

## WRI FACT SHEET

# Stacking Payments for Ecosystem Services

## INTRODUCTION

Payments for ecosystem services are becoming an increasingly important part of the U.S. business and regulatory landscape. Used properly, these payments can efficiently mitigate greenhouse gases, filter pollution from runoff, protect wildlife habitat, and prevent soil erosion. Recognizing this, the American Clean Energy Security Act establishes a cap-and-trade program that allows firms to “offset” their greenhouse gas emissions through practices that reduce or sequester greenhouse gas emissions elsewhere.<sup>1</sup> Some state governments are also expanding water quality trading programs that allow facilities that discharge water pollutants to avoid expensive facility upgrades by, for example, paying farmers to improve land management practices. There are also long-standing federal programs that pay farmers and forest landowners for providing a range of ecosystem services, such as protection of wildlife habitat and prevention of erosion.

As programs that provide payments for ecosystem services grow, policy makers will need to determine how these various payments should interact with each other. This interaction presents an opportunity to expand the suite of services for which an ecosystem is managed. However, it also creates the risk that multiple payments will be made for the same ecosystem services, possibly reducing the efficiency of pay-

ments or diminishing the environmental benefits they were intended to provide. This Fact Sheet offers an initial review of these risks and opportunities. It is part of a larger effort by WRI to develop a comprehensive framework for stacking payments for ecosystem services.

## WHAT ARE ECOSYSTEM SERVICES?

Ecosystem services are the benefits that people obtain from ecosystems. Examples include fresh-water, global climate regulation (e.g., greenhouse gas sequestration), timber, protection from natural hazards, erosion control, and recreation.<sup>2</sup>

## WHAT IS A PAYMENT FOR ECOSYSTEM SERVICE?

A payment for ecosystem services is a financial incentive offered to encourage the supply of a given ecosystem service. For a transaction between a buyer and seller to be considered a payment for ecosystem services, that transaction must be voluntary, and must be for a well defined ecosystem service.<sup>3</sup>

A number of programs to provide payment for ecosystem services have already been implemented in the United States, and there is growing interest in developing additional programs. Table 1 outlines several of these existing programs.

## WHAT DOES IT MEAN TO STACK PAYMENTS FOR ECOSYSTEM SERVICES?

A single project (e.g., moving to low-till agriculture, restoring mangroves, or taking a strip of land next to a river out of agricultural production) may generate multiple ecosystem services. Payments for ecosystem services are considered “stacked” if that project receives payments from different programs for more than one of the ecosystem services that are generated. For example, a farmer may simultaneously reduce emissions of greenhouse gases and nitrogen loadings to streams by applying less fertilizer, thus providing services of climate regulation and clean freshwater. In some regions, there are separate programs that provide payments for the

**TABLE 1. Selected Programs Offering Payment for Ecosystem Services**

Program	Ecosystem service paid for	How payment works
<b>Environmental Quality Incentives Program (EQIP)<sup>4</sup></b>	Improved water quality, water conservation, air quality, and wildlife habitat. Reduced soil erosion and sedimentation.	Provide payments to farmers to adopt conservation practices.
<b>Conservation Reserve Program (CRP)<sup>5</sup></b>	Conserved food and fiber production capacity; enhanced forest and wetland resources; improved water quality and wildlife habitat; and reduced soil erosion and sedimentation.	Provide payments to farmers to convert cropland that is highly erodible and/or environmentally sensitive to vegetative cover.
<b>Climate Action Reserve (CAR)<sup>6</sup></b>	Mitigate ecosystem disturbance from climate change by reducing atmospheric loading of greenhouse gases.	Individuals or entities that wish to offset their own emissions pay others to adopt projects that reduce or sequester emissions of greenhouse gases.

greenhouse gas benefits of the farmer's actions and payments for the water quality benefits. If the farmer receives both of these payments, then the payments for ecosystem services are said to be stacked.

### WHEN IS STACKING BENEFICIAL AND WHEN IS IT DETRIMENTAL?

Allowing stacking could help improve ecosystem management by expanding the focus of that management from a single ecosystem service to the broad range of services the ecosystem can provide. As such, stacking provides a potentially powerful market force to improve the provision of ecosystem services.

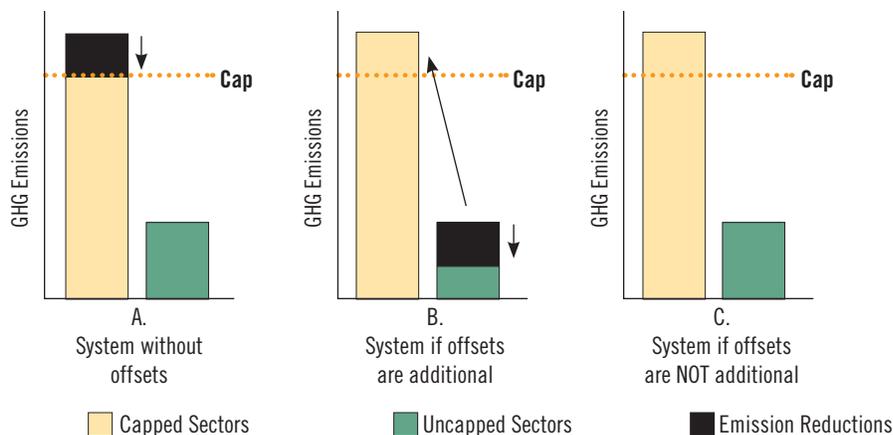
Stacking, however, does not come without risk. All payments for ecosystem services should fundamentally seek to obtain an environmental benefit that would not have otherwise occurred, or to prevent an environmental harm that would have occurred in the absence of the payment. This concept is commonly referred to as "additionality." If done improperly, stacking could undermine the additionality of the policies and programs that the payments serve, and therefore compromise their environmental objectives.

Providing payment to projects that are not additional is also economically inefficient. With limited financial resources, programs should be designed to encourage activities that would not occur otherwise. This is because the total value of each ecosystem service will always exceed our ability to compensate project developers for the full financial value of those services. Therefore, in order for payments to have any measurable environmental impact, compensation must be directed towards services that would not be provided, or would be terminated, if not for the payment.

### HOW DOES ADDITIONALITY IMPACT OFFSET PROGRAMS?

Offsets occur when someone is paid to develop a project that provides a desired ecosystem service in order to undo, or offset, the environmental harm someone else is causing. When offsets are additional, the harm is effectively undone. However, if the project would have occurred without the offset payment (i.e., if it were not additional), then the harm is not undone. Offset

FIGURE 1. Impacts of Additional vs. Non-Additional Offsets on Emissions Reduction Targets



payments currently exist for a number of ecosystem services, including greenhouse gases and water quality, and ecosystems such as wetlands (via wetlands mitigation banking programs).

Most proposals to date for regulating greenhouse gas emissions in the United States involve the development of a cap-and-trade program that provides regulated entities (capped entities) flexibility in how they reduce emissions. Without offsets, regulated, or "capped," sectors must reduce emissions in order to achieve a defined greenhouse gas emissions goal (Figure 1a). However, most proposals provide additional flexibility to capped entities by allowing them to implement or pay for a project that reduces greenhouse gas emissions in uncapped sectors. For example, a capped power plant may be able to avoid implementing greenhouse gas emissions control technologies by paying a landholder to plant trees that sequester carbon. If the reduction or sequestration of emissions is additional, then the cap is effectively met and the emissions reduction goal of the cap-and-trade program is preserved (Figure 1b). If the reductions are not additional, then the cap is exceeded and the emissions reduction goal is compromised (Figure 1c).

### HOW CAN ADDITIONALITY BE ENSURED WHEN PAYMENTS ARE STACKED?

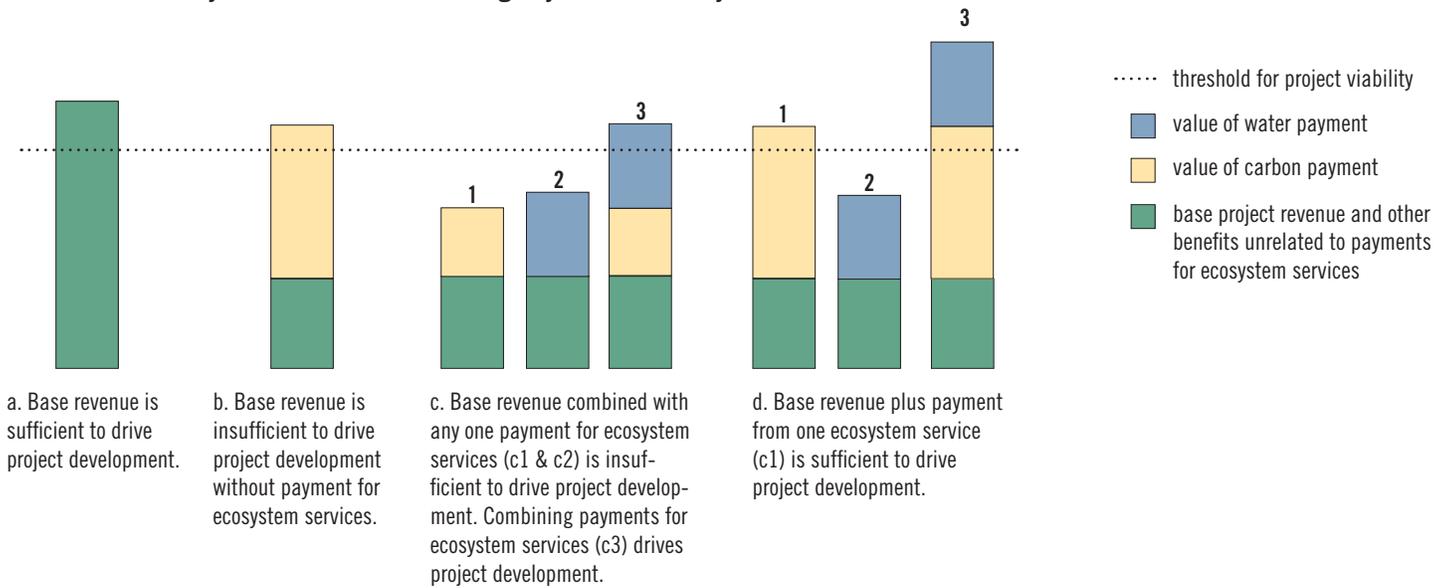
Some projects require payment for more than one ecosystem service in order to be economically viable. Allowing these projects to stack their payments for ecosystem services could lead to increased environmental benefits that would not otherwise occur.

However, in order to protect the environmental goals of the underlying payments for ecosystem services, it is important to preserve the additionality of each payment. This requires the separation of projects that require stacking to be implemented from projects that do not require stacking to be implemented. A project should be ineligible for any particular ecosystem service payment if it would have gone forward without that payment (i.e., if the payment was not additional). Likewise, a project is not additional and should not be eligible for stacking if that project would have gone forward without the combined incentive that stacking multiple ecosystem payments provides. Simply put, it is both inefficient and environmentally detrimental to pay a project for two ecosystem services when only payment for one service is necessary to drive project development.

To illustrate, consider a situation, depicted in Figure 2, in which a farmer could simultaneously reduce emissions of greenhouse gases and nitrogen loading to streams by applying less fertilizer.

As shown in Figure 2a, some types of projects may be commonplace because they save the developer money or generate considerable revenue even without a payment for ecosystem services. For example, if improved fertilizer application processes are widely adopted for cost-saving reasons in the absence of any payment for ecosystem services, then such projects would not be considered additional. However, if those cost savings are insufficient to drive widespread adoption of more efficient fertilizer application, then it may be appropriate for the project to receive payments for ecosystem services to gen-

**FIGURE 2. Additionality Evaluations When Stacking Payments for Ecosystem Services**



erate additional incentive. Figure 2b depicts a scenario where the project will not move forward without a carbon payment. Such a project would be considered additional. Reductions in the use of fertilizer can lead to greenhouse gas benefits through reduced nitrous oxide emissions, and they can lead to water quality benefits via reduced nitrogen runoff.

A project should not be eligible for stacking unless both payments are necessary to drive development. In Figure 2c, neither the climate (2c1) nor the water quality payments (2c2) are sufficient on their own to drive project development. But combined, these two payments are sufficient to encourage the adoption of more efficient nitrogen fertilizer applications (see Figure 2c3). However, if carbon offset prices rise high enough to drive widespread adoption without water quality credits, then awarding water quality offsets is not appropriate (see Figure 2d). In this case, the water quality credits do not help drive project adoption, and therefore the project fails to meet the additionality criterion of the water quality market.

### IS STACKING ALWAYS APPROPRIATE IF IT LEADS TO THE DEVELOPMENT OF A NEW PROJECT?

Even if it leads to the development of a project that would not otherwise occur, stacking may not be appropriate if it causes a project to

count a single ecosystem service in multiple payment programs, or to “double count” that service. This is because double counting leads to the provision of fewer ecosystem services than intended by the programs. This means that careful attention must be paid when stacking involves a payment for a range, or “bundle,” of ecosystem services. In these cases, stacking is only appropriate when it leads to the provision of services beyond what would have otherwise been provided, and thus avoids double counting.

For example, wetland banking and mitigation programs require the development of a wetland of comparable quality to the wetlands that are being replaced. In this instance, stacking would be not be appropriate unless it allows a project developer to provide services over and above what the wetland banking regulations require.

### WHAT'S NEXT?

Stacking multiple environmental services can be an important mechanism for driving new, additional environmental benefits that would not otherwise occur. It will likely play an important role in the future management of ecosystem services. Under some circumstances, however, stacking can also seriously undermine the environmental goals and outcomes of policies designed to manage ecosystems.

WRI has begun to examine a number of questions related to the implementation of these stacking principles, including:

1. How does one utilize the conceptual framework for evaluating additionality when stacking payments for ecosystem services (e.g., water quality trading, wetland banking, CRP, EQIP)? In addition, how can such utilization build off experiences implementing project-based and standardized additionality tests for existing payments for ecosystem services?
2. Are there instances where stacking of payments for ecosystem services should impact the level of compensation from each of the underlying payment systems? For example, when should a project receiving both greenhouse gas offsets and water quality credits receive greenhouse gas offsets for all of the greenhouse gas emissions and nutrient loading that it avoids? Are there circumstances under which it should receive fewer offsets and/or credits?
3. What is the implication of stacking when the bundle of ecosystem services paid for under a payment program is defined by the applicant, such as the case under the U.S. Department of Agriculture’s Environmental Quality Incentives Program (EQIP)?

## NOTES

1. American Clean Energy and Security (ACES) Act of 2009. 111th Congress. As passed June 26, 2009.
2. *The Corporate Ecosystem Services Review: Guidelines for Identifying Business Risks and Opportunities Arising from Ecosystem Change (Version 1.0)*. March 2008. Craig Hanson, Janet Ranganathan, Charles Iceland, and John Finisdore. World Resources Institute. [http://pdf.wri.org/corporate\\_ecosystem\\_services\\_review.pdf](http://pdf.wri.org/corporate_ecosystem_services_review.pdf)
3. *Necessary Conditions for Ecosystem Service Payments*. Sven Wunder. January 31 & February 1, 2008. Presented at Economics and Conservation in the Tropics: A Strategic Dialogue. [http://www.rff.org/Documents/08\\_Tropics\\_Conference/Tropics\\_Conference\\_Papers/Tropics\\_Conference\\_Wunder\\_PES\\_markets.pdf](http://www.rff.org/Documents/08_Tropics_Conference/Tropics_Conference_Papers/Tropics_Conference_Wunder_PES_markets.pdf)
4. *Fact Sheet: Environmental Quality Incentives Program*. May 2009. United States Department of Agriculture Natural Resources Conservation Service. [http://www.nrcs.usda.gov/PROGRAMS/farmland/2008/pdfs/EQIP\\_factsheet.pdf](http://www.nrcs.usda.gov/PROGRAMS/farmland/2008/pdfs/EQIP_factsheet.pdf)
5. *Conservation Reserve Program*. Natural Resources Conservation Service. Updated June 23, 2009. <http://www.nrcs.usda.gov/programs/CRP/>
6. *Climate Action Reserve: How It Works*. 2009. Climate Action Reserve. <http://climateactionreserve.org>

## CONTACTS

Research into stacking is a joint pursuit by WRI's Climate and Energy Program and its People and Ecosystems Program. The lead contact for the perspectives presented in this paper is Nicholas Bianco ([nbianco@wri.org](mailto:nbianco@wri.org) or 202-729-7715). For additional information on ecosystem services, contact Craig Hanson ([chanson@wri.org](mailto:chanson@wri.org) or 202-729-7624). For information on greenhouse gas offsets, contact Alexia Kelly ([akelly@wri.org](mailto:akelly@wri.org) or 202-729-7888). For information on water quality credits, contact Cy Jones ([cjones@wri.org](mailto:cjones@wri.org) or 202-729-7899).