facilitate further development of market-based approaches for a range of environmental goods and services (e.g., water and air quality, carbon storage, habitat protection) involving farmers and landowners.

In part, congressional interest in this area has developed in response to increased attention to the agriculture and forestry sectors' contributions to some remaining environmental pollution and resource degradation concerns. For example, the U.S. Environmental Protection Agency (EPA) reports that agriculture is the leading source of water pollution in U.S. lakes and rivers, and a major contributor of pollution in U.S. estuaries. EPA also reports that agriculture contributes to an estimated 6% of all greenhouse gas emissions in the United States. At the same time, some in Congress are suggesting that U.S. farm support programs should do a better job promoting environmental benefits and also complying with domestic support constraints called for by the World Trade Organization. In addition, the agriculture and forestry sectors are also being regarded as a possible source of carbon capture and storage within the broader climate change debate in the 110th Congress.

The development of market-based approaches to farm conservation and land management might complement existing and/or emerging environmental regulations or natural resource requirements affecting the agriculture and forestry sectors, as well as complement existing federally supported programs that promote conservation in the farm and forestry sectors. Environmental goods and services from the agriculture and forestry sectors might also provide for environmental improvements and mitigation at a relatively lower cost, compared to mitigation in other sectors of the economy. Environmental services markets may also offer additional financial opportunities to farmers and landowners.

What Are Environmental Services Markets?

Environmental goods and services are the benefits society obtains from the environment and ecosystems, both natural and managed, such as water filtration, flood control, provision of habitat, carbon storage, and many others (**Table 1**).[1] In

[1] These may also be referred to as ecosystems services. See, for example, World Resources
(continued...)

most cases, these constitute "free services" since landowners and managers are not compensated in the marketplace. However, as many such services have become degraded over time, there is growing recognition that they should be sustained or substituted by market capital, similar to investing in water treatment plants and engineered flood control systems. One solution would be to create markets, often developed through regulation, so that providers of environmental services can be compensated in private markets for the services they provide. This could offer a potential business opportunity to the farm and forest sectors, which may be able to provide for such services and participate in the market, for example, by creating, restoring, preserving function and value in a natural resources area, or by capturing and storing carbon before gases that contribute to global climate change are released into the atmosphere. These services would be in addition to the food and fiber services traditionally supplied by the agriculture and forestry sectors.

The market for environmental goods and services involving the agricultural and forestry sectors began mostly through various pilot programs starting in the 1990s. The development of voluntary carbon credit markets and watershed approaches incorporating nutrient credit trading, along with wetlands mitigation banking, have involved the farm and forestry sectors. These programs provide a market for farmers to sell carbon or nutrient farm-based offsets to emitters/dischargers that are looking to buy offsets to mitigate their own emissions/discharges. These efforts have triggered interest in other types of tradeable permits and credits, including habitat credit trading and other types of conservation banking. USDA identifies environmental markets with relevance to the agriculture and forestry sectors to include water quality, air quality, wetlands, endangered species, greenhouse gases, and developmental rights.[2] Often the impetus for these efforts may be linked to a "regulatory driver" specific to an actual or anticipated environmental regulation or natural resource requirement, such as requirements in the Clean Water Act (CWA), Endangered Species Act (ESA), or other state or local regulation (see **Table 1**). Other incentives may include market drivers that make trading environmental services financially attractive, or the desire to cultivate community goodwill.

Farmer participation in voluntary carbon credit trading programs has been growing rapidly, and currently involves an estimated 4,000 farmers across 25-30 states covering more than 4 million acres.[3] The two largest programs providing for farm-based offsets are programs operated by the Iowa Farm Bureau and the North Dakota Farmers Union; other similar programs are operated by the Illinois Conservation and Climate Initiative, the Environmental Credit Corporation (based in Indiana), the Upper Columbia Resource Conservation and Development Council (Northwest), and Terrapass (based in California).[4] These programs cover some or all

---

[1] (...continued)
Institute, *Millennium Ecosystem Assessment, Ecosystems and Human Well-being*, 2005.

[2] USDA, *2007 Farm Bill, Conservation and Environment Theme Paper*, June 2006, at [http://www.usda.gov/documents/FarmBill07consenv.pdf].

[3] CRS estimate based on information from the Iowa Farm Bureau (January 17, 2008).

[4] See, for example, Iowa Farm Bureau [http://www.iowafarmbureau.com/special/carbon/]; (continued...)

aspects of the following types of carbon capture and storage activities: sustainable agriculture practices (such as conservation tillage, grass seedlings); planting of unharvested grasslands; tree-plantings; methane capture/biogas production with manure digesters; wind, solar, or other renewable energy use; controlled grasslands or pasture management; and forest restoration.

Table 1. Possible Range of Services and Regulatory Driver

Tradeable Resource/Credit (Type of Service)	Regulatory Driver
Wetland, stream, aquifer recharge, forests, buffers, stormwater controls, habitat/biodiversity (e.g, habitat creation/preservation; water filtration; flood control and protection; water/air pollution controls; runoff reduction)	Federal and/or state
Nutrients (e.g, runoff reduction; water pollution controls)	State
Carbon/greenhouse gas (e.g., capture, storage/sequestration, methane destruction; air pollution controls)	State (and possibly federal)
Renewable energy (e.g., biofuel generation; fuel substitution)	State
Water and development rights (e.g., alternative land and natural resource preservation; habitat creation/preservation; aesthetic value; recreational use)	State, county, or local

Source: CRS, information from American Farmland Trust and World Resources Institute.

Currently, about 300 farmers are participating in water quality trading programs across six states.[5] These include initiatives such as those by the Southern Minnesota Beet Sugar Cooperative, the Grassland Areas Farmers (California), the Rahr Malting Company (Minnesota), the Great Miami River Watershed (Ohio), and the Red Cedar River (Wisconsin), among others. These programs cover some or all of the following types of nutrient runoff reduction activities: cover cropping; reduced fertilizer use; conservation tillage; tree-plantings; buffers; drainage management; and wetlands mitigation trading.[6] Most water quality trading programs were initiated at the local or state level, often involving EPA. In 2006, EPA and USDA's Natural Resources

---

[4] (...continued)
North Dakota Farmers Union [http://www.ndfu.org]; Illinois Conservation and Climate Initiative [http://www.illinoisclimate.org]; Terrapass [http://www.terrapass.com/projects]; and Environmental Credit Corporation [http://www.envcc.com]. See also CRS Report RL33898, *Climate Change: The Role of the U.S. Agriculture Sector*, by Renée Johnson.

[5] Information from EPA. Does not include the Tar-Pamlico in North Carolina since not enforceable through a CWA permit.

[6] H. L. Breetz et al., *Water Quality Trading and Offset Initiatives in the U.S.: A Comprehensive Study*, Dartmouth College, at [http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf]; and EPA's website at [http://www.epa.gov/owow/watershed/trading.htm]. Also see CRS Report RS21403, *EPA's Water Quality Trading Policy*, by Claudia Copeland.

Conservation Service (NRCS) signed a partnership agreement to establish uniform trading standards, along with supporting other collaborative efforts.[7]

The U.S. Fish and Wildlife Service, USDA's NRCS, and the Association of Fish and Wildlife Agencies signed a partnership agreement in April 2007 to promote habitat credits that could offer incentives to landowners who preserve and enhance the habitat of endangered or at-risk species. Among the stated objectives of this agreement is to develop and adopt common definitions, standards, and measurement protocols.[8] Habitat credits or "conservation banking" act like a savings account, where credits are earned for land preservation of habitat and credits can then be sold to land use industries or others who are required to mitigate the loss of habitat under the ESA and other laws that restrict or prohibit development. This is conceptually similar to wetlands and stream mitigation banking, which allows for compensation of adverse impacts of development activities ("compensatory mitigation") to wetlands, streams, wildlife refuges, or other aquatic resources. Such allowances, whether through wetlands or conservation banking, typically involve creating, restoring, enhancing, or preserving function and value in a natural resources area, often within the context of meeting a federal, state, or local regulatory requirement.

The participation of agriculture and forestry in emerging environmental services markets is gaining wide support within the farm community and its supporting organizations and agencies, as well as among the regulatory agencies and some environmental groups.[9] As part of its recommendations for the 2007 farm bill, the U.S. Department of Agriculture (USDA) has proposed to further facilitate the development of environmental services markets in ways that would more effectively involve the farm and forestry sectors. Both the House- and the Senate-passed versions of the 2007 farm bill (H.R. 2419) include similar provisions as part of the conservation title in their respective bills.

What Are the Benefits and Barriers?

The development of market-based approaches has been widely touted as a possible source of additional farm income, whether through the sale of tradeable credits or from other types of payments, such as recreational use or hunting fees. This could offset or partially offset the costs of pollution abatement incurred by farmers who make environmental improvements on their farmlands. In some cases, adopting alternative production practices could also result in on-farm cost savings,

---

[7] The agreement text can be found at [http://www.epa.gov/owow/watershed/trading/mou061013.pdf].

[8] The agreement text can be found at [http://www.fws.gov/endangered/pdfs/Credit_Trading_MOU.pdf].

[9] See, for example, Ann Sorensen, "Ecosystem Service Markets in Agriculture," May 2007, at [http://www.aft research.org/aaas/]; presentations at USDA's Ag Outlook forum by Ginny Kibler, "Water Quality Trading Basics," and Carl Lucero, "USDA Farm Bill Conservation - Supply Side of Trading," March 2007 [http://www.usda.gov/oce/forum/2007%20Speeches/index.htm]; and presentation material distributed by staff at the Environmental Defense.

such as the use of renewable fuel generated on-farm. Market-based approaches are also often viewed as encompassing broader societal benefits by complementing existing farm conservation programs and evolving regulatory approaches intended to address environmental improvements in the farm and forestry sectors.

USDA reports that there are several existing barriers that may prevent the development of environmental goods and services markets involving the farm and forestry sectors.[10] These include but may not be limited to:

- uncertainty quantifying, measuring, and valuing credits;
- low demand for or discounted value of credits from agricultural sources because of uncertainty about the measurement and value of these credits;
- low participation in the farm and forestry sectors due to uncertainty over the value of environmental credits compared to the cost of pollution abatement;
- reluctance by farmers and landowners to participate in a regulatory-based program;
- small quantity of benefits that can be provided by individual farmers or landowners;
- high transaction costs;
- performance risks and liability;
- lack of information about program benefits and how to participate;
- lack of monitoring and enforcement; and
- uncertainty about whether conservation and environmental improvements that were initially funded through other publicly funded programs, such as cost-share programs administered by USDA, will be allowed to be traded.

What Is the Recent Congressional Action?

In mid-July, the House passed its version of the 2007 farm bill (H.R. 2419), which included new provisions for the "promotion of market-based approaches to conservation" (Sec. 2407). In December, the Senate passed its version of the farm bill,[11] which also included new provisions for "conservation programs in environmental services markets" (Sec. 2406). Although the provisions are differently named and differ in approach, the addition of such provisions to the conservation title

---

[10] For more information, see USDA, *2007 Farm Bill, Conservation and Environment Theme Paper*, June 2006, at [http://www.usda.gov/documents/FarmBill07consenv.pdf]; and M. Ribaudo and C. Jones, "Environmental Credit Trading: Can Farming Benefit," *Amber Waves*, USDA's Economic Research Service, Feb. 2006.

[11] During Senate floor action, an amended Senate farm bill was offered as an amendment and substitute to H.R. 2419, the Farm, Nutrition, and Bioenergy Act of 2007.

of the farm bill would establish a framework to develop consistent standards and processes for quantifying environmental services from the agriculture and forestry sectors. This could facilitate further development of market-based approaches for a range of environmental goods and services involving farmers and landowners.

House

The House version of this provision would establish an Environmental Services Standards Board, chaired by USDA with the participation of other identified federal partners. This board would be composed of the Secretaries of USDA and the Departments of Interior, Energy, Commerce, and Transportation, as well as the Administrator of the Environmental Protection Agency, the Commander of the Army Corps of Engineers, and other representatives as determined by the President.

To implement this process, USDA would conduct research and/or provide contracts, cooperative agreements, and grants for "(1) promoting the development of consistent standards and processes for quantifying environmental benefits, including the creation of performance standards and baselines; (2) promoting the establishment of reporting and credit registries, including third party verification and certification; and (3) promoting actions that facilitate the development and functioning of private-sector market-based approaches for environmental goods and services involving agriculture and forestry" (H.R. 2419, Sec. 2407).

The House version follows similar provisions recommended by USDA as part of its 2007 farm bill proposal to Congress,[12] and would cover a range of farm and forestry services, including improved water and air quality, increased carbon storage, and habitat protection, among other types of environmental services. The House provisions differs from the Administration's proposal mostly in the addition of further clarifying language regarding performance standards and baselines, and also third party verification and certification. The House-passed bill authorizes $50 million to be appropriated for this provision.[13]

Senate

The Senate version of this provision also directs USDA to develop a framework to facilitate the participation of farmers and landowners in environmental services markets. However, it differs in its approach. Instead of establishing a board, the Senate bill directs USDA to use a "collaborative" process involving representatives from various government agencies, non-governmental organizations, universities, financial institutions involved in services trading, and farm and forestry interests. As

---

[12] USDA, *USDA's 2007 Farm Bill Proposals*, Jan. 31, 2007, at [http://www.usda.gov/documents/07finalfbp.pdf]. This proposal is one of the four primary components of USDA's overall proposal for the conservation title of the 2007 farm bill, along with other proposals that seek to improve existing conservation programs, provide "green payments" to enhance environmental benefits and provide farm income, and expand conservation compliance. See USDA, *2007 Farm Bill, Conservation and Environment Theme Paper*, June 2006, at [http://www.usda.gov/documents/FarmBill07consenv.pdf].

[13] USDA requested authorization of $50 million in mandatory funding for these tasks.

in the House bill, the Senate identifies the relevant governmental agencies as USDA; the Departments of Interior, Energy, Commerce, and Transportation; the Environmental Protection Agency; and the Army Corps of Engineers. Other representatives would be determined by USDA's Secretary.

Under the framework outlined in the Senate bill, USDA is directed to (1) establish uniform standards; (2) design accounting procedures to quantify environmental services benefits; (3) establish a protocol and a registry to report and maintain environmental services benefits; and (4) establish a process to verify information reported by participating farmers and landowners (H.R. 2419, Sec. 2406). Similar to the House bill, the Senate would allow for third-party verification and certification. Funding under the Senate bill authorizes "sums as are necessary" for each of the fiscal years 2008 through 2012. The Senate bill also requires a series of progress reports to Congress.

The Senate provision also addresses a range of environmental goods and services in the farm and forestry sectors. However, it differs in that it directs USDA to "give priority" to providing assistance to farmers and landowners participating in carbon markets.

Other Legislation

Aside from the 2007 farm bill debate, there are other legislative initiatives that might also facilitate the development of environmental services markets involving the farm and forestry sectors — particularly in the area of carbon storage and emissions reduction — as part of the ongoing climate change debate.

During the 110th Congress, Members have introduced more than ten legislative proposals that would either mandate or authorize a cap-and-trade program to reduce greenhouse gas (GHG) emissions. Some of these bills would allow for the use of agricultural and other land-use carbon offsets as part of a cap-and-trade framework. In the context of these legislative proposals, a carbon offset is a measurable avoidance, reduction, or sequestration of carbon dioxide (CO_2) or other GHG emissions, often expressed in carbon-equivalent terms.[14] The inclusion of offset provisions in a cap-and-trade program could provide opportunities to some farmers and landowners by allowing them to generate (and sell) carbon offsets and credits associated with carbon capture and storage, emissions reductions, and/or other implemented environmental improvements on their farm or forested lands.

While some of the current GHG legislative proposals would allow relatively broad use of agricultural and land use offset types, others would allow for a more narrow use of offsets, such as emission reductions from animal waste. Some bills would not allow for offsets, but would set aside a percentage of allowances for various purposes, including biological sequestration. Participating farmers and

---

[14] Offsets generally fall within the categories of biological sequestration, renewable energy, energy efficiency, and reduction of non-CO_2 emissions. For more information concerning offsets, see CRS Report RL34241, *Voluntary Carbon Offsets: Overview and Assessment*, by Jonathan L. Ramseur.

landowners who receive these allowances for sequestration and/or emission reduction activities could sell them to facilities (e.g., power plants) that could become covered by a cap-and-trade program. These bills and issues are currently being debated in Congress.

For more information about these GHG legislative proposals and the carbon offset provisions in these bills, see CRS Report RL33846, *Greenhouse Gas Reduction: Cap-and-Trade Bills in the 110th Congress*, by Larry Parker and Brent D. Yacobucci; and CRS Report RL34067, *Climate Change Legislation in the 110th Congress*, by Jonathan L. Ramseur and Brent D. Yacobucci.

What Are Some Possible Considerations?

Among the principal questions regarding the inclusion of these provisions is whether the agriculture and forestry sectors can effectively provide environmental goods and services along with the more traditional food, fiber, and other services these sectors already provide. In addition, these provisions could raise various procedural or implementation questions as Congress debates the 2007 farm bill, or as it considers the role of the agriculture and forestry sectors in other legislative initiatives.

- **Standards-setting process.** What are the advantages of establishing a USDA-led Standards Board, as proposed in the House, compared to other possible options such as a federal advisory committee, case-by-case partnership agreements, or memorandum of understanding, etc.? What type of framework would be adopted in the Senate's proposed "cooperative approach"?
- **Lead federal agency.** What are the advantages of establishing USDA as the lead role? What lead role would USDA play, given the mostly regulatory authority and statutory obligations of other likely participating federal agencies? Might putting USDA as the lead create conflict of interest as both the regulator and promoter of standards? Are there jurisdictional issues, such that this provision needs to be referred to other authorizing congressional committees? How might existing state and local programs implemented by other agencies be affected?
- **Collaboration.** How would the collaborative effort between USDA and the other participating federal agencies be put into practice? How would disagreements be addressed and resolved among all federal partners?
- **Consistency with existing regulatory authorities.** Would the agreed-upon decisions and standards resulting from such an effort be binding among all federal agencies? What assurances are there that these decisions would not override the authorizing legislation regulating water and air quality, and wildlife habitat? Would regulatory agencies with authorizing legislation have the flexibility to not adopt the standards authorized by the board or other

collaborative process, if they violate the individual agencies' authorizing statutes, or contain regulations, such as measurement protocols? What are the possible implications if these decisions and standards are inconsistent with other existing regulatory guidelines and authorities?

- **Consistency with possible future authorities and initiatives.** Would such a standard-setting framework and the agreed-upon standards be consistent with, or readily adapted to, other possible future regulatory initiatives, such as those involving climate change? If possible future climate change initiatives do not provide for carbon offsets and credits from the agriculture and forestry sector, would the agreed-upon standards be enforceable within the existing voluntary carbon market? What are the potential implications if these decisions and standards are inconsistent with other possible forthcoming regulatory guidelines and authorities?
- **Standards.** Would uniform standards be national, regional, local, or site-specific in scope? How would uniform standards address differences within different production areas, types of resources, and ecosystems? Would established protocols and management practices take into account these differences? Would these standards consist of an assigned value? Given the wide range in the types of environmental services, how would outcomes or benefits be measured and expressed as standards?
- **Federal versus marketplace functions.** What roles should government agencies play in actually establishing environmental services markets involving agriculture and forestry? What roles would be strictly within the purview of the private-sector and independent credit markets? Is there a federal role beyond developing the reporting and credit registries that would require the board to act as intermediary between sellers and buyers? Who would be responsible for oversight of third party verification and certification, and for assigning market value to tradeable credits within an environmental services market? Would the federal agencies play a role in market oversight, enforcement, risk management, and capital investment? What other types of federal assistance may be needed to further facilitate the development of environmental services markets involving agriculture and forestry?
- **Implementation.** How would the agreed-upon standards, as well as the resultant accounting procedures, protocols, and registries, be implemented? Would there be penalties for non-compliance?
- **Congressional reporting/timeline.** Under the House proposal, how and when would the board be expected to report its accomplishments to Congress? What type of reports would be expected? Under both the House and Senate bills, how would the authorized monies be spent?
- **Market barriers.** How effectively do the current proposals address the types of barriers that have been identified by USDA and others

that may prevent the development of environmental goods and services markets involving the farm and forestry sectors?

- **Possible unintended consequences.** Might establishing a market-based approach shift governmental and/or industry priorities away from addressing more serious environmental problems by allowing some industrial facilities to buy relatively lower-cost farm-based carbon credits rather than pay for on-site pollution abatement at the facility? Might a market-based program shift USDA resources away from established farm conservation programs?