

Payments for Ecosystems Services to Support Transitions to Sustainable Agriculture and Land Use



In brief

Agriculture and food systems are both drivers and victims of escalating climate and nature crises, in turn increasing the risks to healthy diets, livelihoods and economies. Public policies can set incentives for farming and market practices that further exacerbate these trends, but they can also play a role in reversing them. The global Agriculture Policy Dialogue on Transition to Sustainable Agriculture is a peer-to-peer platform to share experience, facilitate partnerships and catalyse policy leadership to accelerate the transition to sustainable agriculture and food systems that benefit people, prosperity and the planet.

Policy Pathway Briefs provide an overview of emerging experiences and lessons on policy approaches that contribute to this transition, covering a series of topics requested by Policy Dialogue members, to support peer learning and knowledge exchange. The briefing notes are in no way exhaustive. The options facing governments will be context specific and look different across and within countries. The notes aim to act as a discussion starter and to facilitate exchanges between countries engaged in the Agriculture Policy Dialogue and with other global initiatives, drawing on the experiences presented by members and examples identified through further research.

This brief focuses on Payments for Ecosystems or Environmental Services (PES) as a mechanism for providing incentives to land users to transition to more sustainable land management.

Key messages

- Payments for Ecosystems or Environmental Services (PES) are payments made to ecosystem service providers – landholders and other resource stewards – on a conditional and voluntary basis for additional environmental benefits that they generate for others beyond their own land, funded by government, direct users or NGOs and philanthropies.
- PES have been used increasingly since their evolution in the late 1990s, are now worth up to USD 42 billion in annual transactions and have broadened from forestry conservation and watershed protection schemes to include programmes to promote more sustainable agricultural practices, such as soil health.
- There are a series of challenges to confront to ensure that PES schemes can fulfil their potential as an instrument to encourage current or potential land users to steward their land more effectively; these include how to attribute values to nature, wider political economy issues and trade-offs between social and environmental aims and impacts.
- These challenges need to be addressed through thinking about the design, implementation and monitoring and verification of PES schemes, namely: what services to pay for (conditionality); who to pay (targeting); how much to pay and for how long (cost-effectiveness and financial sustainability); what else is needed to change behaviour beyond financial incentives (enabling conditions); and how to know whether service providers have delivered (monitoring, reporting and verification).
- Across all of these activities, experience has shown that it is key to involve farmers and other affected parties at each stage, both to get their buy-in but also to ensure that proposed schemes address the main issues and concerns of producers.

Defining PES

PES are **payments (one-off, continuous or time-bound) made to ecosystem service providers – landholders and other resource stewards – on a conditional and voluntary basis for additional environmental benefits that they generate for others beyond their own land**, such as watershed management, biodiversity conservation, and forest and land-use carbon sequestration (Kuhfuss et al., 2018; Wunder et al., 2020).

PES tend to operate within compliance standards established in legal and regulatory frameworks, encouraging landholders to comply with those frameworks and go beyond them (ibid).

PES schemes are funded by three main sources:

- **Governments:** who purchase improved ecosystem service provision on behalf of the wider public, either domestically or internationally, e.g., with REDD+. Funding can be from a general budget or earmarked taxes (e.g. water or fuel taxes).
- **Direct users:** private organizations and individuals who benefit directly from, and pay directly for, improved ecosystem service provision, such as reduced flood risk, clean water or recreational access. These can include water utilities, park authorities and voluntary carbon offsetting schemes,ⁱ among others. Mechanisms to capture payments may include carbon offsets, biodiversity credits, entry fees or price premiums passed on to final consumers.
- **NGOs or philanthropies:** buying improved ecosystem service provision on behalf of sections of the general public. For example, the World Wildlife Fund set up PES in the **Danube Basin** to reward the maintenance, improvement or adoption of conservation-friendly land uses (WWF, undated).

Evolution of PES schemes

PES schemes have grown since the classic examples of the late 1990s (Daily and Ruckelshaus, 2022). They emerged in New York City (protecting watersheds to improve municipal water quality), China (restoring forest and grassland on steep slopes to combat floods) and Costa Rica (conserving and restoring forest to sequester carbon, and contribute to water security, landscape beauty and biodiversity protection). A review of PES in 2018 (Salzman et al., 2018) showed that, globally, there were more than 550 active programmes in over 60 countries worth up to USD 42 billion in annual transactions. These were funded mainly through public sector financing and private investments from the Global North and China (United Nations Environment Programme, 2021).

While most PES schemes are directed at forestry conservation, there is increasing interest in using PES to promote more sustainable agricultural practices and target farmers (see Table 1). Such schemes show no sign of abatement, particularly with the growth of carbon and biodiversity credit programmes.

Challenges for PES

Broader discussions – both philosophical and practical – about conditional PES transfers have accompanied the growth in projects and programmes, indicating that PES schemes need to consider wider political economy issues and trade-offs between social and environmental effects (Wunder et al., 2020). Concerns include: the commoditization of nature; the use of a human-centric concept of nature value that does not translate across cultures; the uneven distribution of payments across intermediaries and ecosystem services providers; long-term

financial sustainability; and additionality – whether PES are leading to additional environmental outcomes.

Given the potential for using PES schemes – and growing interest in them – such concerns need to be factored into design and implementation measures to ensure that they achieve their potential.

Designing and implementing PES for sustainable land use

To successfully encourage current or potential land users to steward their land more effectively, PES schemes need to respond to a series of questions in design, implementation and monitoring and verification, namely: what services to pay for (conditionality), who to pay (targeting), how much to pay and for how long (cost-effectiveness), what else is needed (enabling conditions) and how to know whether service providers have delivered (verification).

Conditionality: what to pay for

The agricultural sector provides a set of environmental services beyond food, fuel and fibre production and income for farmers – in themselves are vital for economies. Managing existing cropland and pastures more sustainably can enhance soil health,ⁱⁱ boost water availability and quality for downstream users, reduce air pollution and greenhouse gas emissions, and protect and restore biodiversity. Policies also need to reduce the expansion of cropland and ranching into ecosystems that are carbon sinks and biodiversity hotspots, e.g., forests, grasslands and wetlands, and which protect water sources in order to conserve the services that they provide.

Farmers – focused on output and income – may not factor broader environmental services provision into the equation when choosing cultivation practices or land use due to financial constraints. Even where changing practices can boost yields over the longer term, farmers need support to transition the period of additional costs and fall in yields that can occur in the short term.ⁱⁱⁱ

Funders and programme managers of PES need to decide what the most important services are in each particular context, depending on the urgency of the issue, the drivers of the problem, who will benefit and the relative costs of a solution.

Targeting: who to pay

In thinking about who to target for PES, funders need to consider both the principles and mechanisms of targeting and selection. In the principles of selection, programme managers normally take into consideration two main principles:

- **Whose behaviour needs to change.** Underlying this is the principle of additionality whereby land users are rewarded for doing things they would not have done in the absence of receiving payments. While this is key to most PES schemes, there is increasing debate about whether existing stewards should be rewarded for continuing good practice, such as protecting forests or soil health: this could avoid introducing adverse incentives whereby such stewards begin unsustainable practices to gain access to payments. However, where resources are limited, funders may need to prioritize changing existing harmful behaviour.
- The **balance between efficiency and equity**: efficiency requirements prioritize selecting those who can yield the best returns for the lowest marginal cost. This means that payments would mostly go to large landowners and cover more land with the lowest transaction costs (Lansing, 2017). However, funders may wish to prioritize more vulnerable land users, such as poorer smallholders (ibid). This has proved hard in practice in some cases, due partly to high transaction costs. For example, **Costa Rica's** PES reaches mainly large landholders and richer smallholders rather than poor

and marginalized smallholder farmers despite government efforts to enrol smallholders across the board (Porrás, 2010). However, **Mexico's** experience of targeting smallholders and communal lands in its PES schemes for watershed and biodiversity conservation provides lessons in how this can be done (Izquierdo-Tort et al., 2022).

Programme managers have used different approaches to select recipients, depending on which principles they prioritize:

- The government of **Canada** has used **auctions** to help overcome information asymmetries and select recipients who can provide ecosystem services for the lowest prices, to provide value for money (Balmford et al., 2023). This allows recipients to self-select and explore contract allocation strategies like bonuses for ecosystem services providers to set aside adjacent land (Liu et al., 2019).
- Existing **social protection or public works programmes** offer a mechanism to provide additional cash transfers to socially vulnerable recipients for environmental services (Norton et al., 2020) emphasizing the equity principle. Some social protection schemes already have wide coverage and a roster of eligible households – or a participatory process to identify eligible households – which could be used to identify recipients to provide additional ecosystems services.^{iv} FAO has proposed using this approach in **Colombia** to merge social protection and climate and environmental protection.

Cost-effectiveness: how much to pay and for how long

How individuals, institutions or policies might value nature depends on how people–nature relationships are framed (Pascual et al., 2023) – in a more extractive way looking at the value of the ecosystems services nature provides to people, or with a broader vision of living with, and in, nature.

In practice, the main approaches being used or developed to decide on payment levels include (Kuhfuss et al., 2018):

- **Fixed price** schemes, determined by budget availability, whereby ecosystem service providers must decide whether the available payment on offer is sufficient to cover the costs of providing those services. While such fixed price payments are at risk of over- or under-paying farmers for work, they also have much lower transaction costs. **Costa Rica** uses fixed prices for specific interventions, calibrated by criteria such as whether the property is in a critical water conservation area, or if the forest has high biodiversity value.
- **Auctions**, where ecosystem service providers offer the price(s) of provision. This can reveal more transparent information about the opportunity costs that providers expect to incur in adapting land management practices to supply non-market ecosystem services.^v **Australia's** Emissions Reduction Fund has used auctions of carbon credits to establish contracts with farmers (Keenor et al., 2021). Experimental results in lower income countries are more limited and suggest a cautious approach is needed (Bingham et al., 2021; Van Soest et al., 2018).
- **Negotiations between buyers and sellers of ecosystem services**, e.g., between a water company (buyer) and upstream farmer (service suppliers) for watershed protection to improve water quality and availability. While this approach may lead to a better price discovery, it has high transaction costs and is more difficult to use in scaling up (Fripp, 2014).

The duration of payments is also crucial: payments need to be reliably available for a sufficient length of time to change behaviour and avoid reversal of results. During that time, the

opportunity cost of changing practices may vary as commodity prices fluctuate and funders may need to build in a flexible payment to respond and avoid losing recipients.

Enabling conditions: what else is needed to change behaviour beyond financial incentives

Beyond the “carrot” of financial incentives, other interventions may be needed, especially to prevent environmentally destructive practices simply moving to other areas,^{vi} including:

- Providing a “**stick**” through enforcing compliance conditions for receiving payments and regulatory frameworks that set minimum standards.
- Offering **support for behavioural change**, via:
 - **Technical support** to farmers on how to change practices, complemented by information on the associated benefits. For example, **New Zealand** has created a Centre for Climate Action on Agricultural Emissions to get new tools, technology and practices to lower on-farm emissions to farmers faster.
 - **Building trust and relationships** with landholders: experience in the **US** (White et al., 2022) highlighted that farmers may not participate in PES because of perceived unfairness and distrust of the government based on previous experiences. This was mitigated by trusted individuals delivering tailored information about how changes could impact ecosystem service performance in a way that aligned with farmers’ own perceptions about how their agricultural systems function and their own relationship with nature.
- Ensuring **clear land rights** as a basis for payments to establish who has rights to receive benefits and ensure conditionality. However, the clarity and precision of the rights required by ecosystem service finance mechanisms may not align with the fluid and overlapping nature of customary tenure systems in some countries (Knox et al., 2011). Additional resources can strengthen rights in different forms, e.g., current efforts under the Tenure Facility to register land rights of Indigenous people and local communities in tropical forests (Tenure Facility, 2022).
- **Aligning existing subsidies** to reinforce PES aims. Agricultural subsidies – often established to boost productivity and farmer incomes – can also drive expansion of production into marginal lands, and promote distorted and inefficient use of inputs that can have negative environmental effects (World Bank, Forthcoming).

Monitoring: how to ensure desired outcomes

Monitoring, reporting on and verification (MRV) of the results of PES need to balance the costs of MRV with its accuracy, as there is usually a trade-off. Assessing compliance of recipients with the conditions of a PES can be input-based or outcome-based.

At the Policy Dialogue in September 2023, country representatives noted that it is difficult for governments to measure the **outcomes** of PES practices at the household level. They suggested that it might be cheaper for governments to measure **practices** at the household level, while focusing on productivity gains, emissions reductions and the protection of natural resources at a more aggregate level (regional, national or landscape).

- A similar approach is being proposed in the current efforts to develop government payments to farmers in **Malawi** for improving soil health. The Malawi scheme may also use a combination of extension field agents to check recipients’ practices and third-party sampling of fields through soil testing and remote sensing data to provide information on soil health outcomes. This would reduce the costs of MRV while allowing for a higher degree of accuracy.

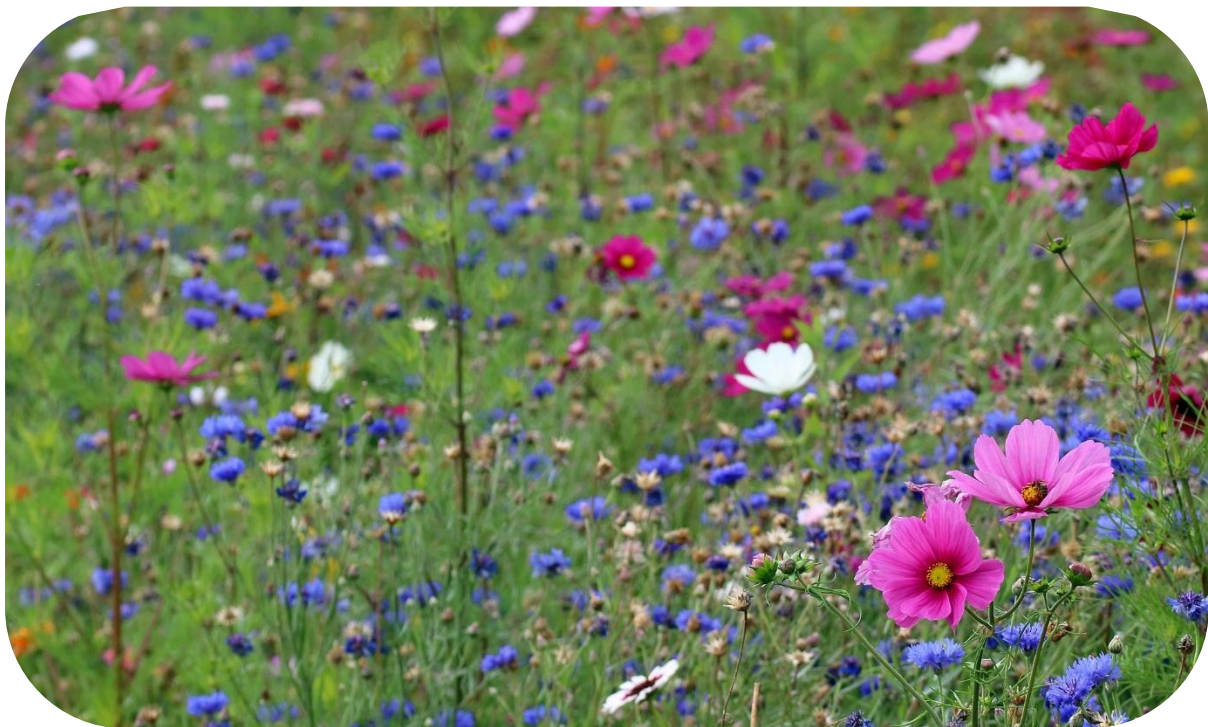
- In the **UK**, farmers and the government agreed that the UK Government would reduce farmer reporting requirements to lower the administrative burden on farmers while reserving the right of the government to undertake random audits to ensure that standards being met. Farmers need only report when they receive an inspection, either random or risk-based, providing information on practices applied and the amount of land under improved practices (communication with DEFRA, 21 November 2023).

As part of maintaining incentives for farmers to remain in PES schemes and reinforcing good practice, an MRV approach can measure plural values that balance more extractive approaches to ecosystems – measured by biophysical or economic indicators – with other more socio-cultural values, such as the relation of land users to the land (Pascual et al., 2023).

Process considerations

Across all of these activities, experience has shown that it is key to involve farmers and other affected parties at each stage, both to get their buy-in but also to ensure that proposed schemes address the main issues and concerns of producers. This helps to sustain good practice if participants perceive the decision-making process and distributional aims and impacts to be fair (Gaworecki, 2017; Porrás et al., 2017). Some examples of participatory design include:

- **UK:** while the UK Government set the overarching policy framework on the Environmental Land Management Scheme, such as designed legislation and defined environmental targets, farmers were asked which measures would work for them and which not, that way increasing feasibility and acceptance of policies.
- In the current process of designing a PES scheme for soil health in **Malawi**, farmers have participated in a series of workshops to discuss the best way to structure such a scheme and will continue discussions throughout its implementation.



Key initiatives

Table 1. Examples of PES initiatives

Scale	Country	Focus	Description
National	Mexico	Water and biodiversity	Programme has combined different funding sources: the government offers cash payments to land owners for watershed services and payments for biodiversity conservation using revenues from a variety of sources – water tax, annual budget allocations, and contributions from local governments and the private sector. ¹
Watershed	South America	Water	Reciprocal Watershed Agreements, e.g., WATERSHARED – grassroots approach to conditional transfers that aim to help land managers located in upper watershed areas to sustainably manage their forest and water resources in ways that benefit both themselves and downstream water users. Funds are sourced locally from institutions or individual downstream water users. ²
Farm-level/project	Kenya	Biogas and carbon	Household biodigesters produce biogas from cattle manure, replacing firewood and reducing emissions from burning wood. Bioslurry produced as a by-product replaces need for purchasing inorganic fertilizers and increases farm productivity. Funding from carbon credits. ³
National	United States	Soil health and ecosystem conservation	The Conservation Reserve Program seeks to preserve soil quality by reducing erosion and protecting soil productivity in fragile croplands, but it aims to protect a variety of ecosystem services across the US, including water resources, wetlands, wildlife habitat, honey bee and pollinator protection, climate change mitigation through greenhouse gas emissions reductions, soil health and flood prevention. The government pays farmers to remove environmentally sensitive land from agricultural production and instead plant species to help improve environmental quality. ⁴

Sources

1. Cortina, S. and Porras, I. 2018. Mexico's Payments for Ecosystem Services Programme. Module 2 in: Guidance for Practitioners Porras, I. and Asquith, N. 2018 *Ecosystems, poverty alleviation and conditional transfers*. London, UK: International Institute for Environment and Development.
2. Asquith, N. 2018. Reciprocal agreements for watershed conservation in South America. Module 2 in: Guidance for Practitioners Porras, I. and Asquith, N. 2018. *Ecosystems, poverty alleviation and conditional transfers*. London: International Institute for Environment and Development.
3. Porras, I., Vorley, B., Amrein, A., Douma, W. and Clemens, H. 2015. *Payments for ecosystem services in smallholder agriculture: lessons from the Hivos-IIED learning trajectory*. IIED and Hivos.
4. Farm Service Agency. 2017. *Environmental Benefits of the Conservation Reserve Program*. USDA FSA. [https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/EPAS/natural-resources-analysis/nra-landing-index/2017-files/Environmental Benefits of the US CRP 2017 draft.pdf](https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/EPAS/natural-resources-analysis/nra-landing-index/2017-files/Environmental%20Benefits%20of%20the%20US%20CRP%202017%20draft.pdf).

References

- Balmford, B., Collins, J., Day, B., Lindsay, L. and Peacock, J. 2023. Pricing rules for PES auctions: Evidence from a natural experiment. *Journal of Environmental Economics and Management*. 122, 102889. <https://doi.org/10.1016/j.jeem.2023.102889>
- Bingham, L.R., Da Re, R. and Borges, J.G. 2021. Ecosystem Services Auctions: The Last Decade of Research. *Forests*, 12(5), p. 578. <https://doi.org/10.3390/f12050578>
- Daily, G.C. and Ruckelshaus, M. 2022. 25 years of valuing ecosystems in decision-making. *Nature*. 606, pp. 465–466. <https://doi.org/10.1038/d41586-022-01480-x>
- Fripp, E. 2014. *Payments for Ecosystem Services (PES): A practical guide to assessing the feasibility of PES projects*. Bogor, Indonesia: CIFOR. https://www.cifor.org/publications/pdf_files/Books/BFripp1401.pdfhttps://www.cifor.org/publications/pdf_files/Books/BFripp1401.pdf
- Gaworecki, M. 2017. Cash for conservation: Do payments for ecosystem services work? *Mongabay*. Available at: <https://news.mongabay.com/2017/10/cash-for-conservation-do-payments-for-ecosystem-services-work/>
- Izquierdo-Tort, S., Corbera, E., Martin, A., Carabias Lillo, J. and Dupras, J. 2022 *Environmental Research Letters*, 17, 055009. <https://iopscience.iop.org/article/10.1088/1748-9326/ac6686>
- Keenor, S.G., Rodrigues, A.F., Mao, L., Latawiec, A.E., Harwood, A.R., and Reid, B.J. 2021. Capturing a soil carbon economy. *Royal Society Open Science*, 8(202305). <https://doi.org/10.1098/rsos.202305>
- Knox, A., Caron, C., Miner, J. and Goldstein, A. 2011. Land tenure and payment for environmental services: Challenges and opportunities for REDD+. *Land Tenure Journal*. https://www.researchgate.net/publication/274310619_Land_tenure_and_payment_for_environmental_services_Challenges_and_opportunities_for_REDD
- Kuhfuss, L., Rivington, M. and Roberts, M. 2018. *The 'Payment for Ecosystem Services' approach - relevance to climate change*. James Hutton Institute, Climate Change Centre. <https://www.climateexchange.org.uk/media/3271/payment-for-ecosystem-services.pdf>
- Lansing, D.M. 2017. Understanding Smallholder Participation in Payments for Ecosystem Services: the Case of Costa Rica. *Human Ecology*, 45, pp. 77–87. <https://doi.org/10.1007/s10745-016-9886-x>
- Leimona, B., Bingham, L.R., Jarungrattanapong, R. and van Noordwijk, M. 2023. Auctions in payments for ecosystem services and the plural values of nature. *Current Opinion in Environmental Sustainability*, 64. <https://doi.org/10.1016/j.cosust.2023.101334>
- Liu, Z., Xu, J., Yang, X., Tu, Q., Hanley, N. and Kontoleon, A. 2019. Performance of Agglomeration Bonuses in Conservation Auctions: Lessons from a Framed Field Experiment. *Environmental and Resource Economics*. 73(3), pp. 843–869. <https://doi.org/10.1007/s10640-019-00330-1>
- Norton, A., Seddon, N., Agrawal, A., Shakya, C., Kaur, N. and Porras, I. 2020 Harnessing employment-based social assistance programmes to scale up nature-based climate action. *Philosophical Transactions of the Royal Society B*, 375(1794), p. 20190127. <https://doi.org/10.1098/rstb.2019.0127>
- Pascual, U., Balvanera, P., Anderson, C.B. et al. 2023. Diverse values of nature for sustainability. *Nature*, 620, pp. 813–823. <https://doi.org/10.1038/s41586-023-06406-9>
- Porras, I. and Asquith, N. 2018. *Ecosystems, poverty alleviation and conditional transfers: Guidance for practitioners*. London: International Institute for Environment and Development.
- Porras, I. 2010. *Fair and green? Social impacts of payments for environmental services in Costa Rica*. London: International Institute for Environment and Development.
- Porras, I., Mohammed, E.Y., Ali, L., Ali, S. and Hossain, B. 2017. Power, profits and payments for ecosystem services in *Hilsa* fisheries in Bangladesh: A value chain analysis. *Marine Policy*. 84, pp. 60–68. <https://doi.org/10.1016/j.marpol.2017.06.031>

Salzman, J., Bennett, G., Carroll, N. et al. 2018. The global status and trends of Payments for Ecosystem Services. *Nature Sustainability*, 1, pp. 136–144. <https://doi.org/10.1038/s41893-018-0033-0>

Tenure Facility. 2022. *Annual Report*. https://view.publitas.com/the-tenure-facility/ttf_annualreport_2022/page/1

United Nations Environment Programme. 2021. *State of Finance for Nature 2021*. Nairobi. <https://www.unep.org/resources/state-finance-nature-2021>

Van Soest, D. Turley, T., Christian, P., van der Heijden, E. and Kitessa, R. 2018. *Can Uniform Price Auctions inform the design of Payments for Ecosystem Services schemes? Evidence from the lab and field*. Washington DC: World Bank.

White, A.C., Faulkner, J.W., Conner, D.S., Méndez, V.E. and Niles, M.T. 2022. “How can you put a price on the environment?” Farmer perspectives on stewardship and payment for ecosystem services. *Journal of Soil and Water Conservation*, 77 (3) 270–283, pp. <https://doi.org/10.2489/jswc.2022.00041>

World Bank. Forthcoming. *Flagship Roadmap on Decarbonization of the Air and Recarbonization of Landscapes through Agri-food System Transformation*. Washington DC: World Bank.

Wunder, S., Börner, J., Ezzine-de-Blas, D., Feder, S. and Pagiola, S. 2020. Payments for Environmental Services: Past Performance and Pending Potentials. *Annual Review of Resource Economics*, 12(1), pp. 209–234. <https://www.annualreviews.org/doi/abs/10.1146/annurev-resource-100518-094206>

WWF. Undated. *Fostering Payments for Environmental Services (PES) in the Danube Basin*. https://wwfint.awsassets.panda.org/downloads/fostering_payments_for_ecosystem_services_in_the_danube_basin.pdf

Endnotes

ⁱ However, there has been debate about whether carbon offsets meet the criteria of bringing additional environmental benefits.

ⁱⁱ There is some discussion about whether soil health is a public good, given that farmers themselves benefit from improvements (Wunder et al., 2020).

ⁱⁱⁱ See Soil Health Policy Brief for more detail.

^{iv} There are long-standing lessons about the need to strengthen institutional systems for delivering social assistance to enable a more effective combination of social and environmental objectives which could be applied (Norton et al., 2020).

^v These can use “Pay-as-Bid” pricing, in which successful participants are paid the amount stipulated in their bid(s). An alternative pricing approach, the “Uniform Price” rule – in which each successful bid is paid the amount specified in the marginal (either last winning or first losing) bid – has been shown to cost less (Balmford et al., 2023; Leimona et al., 2023).

^{vi} So-called “leakage”.

Please contact jrt@merid.org with any questions about this brief.

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