Ethical carbon offsetting

Guidelines and lessons from smallholder and community carbon projects

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Partner organisation

The Plan Vivo Foundation is an international, Edinburgh-based charity which has created a set of requirements for smallholders and communities wishing to manage their land and natural resources more sustainably. The foundation has developed the Plan Vivo Standard, which certifies the implementation of project activities that enhance ecosystem services and allow communities to formally recognise and quantify carbon sequestration, biodiversity or watershed protection. As such, Plan Vivo projects enable participants to gain access to Payments for Ecosystem Services (PES) which allow smallholder farmers and rural communities in the developing world to diversify their income streams, restore local ecosystems and protect biodiversity.

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Photo caption: Women planting seedlings, Nicaragua. Sales from seedlings can boost the family income.

Photo credit: Khalil Baker, from a Taking Root project in Nicaragua.

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Smallholder and community carbon projects have shown they can deliver local livelihoods and non-carbon benefits and promote climate resilience. Their emphasis on these co-benefits provides an advantage when it comes to selling in voluntary carbon markets, as they appeal to companies' corporate social responsibility (CSR) agendas. They also provide effective platforms for implementing and accounting for several Sustainable Development Goals – such as food security and ending poverty – along existing value chains for commodities such as timber or coffee. But they are also more expensive to implement, and many operate in remote areas with scattered and small properties, and/or in areas with social conflict. Before deciding whether to enter into these markets, project developers must have a clear, viable business model with realistic targets and benefit-sharing strategies, and a clear communication and marketing plan.

Contents

List of figures and boxes

Summary

Smallholder and community carbon projects have shown they can deliver local benefits and promote climate resilience. Their emphasis on co-benefits – such as food, energy, carbon sequestration and the protection of water quality and habits for biodiversity – provides an advantage when it comes to selling carbon certificates in voluntary carbon markets, as they appeal to companies' corporate social responsibility (CSR) agendas.

Smallholder and community carbon projects also provide effective platforms for implementing and accounting for several Sustainable Development Goals (SDGs) (such as reducing poverty and achieving food security) along existing value chains such as timber or coffee. But these types of projects can be more expensive to implement, and many operate in remote areas, with scattered and small properties, and/or in areas with social conflict.

This document, designed in collaboration with the Plan Vivo Foundation, compiles some guidance designed to help smallholder and community projects enter carbon markets and make successful sales. Experience shows that smallholder projects using payments for ecosystem services (PES) (which provide farmers with an incentive to maintain the natural resource base on which those services depend) are better placed to succeed if they improve productivity on the farm, and if transaction costs from linking farmers to buyers are manageable (Porras *et al.* 2015b). Clear project design and monitoring are essential to generate legitimacy and credibility for all stakeholders involved. Tools like SHAMBA, value-chain mapping and business models help to map out the dynamics of product flows associated with the ecosystems, key actors and their relations – and to identify opportunities, gaps and bottlenecks.

There is real demand for carbon offsets from forest protection or renewal and 'climate-smart' agriculture. But for community carbon projects to succeed, project developers must ensure delivery of carbon sequestration to offset buyers and on-farm benefits to the farmers. Ensuring credibility along the value chain through clear project design and monitoring and evaluation processes is also key.

This issue paper is based on the learnings from a three-year project funded by the Ecosystem Services for Poverty Alleviation Programme (ESPA), focusing on evidence-based lessons for poverty reduction and improved climate resilience. This issue paper is aimed at practitioners who are considering entering carbon markets and donors or policymakers interested in implementation strategies to reach smallholders and communities. It will also be of interest to anyone who wants to learn more about what ethical carbon offsetting means in practice. Key lessons include:

- Activities that generate carbon and ecosystem services must be aligned with strategies for food security and climate resilience.
- Participants need a clear understanding of the business model attached to carbon offsetting, including costs, expected revenues and actors along value chains.
- Project developers need a clear communication strategy, with targeted monitoring and reporting that informs marketing strategies.
- Partnerships are vital, to share risks and costs of supporting resilience in smallholder and community projects.

Glossary of terms

This glossary was developed as part of a Hivos/IIED/CIAT study looking at carbon offsets in timber, coffee and biogas smallholder value chains (Porras *et al.* 2015b).

Additionality	In the context of carbon offsets, a project activity is 'additional' if anthropogenic greenhouse gas (GHG) emissions are lower than those that would have occurred in the absence of the project activity. In the context of other ecosystem services, additionality refers to incremental services being delivered by the project.
Carbon dioxide equivalent (CO_2e)	The universal unit of measurement used to indicate the global warming potential of each of the six GHGs regulated under the Kyoto Protocol. Carbon dioxide – a naturally occurring gas that is a by-product of burning fossil fuels and biomass, land-use changes and other industrial processes – is the reference gas against which the other GHGs are measured, using their global-warming potential (Kossoy *et al.* 2014).
Certification	Certification is a market-based mechanism, guaranteed by a third party, designed to encourage environmentally sustainable and socially responsible practices. Certification can also offer 'chain of custody' information.
Clean Development Mechanism (CDM)	This is a mechanism provided by Article 12 of the Kyoto Protocol, designed to assist developing countries in achieving sustainable development by allowing entities from Annex 1 Parties to participate in low-carbon projects and obtain CERs in return (Kossoy *et al.* 2014).
Co-benefits	In carbon projects, this refers to well-managed and sustainable projects associated with a variety of benefits beyond reduction of GHG emissions, such as increased local employment and income generation, protection of biodiversity and conservation of watersheds.
Certified Emission Reduction (CER)	A unit of GHG-emission reductions issued pursuant to the Clean Development Mechanism of the Kyoto Protocol and measured in metric tons (tonnes) of carbon dioxide equivalent (tCO_2e). One CER represents a reduction in GHG emissions of one metric ton of carbon dioxide equivalent (Kossoy *et al.* 2014).
Ecosystem services/ environmental services	Ecosystems services are the benefits that people obtain from ecosystems, and include provisioning services (such as food or timber); regulating services (such as climate regulation, flood management, water purification and disease control); cultural services (eg recreation or spiritual); and supporting services that contribute to soil productivity through nutrient cycling, soil formation and primary production (MEA 2005).
Ex-ante offsets	Ex-ante offsets are determined by the future carbon fixation of an activity (often forest based). Accredited projects are then able to sell credits on the agreement of future activities within a set timeframe.
Greenhouse gas (GHG)	Both natural and anthropogenic, GHGs trap heat in the Earth's atmosphere, causing the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and ozone (O_3) are the primary GHGs. The emission of GHG through human activities (such as fossil-fuel combustion or deforestation) and their accumulation in the atmosphere is responsible for an additional forcing, contributing to climate change (Kossoy *et al.* 2014).
Inclusive business models	A profitable core business activity that also tangibly expands opportunities for the poor and disadvantaged in developing countries. They engage the poor as employees, suppliers, distributors or consumers and expand their economic opportunities in a wide variety of ways (BIF 2011).
Inclusive trading relationships	Inclusive trading relationships are the result of business models that do not leave behind smallholder farmers and in which the voices and needs of those actors in rural areas in developing countries are recognised.
Insetting	Investments focus from stakeholders higher up in the supply chain on activities that reduce environmental risks at the base of the supply chain (farmers) that may affect the quality of the final products.
Intermediary	An intermediary is a mediator or negotiator who acts as a link between different parties, usually providing some added value to a transaction that may not be achieved through direct trading.
IPCC (Inter-governmental Panel on Climate Change)	The IPCC is the international body for assessing the science related to climate change. It was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP) to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation. See: www.ipcc.ch

Offset	An offset designates the emission reductions from project-based activities that can be used to meet compliance or corporate citizenship objectives vis-à-vis GHG mitigation (Kossoy *et al.* 2014).
Outgrower schemes	Partnerships between growers or landholders and a company for the production of commercial (usually forest or agricultural) products. The extent to which inputs, costs, risks and benefits are shared between growers/landholders and companies varies, as does the duration of the partnership. Growers may act individually or as a group in partnership with a company, and use private or communal land.
Payments for ecosystems services (PES)	In this paper we understand PES as follows, based on Porras *et al.* (2008) and Ferraro (2009): An instrument that addresses an environmental externality through variable payments made in cash or kind, with a land user, provider or seller of environmental services responding to an offer of payment by a private company, non-governmental organisation (NGO) or local or central government agency. A user of ecosystems services, who is distinguishable from the seller, makes payments to enhance or protect these services through pre-agreed activities (including sustainable land management and energy-based activities like cooking stoves or biodigesters). The ecosystems service provider enters into the transaction voluntarily. Payment is conditional upon previously agreed activities (eg land use, biodigesters) that are expected to provide the service in question. They can be in cash or in-kind (or a mix of both), continuous or one-off, depending on each individual arrangement. PES is anchored in the use of payments to correct an economic externality (Pigou 1920, Coase 1960). Coase argues that socially sub-optimal situations, in this case poor provision of ecological services, can be corrected through voluntary market-like transactions provided transaction costs are low and property rights are clearly defined and enforced (Pattanayak *et al.* 2010).
Poverty	While there can be many definitions of poverty, we understand it as the lack of, or inability to achieve, a socially acceptable standard of living, or the possession of insufficient resources to meet basic needs. Multi dimensions of poverty imply going beyond the economic components to wider contributory elements of well-being. Poverty dynamics are the factors that affect whether people move out of poverty, stay poor or become poor (Suich 2012).
REDD+	All activities that reduce emissions from deforestation and forest degradation and contribute to conservation, sustainable management of forests, and enhancement of forest carbon stocks.
Small producers/ small farms	Although no common definition exists we follow Nagayets' (2005) approach, defining small farms on the basis of the size of landholding. This has limitations as it does not reflect efficiency. Size is also relative. Individual agricultural plots of <2 hectares are common in Africa and Asia but are generally larger in Latin America. Community forest land can include considerably larger patches.
Supply chain	'Formal' = 'modern' = 'coordinated' supply chains: coordinated supply chains are durable arrangements between producers, traders, processors and buyers about what and how much to produce, time of delivery, quality and safety conditions, and price. They often involve exchanges of information, and sometimes also help with technology and finance. They are usually initiated by investments of private traders and food companies, who act as chain leaders. They have characteristics of partnerships and joint interest (van der Meer 2006).
Transaction costs	Pagiola and Bosquet (2009) define transaction costs in reducing emissions from deforestation and forest degradation (REDD+)/PES as those necessary for the parties to reach an agreement that results in the reduction of emissions. The costs are associated with identification of the programme, creating enabling conditions for reducing emissions, and monitoring, verifying and certifying emissions reductions. Costs fall on different actors, including buyers and sellers (or donors and recipients), market regulators or institutions responsible for administration of the payment systems, project implementers, verifiers, certifiers, lawyers and other parties. The costs can be monetary and non-monetary, ex-ante (initial costs of achieving an agreement) and ex-post (implementing an agreement once it is in place).
Validation and verification	Validation is the process of independent evaluation of a project activity by a designated operational entity (DOE) against the requirements of the CDM. Verification is the review and ex-post determination by an independent third party of the monitored reductions in emissions generated by a registered project approved under CDM or another standard during the verification period (Kossoy *et al.* 2014).
Verified Emission Reduction (VER)	A unit of GHG emission reductions that has been verified by an independent auditor. Most often, this designates emission reductions units that are traded on the voluntary market (Kossoy *et al.* 2014).
Voluntary carbon market	The voluntary carbon market caters to the needs of those entities that voluntarily decide to reduce their carbon footprint using offsets. The regulatory vacuum in some countries and the anticipation of imminent legislation on GHG emissions also motivates some pre-compliance activity (Kossoy *et al.* 2014).

Other acronyms, abbreviations and initials

CIAT	International Center for Tropical Agriculture
CPO	Construction partner organisation
CSR	Corporate social responsibility
ESPA	Ecosystem Services for Poverty Alleviation Programme
FFI	Flora & Fauna International
FSC	Forest Stewardship Council
IIED	International Institute for Environment and Development
LPG	Liquefied petroleum gas
M&E	Monitoring and evaluation
MFIs	Microfinance institutions
NGO	Non-governmental organisation
PIN	Project idea note
SDGs	Sustainable Development Goals
tCO_2e	Tonne of carbon dioxide equivalent
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

Carbon offsetting

This section introduces this issue paper and discusses why it is a good idea to use smallholder and community projects to deliver climate resilience and adaptation strategies.

1

1.1 The International climate change agenda

Climate change is one of the most pressing problems of the 21st century. Climate change is a natural phenomenon that happens when the atmosphere warms up. However, the speed at which the atmosphere is heating has been accelerated by high levels of man-made pollutants – known as greenhouse gases (GHG). This is having major impacts, such as changes in local temperatures and precipitation patterns and rising ocean levels. A recent review commissioned by the United Nations (UNFCCC 2015) shows that the impacts of a two-degree rise in temperature poses serious risks for many countries, for example small island states. The report also noted the risks for regions or countries with heavy economic dependence on climate-sensitive sectors, for example agriculture and tourism, with limited opportunities for economic diversification.

At the global level, negotiations on how to reduce emissions are moving slowly. Recent results from the 2015 United Nations Climate Change Conference in Paris (COP 21) are encouraging, with countries committing to reducing emissions to 'to well below 2 degrees C'. The agreement, however, will have to be signed and ratified to be legally binding. And importantly, it needs to be adopted by the countries within their own legal systems.

1.2 Voluntary carbon offsets

The idea of carbon offsetting takes place within this context, allowing trade between those who emit GHGs and those who reduce them.

Voluntary carbon markets emerge as an option where people or organisations can reduce their unavoidable carbon emissions by purchasing certified carbon offsets from smallholder and community projects. Working in partnerships with local organisations, companies can offset their carbon emissions while promoting their corporate social responsibility (CSR) agenda by supporting small farmers and communities. And, in the case of insetting (see glossary), some companies – like coffee roasters – can offset their emissions while tackling procurement costs, strengthening links with local suppliers and helping them to increase their resilience to climate change.

1.3 About this document

In this document we highlight the main steps to consider for developing smallholder and community PES projects – in particular involving carbon offsets. There is an emphasis on systems that promote more equitable benefit sharing or sharing of revenues, costs and risks. We draw on:

- The team's experience in PES and carbon offsetting
- Information from workshops, focus groups and conferences involving the Plan Vivo Standard stakeholder network, including project developers in many countries, technical staff, and retailers of carbon offsets, held between 2012 and 2015
- Information from the ESPA-funded project Streamlining Monitoring for Smallholder and Community PES Projects
- The Hivos/IIED/CIAT-funded project PES in Agriculture and Forest Value Chains.

We focus on two main areas: the process by which offsets are created (Section 2) and what is involved in offsetting as a viable business (Section 3). This issue paper is aimed at practitioners who are considering entering carbon markets and donors or policymakers interested in implementation strategies to reach smallholders and communities. It will also be of interest to anyone who wants to learn more about what ethical carbon offsetting means in practice.

Carbon within agroforestry systems

This section explains the process by which a carbon offset is created – the science of the process, the link to activities on the farm, and how these offsets enter the market.

2

2.1 Mitigating climate change and generating community benefits

Smallholder and community land-based projects are good vehicles for mitigating climate change and generating local benefits, such as jobs, food security, access to sustainable energy sources and better health. Practices that combine agricultural crops and animal husbandry with trees can help tackle multiple dimensions of poverty, providing short- and long-term benefits such as food and timber. By improving the natural base, these activities improve resilience to climate change. This approach has given rise to a new set of projects and programmes that combine reductions in greenhouse gas emissions with local benefits. The resulting reductions of carbon emissions can be packaged as 'carbon offsets' and sold in international markets, becoming an additional short-term cash 'crop' for the farm system.

2.2 Understanding the science: land-based emissions reductions

Change to land use in forests and croplands is one of the major contributors of greenhouse gas (GHG) emissions (see glossary; IPCC 2014b). The burning of trees and crop residues, overuse of organic and synthetic fertilisers, and use of fossil fuels are all sources of the three major GHGs: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) (IPCC 2014a).

On the other hand, improvements to land use can help with climate change. Planting and maintaining trees and plants removes CO_2 from the atmosphere through photosynthesis, and stores the carbon in stems, roots and soils (known as carbon pools). Also, by better managing GHG sources such as fire, fertilisers and fossil fuels, other GHG emissions can be reduced (IPCC 2014a). When land use is improved, such as through tree planting, stopping deforestation and improving crop management, it is possible to monitor the change in the carbon pools and the GHG sources to quantify and certify emission-reduction credits for trade in carbon markets.

A variety of certification standards and monitoring methodologies exist (VCS 2011, Plan Vivo 2013, The Gold Standard 2014, University of Edinburgh 2014), the most advanced of which focus on measuring indicators such as above-ground tree growth, fertiliser use, crop yields and residues, fire frequency and fossil fuel use. This information is used to estimate changes in tree root and soil carbon pools. A series of equations is then used to estimate the GHGs sequestered by the carbon pools, and the emissions avoided by reductions in GHG sources. Finally, to combine the emissions reductions of the three different GHGs (which, per unit, all have different climate-warming potentials) into one tradable commodity, all pools and sources are combined into tonnes of carbon dioxide equivalent (tCO_2e) for certification.

BOX 1. THE SMALLHOLDER AGRICULTURE MONITORING AND BASELINE ASSESSMENT (SHAMBA) TOOL

SHAMBA is a carbon accounting tool that promises to make community-driven climate projects even more viable, while also making these projects more transparent to businesses who invest in them. The carbon accounting software sets out to make it easier and affordable for rural communities and grassroots project developers to create good projects. It offers the potential to reduce costly technical consultancy inputs, while at the same time increasing carbon and financial benefits to smallholders. See: https://shambatool.wordpress.com and www.planvivo.org/latest-news/shamba-new-video

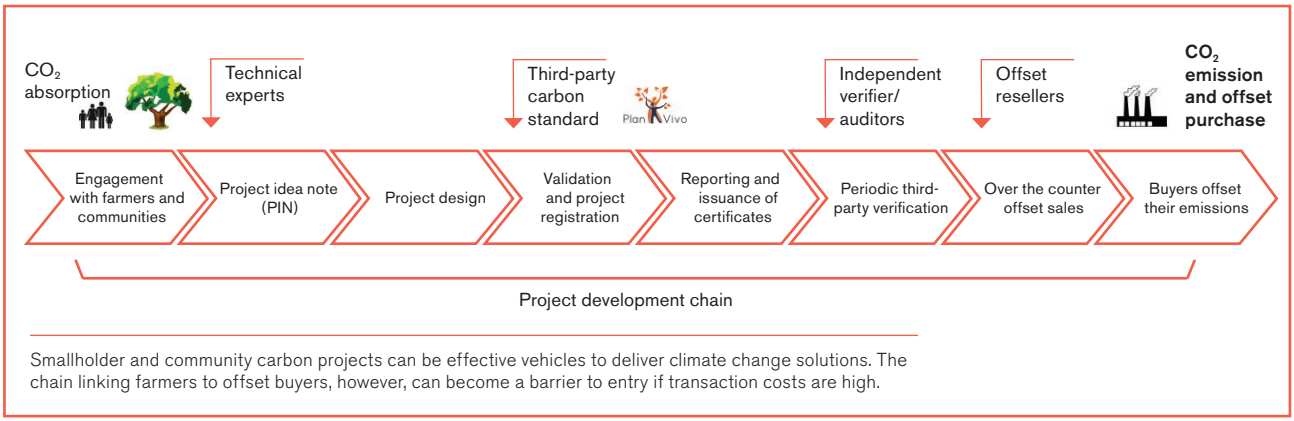
2.3 Transforming carbon into a tradable commodity

Any growing tree can fix and reduce carbon emissions. But it takes a series of extra steps to turn this action into a commodity that can be traded.

Offsets from agroforestry activities, like those described in the previous section, are usually traded in voluntary carbon markets where carbon co-benefits help fetch better prices, by appealing to the ethical principles of buyers. International buyers rely on independent 'speciality' standards to ensure transparency and reliability, like the Plan Vivo Standard or the emerging Fairtrade carbon credits.

Figure 1 shows how a typical Plan Vivo carbon offset project operates. A project developer works with smallholders, communities and supporting agencies to develop a project idea note (PIN). This is submitted to Plan Vivo where it is initially checked against the eligibility criteria set out by the Plan Vivo Standard. Amongst other key aspects, the Plan Vivo Standard has a particular focus on whether the project secures land tenure or carbon rights for participating communities and uses native or naturalised species in its project activities. If it fulfils the eligibility criteria, the carbon accounting methodology goes into the

Figure 1. The value chain for smallholder and community carbon offsets



Smallholder and community carbon projects can be effective vehicles to deliver climate change solutions. The chain linking farmers to offset buyers, however, can become a barrier to entry if transaction costs are high.

project design stage. After submission, the carbon accounting methodology is evaluated through a peer-review process and assessed by Plan Vivo's technical committee. Successful projects go through validation and project registration. Through the submission of annual reports, projects can demonstrate compliance with their project design and monitoring targets, which will lead to the issuing of valid carbon certificates. The project developer is then able to sell these certificates in voluntary carbon markets. Regular third-party evaluation takes place to ensure the validity and permanence of carbon sequestration rates and that the distribution of funds to communities is done in a way that is equitable, benefit sharing and transparent.

The value chains associated with carbon offsets are simple and yet complex. At first glance, they resemble agro-commodity value chains: approved activities to reduce emissions, like reforestation or agroforestry, are carried out by smallholders or communities on their plots. An intermediary or project developer manages the project, ensuring that activities take place to the required standard, distributing payments and selling ensuing credits to (usually international) buyers. Although direct sales can take place, thereby skipping a few steps in the chain, most transactions are formalised through resellers. Certification by an independent agent – such as Fairtrade for social norms or the Forest Stewardship Council (FSC) for sustainable forest management – is increasingly required to ensure quality standards are met throughout the process (Swallow and Goddard 2013).

Yet carbon offsets are different from agro-commodities because they are 'invisible'. They enter financial markets in similar ways to tradable permits, insurances and some derivatives – not necessarily linked to a physical commodity but to its trading or management systems. Companies and their shareholders demand trust in and clarity about what they purchase, and they need assurance that carbon emissions are really being reduced. Clarity is required at the bottom of the chain as well. For farmers, understanding the 'carbon' element of their activities can be confusing, and they require clarity over the process by which their efforts result in offsets for which they would be entitled to compensation, and at what price.

The process of transforming carbon into a tangible and marketable commodity relies on an understanding of the science that measures and reports these emissions at the point of origin (eg, with the landowner), and the institutions and legal frameworks that provide incentives to ensure permanence and avoid displacement of harmful activities. Furthermore, many smallholder and community carbon projects are traded in niche markets where their strong social component is more likely to be recognised in the form of a price premium. Thus, the perception is that carbon offsets are already linked to additional benefits, like better incomes for small farmers or enhancement of habitats for biodiversity protection.

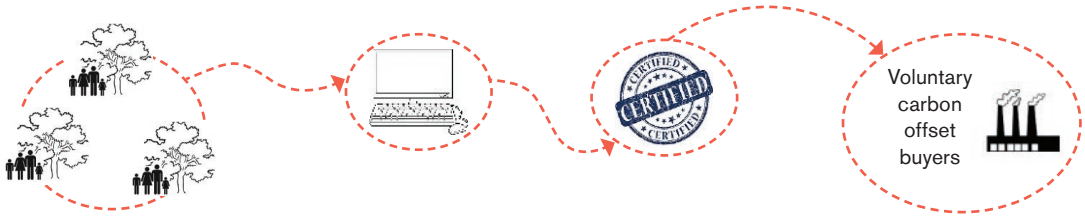
2.4 Monitoring accountability

Monitoring and evaluation (M&E) becomes the tool by which projects are able to prove the existence of the carbon offset and its co-benefits. International certification bodies such as the Plan Vivo Foundation or the Gold Standard act as independent agents that ensure transparency and credibility of these transactions.

Monitoring is important along the chain for several reasons (see also Figure 2):

- For farmers, it checks compliance of agreed activities, and provides useful feedback to them on the quality of their activities – for example, how well their trees are growing or if any remedial actions are necessary if operational concerns arise.

Figure 2. Monitoring along the value chain



	Farmers	Project developers	Independent standards	Buyers
Who are they?	Heterogeneous. Seek added value to agriculture. Carbon-generating activities must combine with existing farming activities. Commitment: long-term to access project	Absorb risk of price volatility. Carbon as single activity or part of portfolio. Must comply with requirements. Manager and seller.	Standardisation of carbon as over-the-counter commodity. Establish criteria to provide credibility.	Offsets as compliance or CSR. Heterogeneous and not grouped. Individuals or companies. Respond to shareholder and public pressure.
Link to M&E	Useful feedback on the quality of their activities but may divert from other activities. Helps understand when they may be at risk of default and why.	Legitimacy to access international markets but need to keep transaction costs down.	Trust that is reflected in market share.	Trust re. legitimacy of transaction is reflected in prices and repeat purchases.

Source: Porras and Stephenson (2015).

- For project managers, it helps align incentives for performance and triggers payments
- For transferring technology, capacity and feedback related to the activities promoted from project developers to farmers, creating a wider community of practice and sharing lessons and strategies with other smallholder and community projects
- For validating assumptions for model development
- For supporting transparency and credibility for buyers to foster sales.

But monitoring can be challenging, especially for smallholder and community projects. Many of these projects operate in places with very limited access to technical support, a crucial element, especially at the early stages of planting. Project coordinators within the Plan Vivo Standard network are highly committed to providing this support ('Each tree, each person,' according to Pauline Nantongo of Ecotrust in Uganda), as it enhances the legitimacy at farmers' level. But it comes at a cost. The increased precision demanded by emerging voluntary carbon markets adds to stretched budgets, and with slumping international carbon prices it is important to match expectations with prices.

Community monitoring plays an important role in REDD+ projects in monitoring carbon stocks (Larrazábal *et al.* 2012). For example, communities can provide a large workforce to facilitate collection of large amounts of data at large scales; they can bring their local skills and knowledge to complement expertise (Berkes *et al.* 2000), and they can provide ecological data where there are gaps in academic studies (Doswald *et al.* 2010). The cost of hiring local labour is, for the most part, relatively cheap (see Box 2). There are, however, some risks. For example, training is required to ensure that protocols and procedures approved by IPCC are met (see glossary). Supervision is required (especially in early stages) and procedures to ensure the reliability of data collected must be adhered to. Larrazábal *et al.* (2012) also point out that local people might be tempted to exaggerate the carbon stock increases if this is linked to payments received.

BOX 2. FROM THE EXPERTS: VIEWS ON DIFFERENT TYPES OF MONITORING

Opportunities

- **Participatory monitoring** builds local capacity and provides new jobs for local technicians, and is relatively cheap to do. Depending on the culture/location, these jobs can represent opportunities for youth and women (eg in Uganda and Nicaragua). In the Flora & Fauna International (FFI) carbon projects in Indonesia, communities rotate the people (mostly male youths) who do the monitoring to enlarge the pool of those who benefit directly.
- **Farmer-to-farmer training** and monitoring is good for community and smallholder projects. Those farmers whose plots perform well like to support others. This adds to their social status, and represents another source of income.
- Information obtained through **remote sensing** can be used beyond the PES project. For example, information from the Indonesia FFI project (currently in the Plan Vivo pipeline) is linked to national forestry monitoring.
- **Linking to global initiatives** like the Forest Global Watch[1] can be very useful and reduce the cost of monitoring for individual projects. The results, however, many not be tailored to the project site.

Barriers

- The cost of labour is relatively low but educating the farmers and the technicians for community monitoring can be a **time-consuming process**.
- **Local understanding of monitoring results** may decrease as tools become more technical, for example going from tree measurement to remote sensing and computer modelling.
- **Remote sensing without local corroboration** is not perceived as adequate for agroforestry projects, especially for native species that lose their leaves during dry seasons and which are not captured by remote sensing.
- **Costs of remote sensing** can be too high, especially if higher resolutions are needed but are not freely available. Technologies are evolving rapidly.

Source: Monitoring Strategies in Smallholder and Community Projects capacity-building workshop, IIED, University of Edinburgh and the Plan Vivo Foundation, Entebbe, Uganda 26th March 2015. The workshop brought together practitioners from Uganda, Nicaragua, Mozambique, Indonesia, Mexico and Kenya, as well as international facilitators and researchers to discuss effectiveness and legitimacy of different monitoring strategies in smallholder and community projects.

2.5 Co-benefits at the core

Most smallholder and community projects propose activities in line with the needs of local people. The Plan Vivo Standard, for example, requires their approved projects to include strategies that result in local socio-economic and biodiversity benefits. For example, projects have to demonstrate that activities exclude large-scale reforestation with exotic species, will not result in negative impacts on local water sources or biodiversity, and will not compromise food security. Instead, Plan Vivo projects focus on smallholder forestry activities, in which trees or shrubs are protected or planted around crops or pasture, resulting not only in increased carbon sequestration but improved soil fertility and nutrient cycling. The activities are designed to provide the farmer with a range of concurrent benefits – such as energy, food supply and the creation of new jobs – while also protecting water sources and biodiversity. An increasing part of the portfolio now also covers forest custody and regeneration. It includes, for example, community forest management in Indonesia with Fauna & Flora International and forest protection in the South Pacific Islands. Cataloguing co-benefits and effectively communicating them to buyers may improve offset sales and overall project income.

2.6 A strong SDG score

The Sustainable Development Goals (SDGs) are a new, universal set of targets and indicators. UN member states are expected to incorporate them into their agendas and political policies over the next 15 years. They include a commitment to end poverty and hunger, improve health and education, make cities more sustainable, combat climate change and protect oceans and forests. The investment required will run into trillions of US dollars. This will mean forming partnerships across the whole spectrum of society: government, the private sector, international and local NGOs, and communities.

[1] See: www.globalforestwatch.org

BOX 3. IMPROVING KNOWLEDGE OF MONITORING STRATEGIES

The Ecosystem Services and Poverty Alleviation Programme (ESPA) funded a three-year project to assess different types of monitoring strategies for smallholder carbon-offsetting projects in terms of scientific robustness, equity and legitimacy. Working with local partners, the project has provided an in-depth review of two long-established projects in Uganda (Trees for Global Benefits) and in Mexico (Scolel Té), as well as the wider Plan Vivo Foundation portfolio of projects.

The techniques vary in terms of local participation, capacities required and the use of techniques like remote sensing or computer modelling. They were tested in relation to their ability to predict the carbon potential in smallholder agroforestry systems. The project collected biophysical and socio-economic data and perceptions using a variety of techniques such as plot inventories, interviews with farmers, and scenario-development exercises with implementers to run iterations of models, and benchmark current monitoring as baselines. It also used remote sensing land-cover analysis exercises, both participatory (with local technicians) and external (with specialists in the UK). The project has also evaluated if and how buyers react to these monitoring strategies.

The key findings were:

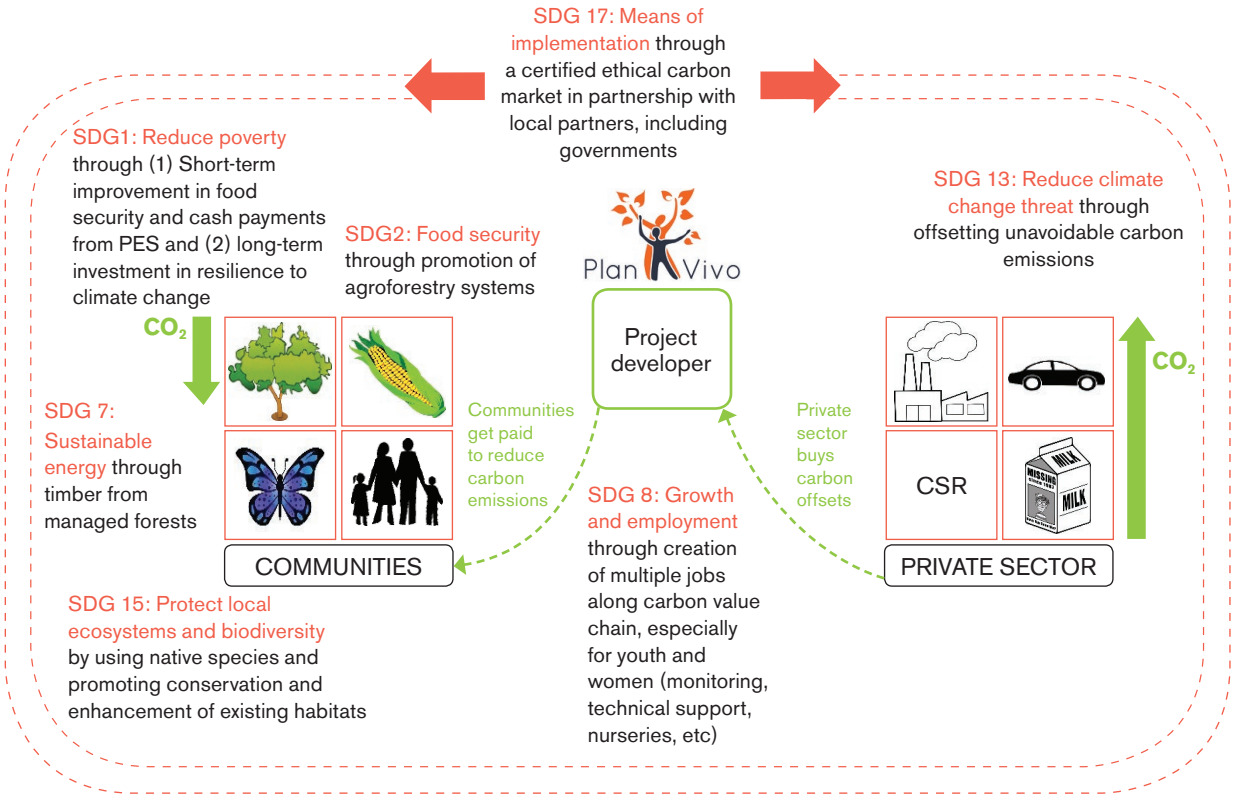
- Out of the tested agroforestry monitoring strategies, those tools with a high spatial resolution (ie at farm level as opposed to regional level) and which included field visits increased accuracy and project flexibility (and potentially profitability) for farmers, while maintaining cost effectiveness, equity and legitimacy.
- Remote-sensing tools that involved fewer or no field visits (ie remote sensing) performed poorly in accuracy, cost, local legitimacy and equity for smallholder agroforestry projects.
- The choice of monitoring regime appeared to have little or no impact on buyers' preferences for different carbon offsets. Buyers' preferences were more related to price and perceived co-benefits of a project. As a result, smallholder agroforestry projects are empowered to reform their monitoring without fear of losing buyers, as long as the reforms do not impact local co-benefits and related legitimacy and equity.
- Participants reported that a key factor in successfully attracting buyers was marketing and provision of information. Therefore, smallholder projects may benefit from investments in efficient data management, communications and marketing.

The mutually beneficial, ethical partnerships promoted by Plan Vivo are well placed to support the implementation of at least seven of the SDGs (Porras 2015b), as shown in Figure 3 and outlined below.

SDG1: End poverty. Partnerships can cut through many of the roots of poverty in several ways. Direct cash transfers estimated in proportion to the amount of carbon absorbed in the plot provide short-term poverty alleviation. Projects build human and natural capital within communities, helping eliminate long-term poverty. And Plan Vivo operates in many places ignored by others. For instance, it works in remote locations/farms and in areas divided by conflict. In these situations, the projects provide much-needed technical support in the design of the individual farm-management plans. The farmers own the trees planted and are able to use and/or sell the timber in both the medium and long term depending on the species used. Some projects help communities establish small-scale timber workshops, and local people are learning how to produce furniture or crafts.

SDG2: Achieve food security. During the initial stages of a project, farmers and project developers hold regular meetings. Their objective is to design a management plan that will ensure the long-term survival of tree species without compromising family food security. Plan Vivo promotes a mixed portfolio of activities to spread risk, considering what works best with the agricultural crops farmers have available. For example, different types of tree species are appropriate for timber, fruit, fodder and shade for intercropping. Activities like beekeeping produce honey for household consumption or sales income while encouraging natural pollination.

Figure 3. Smallholder carbon offsetting and the SDGs



Source: Porras (2015a).

SDG7: Affordable and sustainable energy. A significant amount of timber is generated by removing branches to encourage tree growth and through the thinning process – when younger trees are removed to provide space for others to mature. Many projects, like Scolel Té in Mexico, also promote the adoption of efficient cookstoves. These are excluded from the carbon account but financed through the support of committed offset buyers either as donations or through agreements to increase the price per offset.

SDG8: Growth and employment. The introduction of carbon markets has created a major new supply chain. At the local level, this includes project developers who carefully orchestrate the participation of smallholders and remote farmers. They provide cash payments and technical support, and sell carbon offsets to international buyers. Community monitoring creates jobs for forest technicians, many of them women, as well as young people eager to learn new technological skills. Demand for tree cultivation also promotes seed collection and the creation of local nurseries. All Plan Vivo projects are independently verified, and most of the voluntary carbon offset marketing is carried out through a growing network of retailers in the USA and Europe.

SDG13: Urgent action to combat climate change. Reforestation, and protection and management of forests help diminish the threat of climate change. Collaborations with the research and academic sectors, such as the ESPA project with IIED and Edinburgh University, have a role to play here. For instance, they help develop rigorous and streamlined scientific methodologies employed to measure the environmental footprint of these activities in cost-effective ways. Once verified and validated, these reduced emissions become a tradable commodity sold in voluntary carbon markets. Companies and governments are then more confident in purchasing these offsets and can use them to meet emissions reduction targets.

SDG15: Protect biodiversity and ecosystems. The sustainable principles underpinning each management plan seek to balance food and timber cultivation while broadening the area of impact to other ecosystem services. Better farm management contributes to improved water retention and reduces sedimentation. Planting new trees, especially native species, helps rehabilitate degraded landscapes. The Yaeda Valley REDD+ project in Northern Tanzania is an example of a project working with hunter–gatherer communities to reduce pressure on existing forests while improving livelihoods. Projects like the Nakau Programme in the Pacific Islands put forward a 'habitat protection' unit that promotes rainforest and mangrove protection to reduce indigenous communities' vulnerability to climate risks. This link to biodiversity conservation is also a key proposition for community forest management in Indonesia. It is currently piloted by Flora & Fauna International and shows great potential for being scaled up across the rest of the country.

SDG17: Partnerships for implementation. The increasing number of projects promoting reforestation, organic agriculture and cleaner energy technologies requires multiple partners along the value chain. These include farmers, technical and capacity-building specialists, project managers, office administrators, carbon experts (modelling specialists, auditors and certifying agents), offset resellers, and importantly, offset buyers. Project developers are increasingly becoming leading figures in the design of national public initiatives, such as Ecotrust in Uganda and Fundación Ambio in Mexico.

The importance of including and accounting for local co-benefits is bound to increase as projects seek differentiation in markets and as governments and businesses are required to demonstrate greater accountability. Greater effort, however, is needed to convince policymakers and other actors to mainstream the concept and move away from the 'niche'. Specific efforts are needed to:

- Clarify terminology and communicate to targeted discussion platforms
- Build capacity to quantify costs and benefits beyond monetary units, and transfer experience across projects and countries
- Go beyond just demonstrating the existence of co-benefits. More effort is needed to design instruments and institutional arrangements that financially recognise co-benefits, reduce barriers to investment (such as risk) and attract the interest of investors.

Viable businesses

This section presents the current state of voluntary carbon markets in smallholder projects and discusses how PES can contribute to sustainable smallholder agriculture.

3

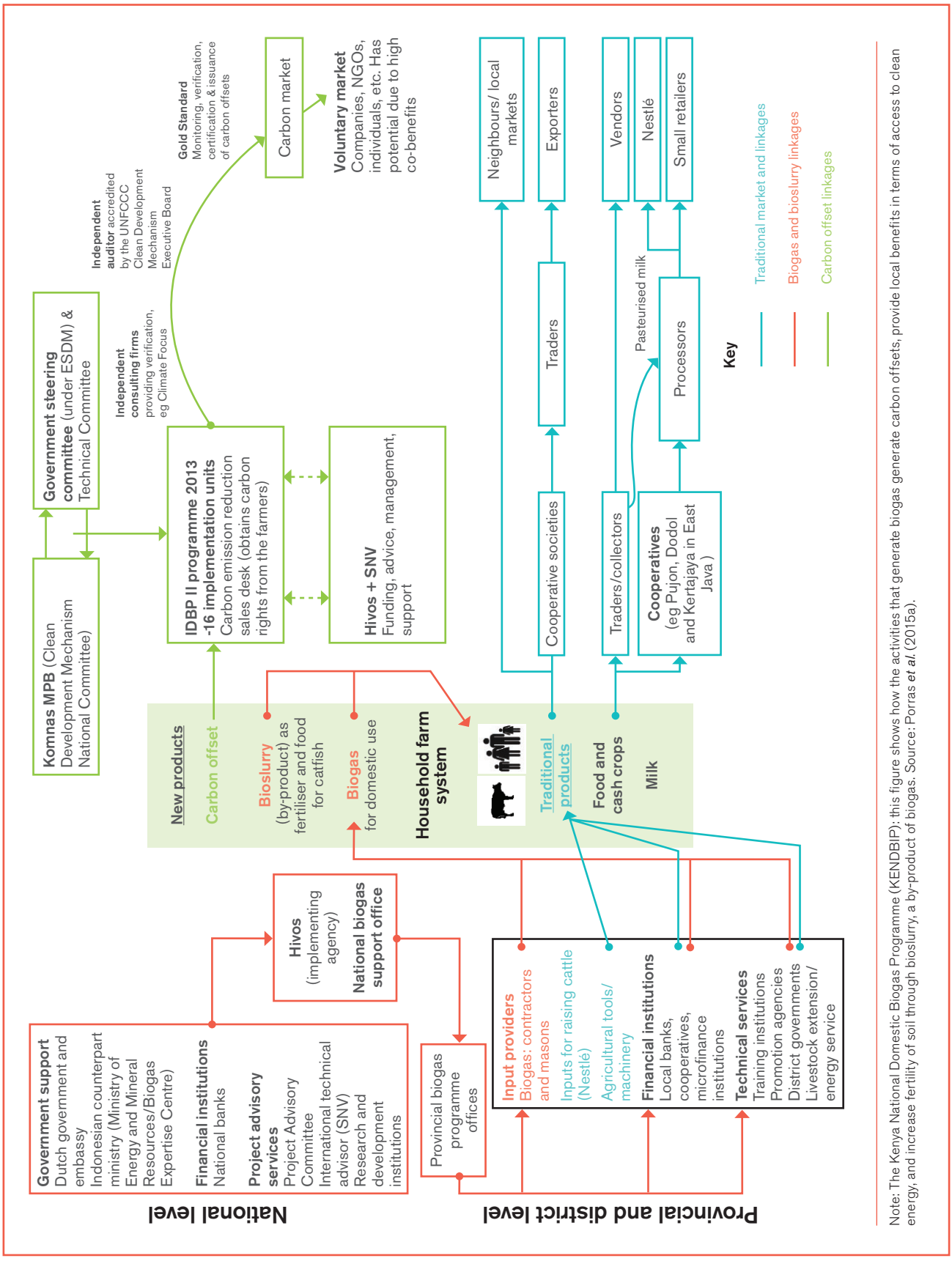
3.1 Adding value at farm level

A recent project by IIED and HIVOS assessed the potential of PES, and specifically carbon offsets, to contribute to sustainable smallholder agriculture. The study looked at ongoing projects in different countries (Nicaragua, Guatemala, Peru, Kenya and Indonesia), at different scales (local and national), with farmers engaged in a variety of production activities (biogas, coffee and timber as well as subsistence agriculture), and using different certification bodies to sell carbon offsets (Gold Standard, Plan Vivo and Cambio2).

Working in partnership with the local projects, the project used value chains and business model canvas tools, originally developed by CIAT (2012) to analyse agricultural commodities. Emphasis was placed on mapping stakeholders, interests and roles along the value chain, and how carbon interacts with existing agricultural activities. For example, in Kenya (see Figure 4) and Indonesia (see Figure 5 and Figure 6) the value-chain mapping tool looked at how biogas is linked not just to carbon offsets, but also to agriculture (through bioslurry, a natural fertiliser, which is a by-product of the biogas process) and to dairy-farming activities (for example, selling milk to Nestle or increasing the value of the livestock within the farm).

The study found that PES can indeed provide a viable financing strategy for smallholder agriculture, but it depends on how well it integrates within the smallholder enterprise – as well as the level of payoffs from the carbon markets (Porras *et al*. 2015b). The main insights suggest that:

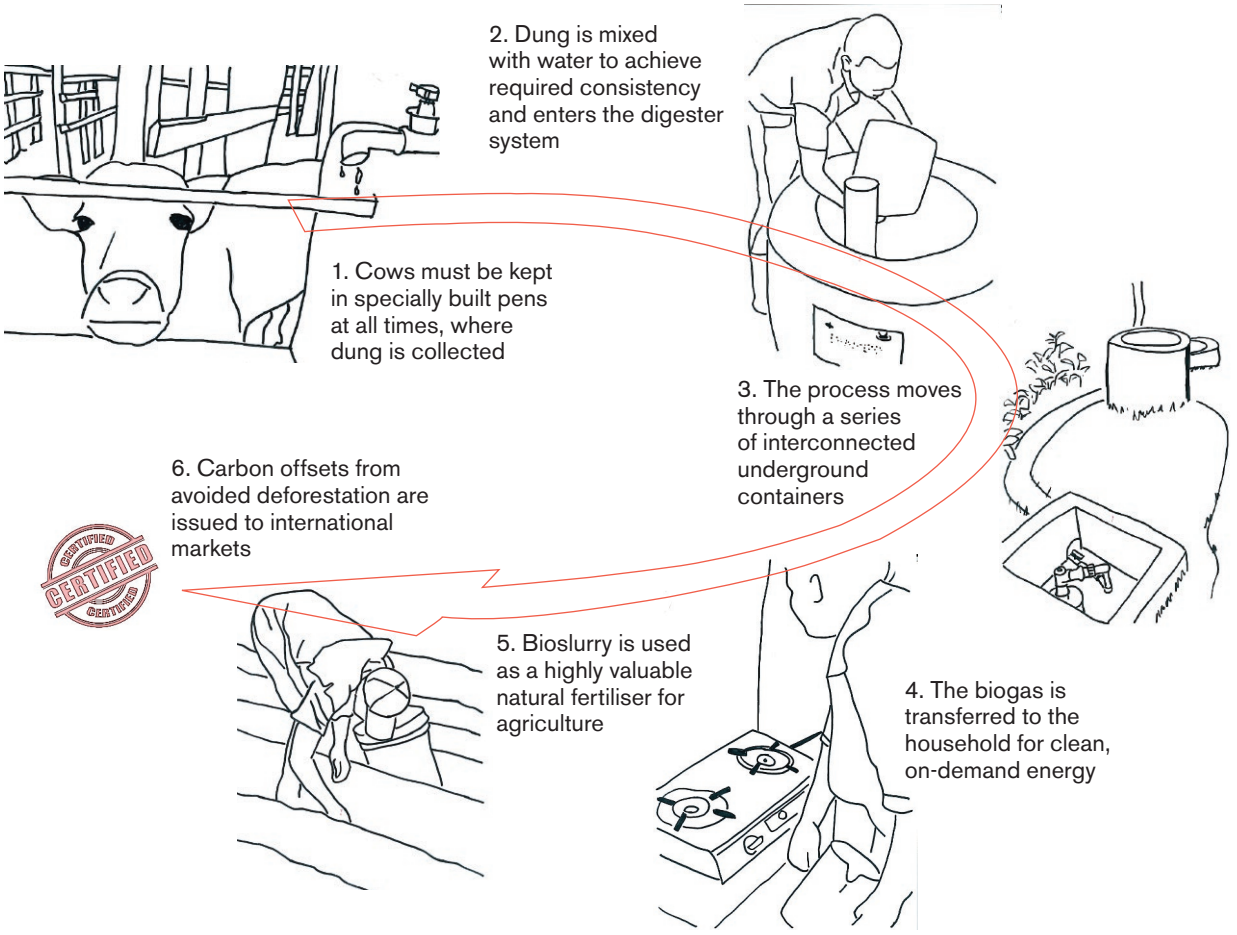
- Carbon in smallholder agriculture is new, and the learning process is still developing.
- Expectations of revenues from carbon sales need to be realistic. There is a marked disassociation between costs of implementing climate-resilience activities, and the price that carbon markets are willing to pay.
- The share of costs and benefits along the value chain need to be clearer, including the impact of risk for project developers and farmers.
- Transaction costs need to decrease – to make business viable to upscale and ensure meaningful benefit sharing for the farmers.
- Projects need to sell offsets – demonstrating the existence of co-benefits is not enough and projects need to improve their marketing strategies.



Note: The Kenya National Domestic Biogas Programme (KENDBIP): this figure shows how the activities that generate biogas generate carbon offsets, provide local benefits in terms of access to clean energy, and increase fertility of soil through bioslurry, a by-product of biogas. Source: Porras *et al.* (2015a).

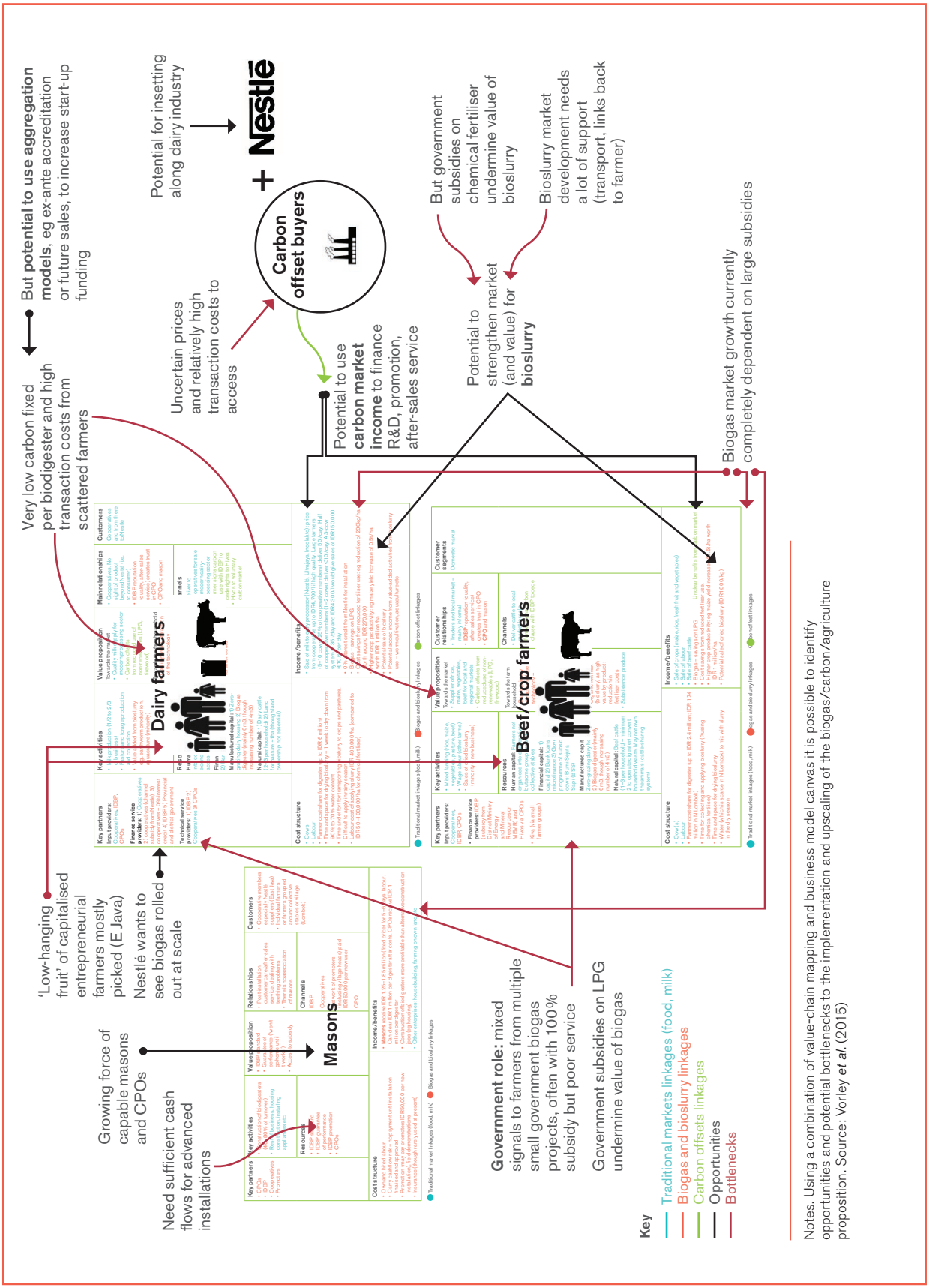
Figure 4. Biogas, carbon and smallholder agriculture in Kenya

Figure 5. Value chain for domestic biogas and carbon in Indonesia



The Indonesia Domestic Biogas Programme (known as BIRU) is a national programme that promotes biodigesters for households linked to milk, horticulture and cattle activities. The carbon component looks at marketing offsets created through reduced firewood for energy, and could potentially expand into reducing GHGs through the use of natural fertiliser (bioslurry). Source: Vorley *et al.* (2015).

Figure 6. Opportunities and bottlenecks for biogas, carbon and smallholder agriculture in Indonesia



Notes. Using a combination of value-chain mapping and business model canvas it is possible to identify opportunities and potential bottlenecks to the implementation and upscaling of the biogas/carbon/agriculture proposition. Source: Vorley *et al.* (2015)

3.2 State of voluntary carbon markets

Projects that include activities like reforestation, organic agriculture and cleaner energy technologies are increasing their presence in voluntary global carbon markets. These emerging projects are important for road-testing the economic viability of climate change, and the potential for incorporating 'co-benefits' – the indirect benefits gained from efforts to reduce greenhouse gas emissions, like community rights and biodiversity protection. The actions of voluntary projects and buyers play an important role in sending signals to project developers, other buyers and governments, and helping to shape and inform global climate talks and policies.

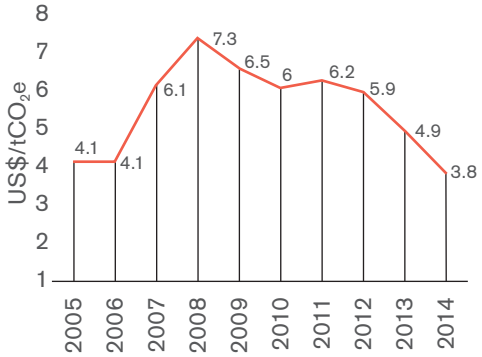
According to Forest Trends, in 2012, buyers committed more than US$ 523 million to offset 101 million tonnes of greenhouse gas emissions from projects including reforestation, protection of tropical forests and clean cookstoves (Peters-Stanley and Yin 2013). Their recent publication reports a demand for carbon offsets of 87 tCO_2e in 2014 (Hamrick and Goldstein 2015).

Currently, the majority of offsets are transacted in large countries (USA, Brazil, India and China) and smallholder projects still play a very small role – with smallholder agriculture just beginning to make an entrance. Government-to-government agreements under REDD+ have made it the dominant instrument in the forest sector, reaching an all-time high of 25 million tCO_2e in 2014.

Voluntary offset prices have remained relatively resilient with respect to global compliance markets but they are decreasing. The average price of voluntary offsets rose to its highest level in 2008, but has been declining ever since. At US$3.80/$tCO_2e$, it reached its lowest level in 2014 (see Figure 7). Projects that generate co-benefits get, on average, an additional US$2.70/$tCO_2e$, and also show significantly more variations in price, depending on the type of project. The downward trend in prices is a worrying factor: many projects need to either adjust their expected payoffs from future carbon sales, or they need to revamp their marketing skills to convince buyers to pay more for the co-benefits; and they certainly need to streamline their approach to keep transaction costs competitive. Dropping prices reflects a situation of supply exceeding demand: while certificates representing 76 tonnes of offset CO_2e were sold in 2014, nearly the same amount (63 tCO_2e) remained

Figure 7. Average historic price of voluntary carbon offsets (US$/$tCO_2e$)

Historical average price per tCO_2e



By type of project (US$/$tCO_2e$)

	Cumulative	
	2014	2007–2014
Average voluntary offset price	3.8	5.8
Average additional amount for projects with co-benefits (cookstoves, community sharing, etc)	2.7	NA
Average REDD price	4.3	5.2
Cookstove project offsets (large-scale projects tend to work under CDM only)	5.8	10.2
Afforestation/reforestation	8.9	7.7
Wind projects (bulk offsets)	2.1	4.6

Notes: Average price of voluntary carbon offsets has been declining since 2008, with a lowest price (US$3.80/$tCO_2E$) in 2014. Average REDD prices vary: planned deforestation offsets – like timber or large-scale agriculture conversion – had an average of US$3.10/$tCO_2E$; unplanned deforestation – from smallholder agriculture, informal mining or rural development – held a price of US$5.20/$tCO_2E$. Source: Hamrick and Goldstein (2015).

as unsold stock, either because of a lack of buyers or because of project developers waiting for better future prices.

The added revenues and investment from an ecosystem service approach in agriculture and forestry can help shield farmers from market volatility, increase producers' yields and promote a long-term approach. This demand enables the development of innovative ways to help reduce emissions, and road tests strategies that can inform policy developments. However, because they are new and have to develop and test methodologies, these projects bear the brunt of the costs for research and development, and standard methodologies to provide transparency in the markets still remain very expensive and restrictive in the smallholder context.

3.3 What drives buyers' preferences?

Accessing private carbon markets requires a better understanding of what buyers want when they purchase carbon offsets. This in turn needs to be transformed by project developers into a strategy that highlights how the project responds to these preferences.

Several studies have looked at the institutions and motivations linked to carbon and other ecosystem services and how this affects demand for voluntary environmental services (ES) certificates (Dargusch *et al.* 2010; Peters-Stanley *et al.* 2011; Swallow and Goddard 2013). But relatively little is known about how these preferences affect the willingness to buy offsets from smallholder and community projects, and how it affects the final prices paid. A recent study (see Figure 8) by IIED and the Plan Vivo Foundation tried to fill this gap by looking at market attitudes towards several attributes, like bundling carbon and other ecosystem services; whether buyers feel that a certification by a third party standard is needed; and what they think of monitoring strategies and the existence of co-benefits.

While the final results are not yet available, initial results (Porras *et al.* forthcoming; see also Figure 9 and Figure 10) suggest that:

- **A significant proportion of those who buy offsets buy again:** 39 per cent have bought carbon offsets once before but are planning to buy more, while only 23 per cent bought but are not planning to make any more purchases. Nearly 40 per cent of the respondents buy carbon offsets on a regular basis.
- **The size of the purchase varies:** of those who specified amounts, nearly 30 per cent buy in relatively small quantities (under 100 tCO2e) in each purchase, but 36 per cent buy in quantities of more than 100 tCO2e. Larger quantities are preferable for projects, as they reduce the individual transaction costs and provide more financial stability.
- **The type of certification standard used is the main factor** affecting which offsets they buy. Price is the second most important factor.

Figure 8. Distribution of responses to buyers' attitudes to carbon offsetting

Note: The survey targeted existing offset buyers, primarily from the Plan Vivo Foundation's portfolio of buyers, contacted directly or through approved retailers. Total sample 117 respondents.
Map data © 2016 Google.

Figure 9. What are the most important factors affecting your purchase?

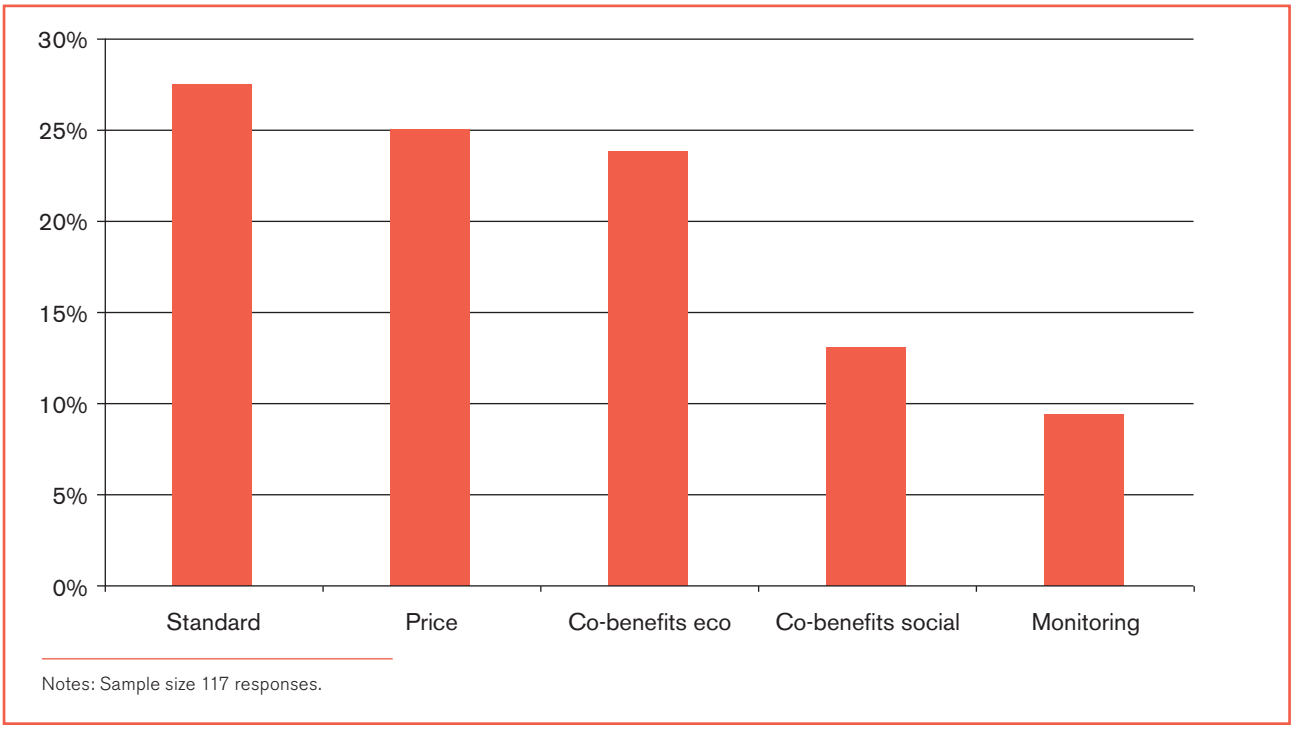
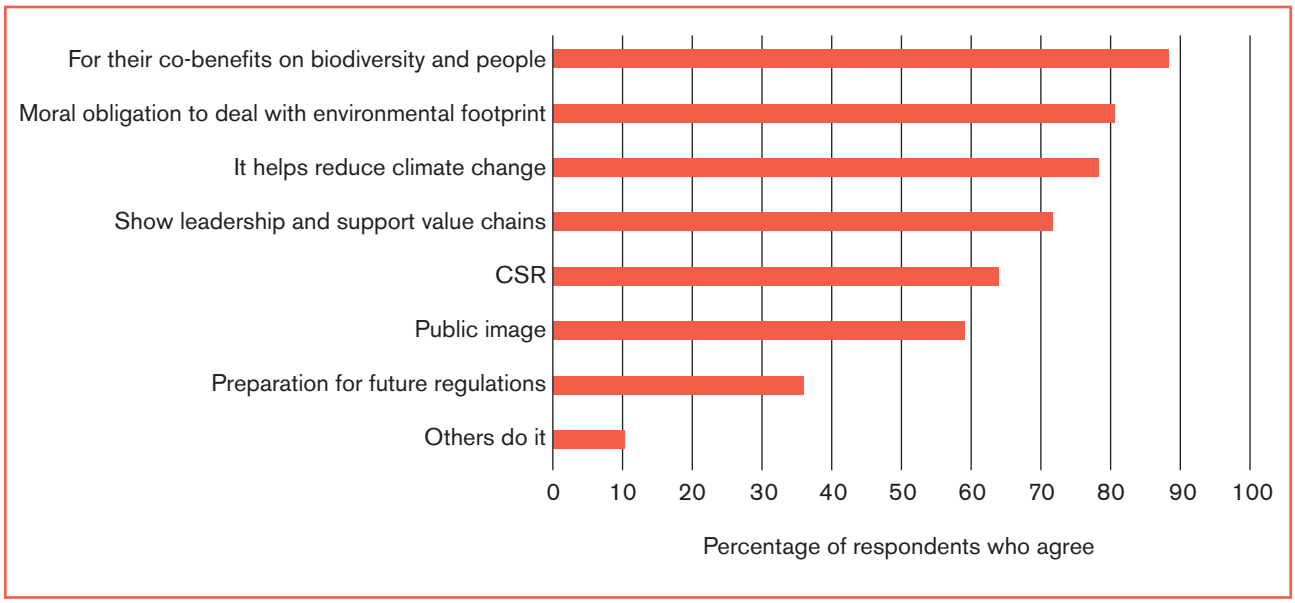


Figure 10. Why do you or your company buy carbon offsets?

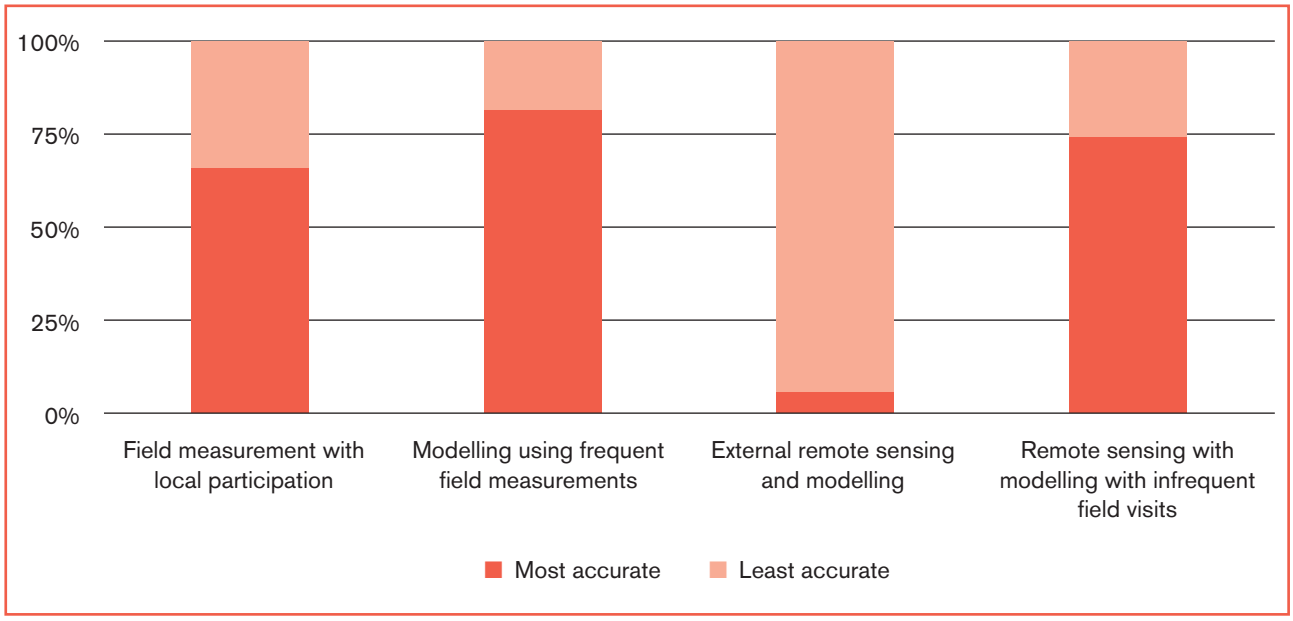


- **In an increasingly competitive market, price can have a large impact on projects** which are competing against each other to drive down the price of carbon offsets. The danger is that the cost of climate change is then transferred to the farmer.
- **37 per cent of buyers buy carbon offsets because of the co-benefits they deliver:** when asked about the types of co-benefit they prefer, impacts on the environment was ranked relatively higher than impacts on local people. The data does not show if this is because buyers are not interested, or because they assume that co-benefits for people are inherent to the type of offsets tested (smallholder and community projects). Buyers also demonstrated a strong belief in the need to reduce the individual's or the company's environmental footprint.

When asked about their opinions regarding monitoring strategies, few respondents were interested in the details of how monitoring takes place (ie using community monitoring or remote sensing systems), provided that the project is certified. When asked about their perceptions of how accurate different monitoring strategies are in estimating carbon offsets, results suggest that buyers consider that field visits – however frequent or infrequent – play a key role in ensuring accuracy of carbon estimates in smallholder and community projects. The survey shows that respondents rated modelling using frequent field measurements as the most accurate tool, very closely followed by remote sensing with modelling and infrequent field visits. Methodologies that fully rely on external remote sensing and modelling only were considered the least accurate (see Figure 11).

The survey results (and several follow-up questions) show that most carbon buyers are not aware of the costs attached to monitoring carbon offsets. Responses suggest that while buyers think that combining remote sensing, modelling and field visits is the most accurate approach, they also think it is probably the most expensive, closely followed by field measurement with local participation. Remote sensing combined with modelling was considered the least expensive tool, suggesting that for carbon buyers the key factor increasing costs of monitoring is field visits. This is an interesting result, not in line with reported costs from community monitoring that highlight their relatively cheap cost in terms of local salaries (see Section 2.3).

Figure 11. Which monitoring strategy do you think is more accurate?



Key messages

Sustainable smallholder agriculture generates benefits for farmers and society, such as food, energy, carbon sequestration, and the protection of water quality and habitats for biodiversity. Experience shows that smallholder projects using payments for ecosystem services (PES) are better placed to succeed if they improve productivity on the farm, and if transaction costs from linking farmers to buyers are manageable (Porras *et al*. 2015b). Clear project design and monitoring are essential to generate legitimacy and credibility for all stakeholders involved. Tools like SHAMBA, value-chain mapping and business models help to map out the dynamics of product flows associated with the ecosystems, key actors and their relations, and from there identify opportunities, gaps and bottlenecks.

4

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4.1 Payments for ecosystem services are incentives

Payments for ecosystem services (PES) are mechanisms that reward landowners for ecosystem services that are used by the society. They provide farmers with an incentive to maintain the natural capital that provides the ecosystem services used by others. Besides compensating farmers, the mechanism also engages those who benefit – known as 'users, or beneficiaries' – from these ecosystem services into sharing the costs of their protection.

4.2 Demand for ecosystem services exists

Demand for carbon offsets from forest protection or renewal and 'climate-smart' agriculture grew 17 per cent in 2013, totalling US$ 192 million from governments and companies. Plan Vivo offsets sold at an average of US$80/t$CO_2$e. Water utilities in Bolivia compensate farmers; governments pay landowners for forest protection in Costa Rica; and UN-led efforts compensate nations that avoid carbon emissions from deforestation.

4.3 Recognising co-benefits

The importance of including and accounting for local co-benefits is bound to increase as projects seek differentiation in markets and as governments and businesses are required to demonstrate greater accountability. Greater effort, however, is needed to convince policymakers and other actors to mainstream the concept and move away from the 'niche'. Specific efforts are needed to:

- Clarify terminology and communicate to targeted materials and discussion platforms
- Build capacity to quantify costs and benefits beyond monetary units, and transfer experience across projects and countries
- Go beyond just demonstrating the existence of co-benefits. More effort is needed to design instruments and institutional arrangements that financially recognise co-benefits, reduce barriers to investment (such as risk) and attract the interest of investors.

4.4 Project developers play a key role

Project developers work to ensure delivery of carbon sequestration to offset buyers and on-farm benefits for the farmers. Spatial scale is important to impact on the provision of ecosystem services and requires aggregation of participants. Project developers provide technical support and reduce transaction costs associated with linking farmers to buyers of ecosystem services. They also play a key role in ensuring revenues return to the farmer – for example, as direct cash payments to farmers or to the communities, or providing technical assistance. Successful developers (eg Ecotrust in Uganda and Taking Root in Nicaragua) operate within existing produce channels and forge alliances with governments and other groups.

4.5 Credibility is essential in ecosystems value chains

Credibility along the chain – a key step to access international streams of revenue – is obtained from understanding product creation and delivery, through clear design and monitoring and evaluation (M&E).

- **Field monitoring visits and analysis are key.** For smallholders, these are the two most important factors in supporting accurate, equitable and legitimate monitoring.
- **Monitoring should only be as complex as is necessary.** It should satisfy the expectations of certification standards and buyers – and no more. New monitoring technologies and complex project design can increase costs without always achieving more accuracy or credibility.
- **Documenting and communicating co-benefits are integral**. They support local benefits and make offsets more attractive to buyers.

Credibility combines accuracy of measurement or models used to make predictions, transparency in processes for collecting and using information, fairness in participation and feedback channels, accessibility of tools in terms of resources and capacities required, and fairness in terms of who bears the burden of cost of risks associated with non-compliance. Revenues from carbon offsets in voluntary markets depend on how much trust buyers place in existing systems, which results in repeated purchases of offsets.

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Smallholder and community carbon projects have shown they can deliver local livelihoods and non-carbon benefits and promote climate resilience. Their emphasis on these co-benefits provides an advantage when it comes to selling in voluntary carbon markets, as they appeal to companies' corporate social responsibility (CSR) agendas. They also provide effective platforms for implementing and accounting for several Sustainable Development Goals – such as food security and ending poverty – along existing value chains for commodities such as timber or coffee. But they are also more expensive to implement, and many operate in remote areas with scattered and small properties, and/or in areas with social conflict. Before deciding whether to enter into these markets, project developers must have a clear, viable business model with realistic targets and benefit-sharing strategies, and a clear communication and marketing plan.

IIED is a policy and action research organisation. We promote sustainable development to improve livelihoods and the environments on which these livelihoods are built. We specialise in linking local priorities to global challenges. IIED is based in London and works in Africa, Asia, Latin America, the Middle East and the Pacific, with some of the world's most vulnerable people. We work with them to strengthen their voice in decision-making arenas that affect them – from village councils to international conventions.

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