Coordinating Finance for Climate-Smart Agriculture

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August 2012

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EXECUTIVE SUMMARY

'Climate-smart agriculture' is a term that has emerged since 2010 to describe agricultural systems designed to simultaneously improve food security and rural livelihoods and support climate change adaptation and mitigation efforts. Meeting the financing requirements for climate-smart agriculture implementation will be a significant challenge. Given overlapping and interrelated investments required to meet the multiple objectives of climate-smart agriculture, the financing systems that support these objectives must be closely linked to maximize the efficiency of climate-smart investments and to manage the fragmentation of sectoral solutions. However, funds for climate adaptation, mitigation, agricultural development, and the closely related goals of food security and sustainable land management generally come from different sources. Without a coordination framework of these funds, there can be a tendency towards inefficiency and insufficient access to financing for climate-smart agriculture.

This paper presents the findings of an inventory the scale and structure of flows of climate and agricultural finance in the developing world, with a particular focus on sub-Saharan Africa - a region of the world for which climate-smart agriculture will be especially critical to overall economic development and social welfare. Analysis of the inventory is used to develop recommendations on how the systems of finance can be better integrated to support climate-smart agriculture.

To identify potential sources of funds for climate-smart agriculture, a template was developed for collecting data on sources of funds for climate-smart agriculture in the developing world, with a focus on sub-Saharan Africa. Funds were split into two broad categories climate and agricultural development, and then further refined into narrower sub-categories. Data was collected through literature searches and expert consultations. Collecting this data was difficult due to challenges, including a lack of clarity on whether funds are grants or loans, double counting, and standardization of terminology (e.g. how is agriculture defined).

The analysis of the data did yield powerful insights about the barriers to streamlined and scaled-up funding for climate-smart agriculture. These include observations that 1) International public funding sources are uncertain; 2) Climate finance is fragmented; 3) Private agriculture investments are the main drivers of land use decisions, although climate finance would be substantial if international funding commitments were honored; and 4) Public funds supporting climate action and those supporting agriculture remain largely separate.

Recommendations to improve coordination of finance in support of climate-smart agriculture include:

1) Donors should meet current commitments and increase support for climate-smart agriculture
2) Use international climate funds to mainstream climate considerations into agricultural investments
3) Develop funding mechanisms and models that support integrated climate-smart agriculture
4) Private investors can take advantage of emerging certifications and standards
5) Coordinate investments across sectors
6) Improve monitoring systems to track the multiple benefits of climate smart agriculture

INTRODUCTION

By 2050, the world will need to feed 9 billion people and raise global agricultural production by 70% (Miller et al. 2010; FAO 2009). Meanwhile, agriculture will face enormous impacts from climate change. Climate change is expected to negatively impact at least 22% of the cultivated area for the world's most important crops by 2050, and as much as 56% of all crops in sub-Saharan Africa (Campbell et al. 2011). In addition to the necessity of building resilience in agriculture, more than 30% of the world's greenhouse gas emissions come from land use - 17% from forest conversion and another 14% from agriculture (soil erosion and cultivation, livestock and manure, and rice cultivation) (Smith et al. 2007). Moreover, land-based carbon sequestration efforts, through photosynthesis and soil carbon sequestration, currently offer a substantial opportunity for large scale removal of Greenhouse Gases (GHG) from the atmosphere. Agricultural soil carbon accounts for 89% of this sequestration potential, representing an estimated potential of between 5.5-6 gigatons of CO2e per year, which roughly equals agriculture's total yearly contribution to global emissions (Smith et al. 2007). Even with herculean mitigation efforts within land use sectors and elsewhere, climate will significantly impact agricultural production and agricultural adaptation efforts will need to scale up significantly.

'Climate-smart agriculture' is a term that emerged in 2010 to describe agricultural systems designed to simultaneously improve food security and rural livelihoods and support climate change adaptation and mitigation efforts (FAO 2010; World Bank 2011a). While newly framed as a concept for the climate change and agricultural development communities, climate-smart agriculture can include many of the field and farm-based sustainable agricultural land management approaches already in the literature and in wide use, such as conservation tillage, agroforestry, residue management, and others (Campbell et al. 2011; Bleker 2011; FAO 2010; World Bank 2011b; Milder, Majanen and Scherr 2011; Pye-Smith 2011). Many others within the scientific community are engaged in the discourse on agricultural practices for climate change mitigation and adaptation, but without using the climate-smart terminology (Easterling 2007; Smith et al. 2007; Delgado et al. 2011; Lal et al. 2011).

One of the key pillars of the climate-smart framework as introduced by the Food and Agriculture Organization of the United Nations (FAO) in 2010 is "adopting an ecosystem approach, working at landscape scale and ensuring intersectoral coordination and cooperation…" Therefore, in addition to appropriate on-farm practices, climate-smart agriculture requires investment across landscapes – climate-smart landscapes – to maintain healthy watersheds and ecosystem services to support adaptation, achieve net mitigation across all land uses, and supply the full range of agricultural products. A climate-smart landscape approach includes a spatial understanding of land uses and their interactions as well as a process for coordinating the institutional diversity of stakeholders (Scherr, Shames and Friedman 2012).

Investing in climate-smart agriculture at a landscape scale will have a large price tag. For example, in order to achieve food security for a growing population, an estimated net US$83 billion a year will be required in developing countries and US$11 billion in sub-Saharan Africa alone (Miller et al. 2010; FAO 2009). In general, the World Bank estimates that mitigation measures in developing countries could cost between US$140 – $175 billion per year for the next twenty years (World

Bank 2010). Sub-Saharan Africa is particularly vulnerable to climate change impacts, with annual costs for climate change adaptation between 2010 and 2050 estimated at US$18 billion, and more needed for low-carbon development (Nakhooda et al. 2011b). FAO estimates that investment needs for sub-Saharan Africa, the Near East, and North Africa for climate adaptation in agriculture will need to be around US$3 billion per year (Branca et al. 2012). Climate mitigation costs in Africa through better land and water management in Africa are estimated between US$2.6 – 5.3 billion per year until 2030, with an additional US$8.1 – $16.2 billion per year to avoid 75% of total deforestation on the continent.

Between 2005 and 2050, US$9.2 trillion will be needed for the maintenance and expansion of the capital stock required across the agricultural supply chain to double production, an average of US$204 billion annually (Schmidhuber, Bruinsma and Boedeker 2009). This total would include investment for machinery, irrigation, land development, processing facilities, energy, livestock, perennial crops, soil and water conservation, and flood control.

Given these financing needs for climate change adaptation, mitigation, and agricultural development, and the importance of working throughout landscapes and across sectors to achieve climate-smart agriculture's inter-related objectives, funds intended for these purposes will need to be used as efficiently and synergistically as possible. And considering overlapping and interrelated investments required to meet the multiple objectives of climate-smart agriculture, the financing systems that support these objectives should also be closely linked to maximize the efficiency of climate-smart investments. However, these streams of funding are currently largely divided by sector. Funds for climate adaptation, mitigation, agricultural development, and the closely related goals of food security and sustainable land management generally come from different sources. The consequence of this separation is a tendency towards inefficiency and insufficient access to financing for climate-smart agriculture.

In this paper we present the findings from an inventory of the scale and structure of flows of climate and agricultural finance in the developing world, with a particular focus on sub-Saharan Africa - the region of the world for which climate-smart agriculture will be especially critical to overall economic development and social welfare (Nelson et al. 2009). Analysis of the inventory is used to develop recommendations on how the systems of finance can be better integrated to support climate-smart agriculture.

RESULTS: POTENTIAL FINANCE SOURCES FOR CLIMATE-SMART, INTEGRATED RURAL DEVELOPMENT

METHODOLOGY

To identify potential sources of funds for climate-smart agriculture, a template was developed for collecting data on sources of funds for climate-smart agriculture in the developing world, with a

focus on sub-Saharan Africa. Funds were split into two broad categories climate and agricultural development. Climate sub-categories were carbon market dependent, purely public sources (for adaptation and mitigation), CSR/corporate standards, and philanthropy. The agricultural development sub-categories were private domestic, private international, public domestic, and public international. The fields in the template that characterize each source were finance source, delivery mechanism, program goals, activities supported, level of available/projected funds, and relevance to sub-Saharan Africa. Data was collected through literature searches and expert consultations. Sources are included with the data in the Annexes, which contain the full templates.

Tracking flows of funding from donors as well as the private sector is complex, and the presentation of the results should be considered within this context. For donor funds, it is often unclear if the funding is conditional (e.g. loans, which must be paid back), or non-conditional, and double counting can also be an issue. Funds that are disbursed from multilateral organizations, such as the African Development Bank or the World Bank, originate from donor governments, and there may be several tiers of disbursement (e.g. from a donor government to a multilateral, or from one multilateral to another one). Sometimes the multilateral or bilateral funder utilizes mechanisms such as loans or credit guarantees, and so the total they provide may not be an accurate reflection of actual money transfers. Although the ultimate source of funding is from these multilateral institutions and donor governments, there is a variety of channels through which funding can move, and ultimately influences the trajectory of the types of activities funded. For the private sector, for which there are often no obligations to report to the public, it was particularly difficult to estimate investment levels and key actors.

Standardization of data was another significant challenge. For example, the scope of agriculture can differ substantially depending on context. In some cases, agriculture can be bundled with forestry and fisheries together as agricultural production. Others report food and agriculture data that includes production along with the rest of the value chain. The types of activities funded, the time period covered, and often countries included vary significantly from funding source to funding source, making it difficult to compare (Lowder and Carisma 2011).

The full datasets in excel format are available separately, including:

Tab 1. Finance sources relevant to African agricultural development (Summary)
Tab 2. Finance sources relevant to African agricultural development (Full)
Tab 3. References for agricultural finance data
Tab 4. Finance sources relevant to African agricultural climate mitigation and adaptation (Summary)
Tab 5. Donor Climate funds (Full)
Tab 6. References for climate finance data

CLIMATE FINANCE

Climate funding channels range from carbon markets supporting mitigation activities to grants, loans, and insurance that fund a variety of projects. Many of the targeted funds and financial instruments have their roots in the United Nations Framework Convention on Climate Change (UNFCCC) process. Outside the UNFCCC are other regulated and voluntary carbon markets.

Both public and private sources of funds are beginning to be directed towards climate-related activities in sub-Saharan Africa; however the distinction between adaptation and mitigation activities is often unclear. So far only US$379 million in climate funds have been disbursed. Furthermore, climate finance is not evenly distributed between mitigation efforts and adaptation needs, with nearly two-thirds of funding for climate initiatives targeted towards mitigation. Committed adaptation finance for sub-Saharan Africa largely originates from the Pilot Program for Climate Resilience (PPCR) and the Least Developed Country Fund (LDCF). US$764 million has been dedicated to mitigation projects in sub-Saharan Africa.

Multilateral funding and donors

There are public and private capital flows to sub-Saharan Africa for climate change mitigation and adaptation activities. Climate finance in the form of Official Development Assistance (ODA), from multilateral and bilateral sources, flows to developing country governments, in the form of budget support and sovereign loans, as well as to both for- and not-for-profit non-governmental organizations as grants, subsidized loans and equity investments in companies. Many donors also support activities through their government banks. For example, the French governments' private sector financing arm, PROPARCO, invested EUR 30 million in CDC Climat, half of which is to be used to invest in emission reduction projects in sub-Saharan Africa (CDC Climat and Proparco 2011).

Total donor pledges coming through the multilateral organizations for climate change mitigation and adaptation activities is between US$31.5 – $33.4 billion from 2001-2011. Also, according to the Copenhagen Accord commitments, US$100 billion per year by 2020 will be mobilized for a balanced allocation between mitigation and adaptation efforts (Persson 2011). However, there seems to be a large disparity between pledges and actual transfers of funds, with some concern that this climate money in some cases does not actually represent new funds (Schalatek, Bird and Brown 2010).

Of these pledges, at least US$2 – $5 billion have been deposited with multilateral institutions for climate change, although the true value is likely greater. Although making estimates specifically for sub-Saharan Africa is quite difficult, we estimate that in the same period, approximately US$676 – $766 million has gone to the region for climate change related activities through multilateral institutions.

The Organisation for Economic Co-operation and Development (OECD) recently started to track donor funding for climate change activities. They estimate that in 2010 OECD Development Assistance Committee (DAC) countries provided about US$22.9 billion on climate change, but this represents a double count of roughly US$718 million (OECD 2011b). According to the OECD, approximately 25% of all ODA is for sub-Saharan Africa. Using this very rough approximation, one would expect donor aid flows to the region for 2010 to be valued at US$5.725 billion (OECD 2011a; Clapp et al. 2012).

Green Climate Fund

One attempt to make climate funds more transparent and easier to access is through the Green Climate Fund (GCF), jointly managed by the UNFCCC and the Global Environment Facility (GEF). In a transitional phase until 2013, the GCF is anticipated to provide recipient countries direct access to climate change finance, through accredited national implementing entities in addition to multilateral agencies (Nakhooda and Schalatek 2012). Pledges for the GCF and the associated 'fast start' financing, have been made for US$30 billion by 2012 and US$100 billion a year by 2020, to be balanced between adaptation and mitigation. The criteria for the allocation of these funds are still unclear, as is the distribution between public and private sources, and the level of funding that will ultimately materialize (Martone and Rubis 2011). From the promised US$30 billion a year of fast-start funds, only 8% has been disbursed, in many cases drawing from development aid funds.

NAMAs

Nationally Appropriate Mitigation Actions (NAMAs) refer to voluntary actions pledged by developing countries to reduce their emissions, and serve as a mechanism to channel finance and technical assistance (Röser and De Vit 2012). These are country-driven, align with national policies, require government backing, and can apply to a national level or regional or municipal scales. Even though most NAMAs identified so far are in the transport and energy sectors, they have the potential to provide flexibility, which may make them more amenable to agriculture than the current carbon markets. In proposed future NAMAs, agriculture is presented in 59% of countries that have prepared NAMAs, and this number increases to 70% for least developed countries (Bockel et al. 2011). While progress was made in Durban on institutionalizing NAMAs (e.g. developing terms of a registry), many details about definitions and implementation processes have yet to be defined, and it is difficult to estimate the size of funding required for NAMAs as most governments have not fully scoped their targets.

Adaptation funds

A variety of mechanisms have been developed for financing climate change adaptation in developing countries. Many of these support the development of National Adaptation Programs of Action (NAPAs) or even require the presence of a NAPA for eligibility. The UNFCCC-linked LDCF and Adaptation Fund have provided the bulk of financial support for the development of NAPAs and implementation of associated adaptation projects, with additional support from the adaptation window of the Special Climate Change Fund (SCCF) (UNFCCC 2007; UNFCCC 2011). The LDCF and SCCF committed over US$350 million from 2002-2010, and a projected US$305 – $408 million will be dispensed (US$126 already approved or disbursed) by the Adaptation Fund from 2010-2012 (Persson 2011). The Adaptation Fund allows National Implementing Entities, such as local NGOs, to directly access the funds as opposed to requiring it to always be channeled through National Governments (Nakhooda et al. 2011a). Of LDCF funding, 39% has targeted food and agriculture (GEF 2012), and almost all of the 18 Adaptation Fund projects involve agriculture and food security in some way (Adaptation Fund 2011). Moreover, over half of the LDCF projects are dedicated to increasing resilience in Africa. Agriculture and food security, with least developed countries in Africa as a focal point, will likely continue to be a primary target of any new funding streams.

Other climate funds

Several multilateral organizations and donor governments also have their own carbon funds. These funds act like purely commercial carbon credit funds, in that they invest to generate credits, primarily to be used for compliance to national commitments. These donor government funds may be managed in their host country, or by a multilateral organization such as the World Bank. For example, the World Bank's Carbon Finance Unit manages national carbon funds for the governments of Italy, the Netherlands, Denmark, and Spain (World Bank 2012). Most of these focus on Clean Development Mechanism (CDM) credits and sectors other than agriculture and forestry.

For example, the Strategic Climate Fund (SCF), implemented by a consortium of multilateral development banks, was set up as a financing instrument to pilot sectoral approaches for low-carbon development with the potential for scaling up. It has three sub funds (Forest Investment Program, Pilot Programme for Climate Resilience (PPCR) and the Scaling up Renewable Energy Program) that can invest in all types of activities and actors mentioned, excluding equity (CIF 2011). Most of these funds are pledged towards a Clean Technology Fund (US$4.1 billion) whose scope is generally outside of the realm of land use.

Many of the submitted projects to PPCR include agricultural and rural resilience components (PPCR Sub-Committee 2011), although only three of the pilots currently underway are in Africa. These are intended to be country-led, build on NAPAs, and to complement any existing adaptation funding in the location. Depending on how agriculture is integrated into projects for Reducing Emissions from Deforestation and Forest Degradation (REDD), PPCR could play a significant role through those projects as well. The place of agriculture in REDD will also remain a significant issue in the administration of other forest related funds such as the Forest Carbon Partnership Facility and the UN-REDD Programme. The GEF is expected to provide about US$1 billion for mitigation projects from 2010 to 2014, and agriculture and sustainable land use is represented in one of the six objectives of the funding strategy (Persson 2011). However, it is not clear how much has been committed to this objective (Climate Funds Update 2010).

The European Commission's Global Climate Change Alliance (GCCA) focuses on least developed countries and African countries impacted by drought, desertification, and flooding (Nakhooda et al. 2011a). US$22 million has been dispersed for implementing adaptation projects in sub-Saharan Africa, the largest recipient being Mozambique (GCCA 2012).

Domestic investment

It is not clear how much funding sub-Saharan African governments are allocating to climate change activities from their national budgets. For example, the East African Community (EAC), a regional organization consisting of the governments of Kenya, Uganda, Tanzania, Rwanda and Burundi has, in its Climate Change Policy (EACCCP), proposed to establish a regional carbon fund (EAC 2011). The EAC is funded by equal contributions from its member states, but also from development partners (including donors and multilateral agencies). It is unclear if the fund's capital will come from the EAC member governments, from donors, or a mix.

Private investment

Private sources of capital can be classified as tied to the regulated carbon markets, specifically the CDM, or to the Voluntary Carbon Markets (VCMs). However, it should be noted that the lines between private and public investment funds can blur within carbon markets because public institutions can be buyers of credits. Private companies may also invest in projects that could be considered 'low carbon' through their Corporate Social Responsibility (CSR) programs or supply chain sustainability efforts. Funding not linked to the CDM or VCMs is very difficult to track. The OECD is trying to develop tracking systems similar to the ones that it uses for major philanthropic organizations operating in the space (e.g. the Rockefeller Foundation); however this initiative is in its infancy.

Regulated carbon markets

Regulated carbon markets require the setting of GHG emission limits, through legislation. The most significant piece of existing legislation is the UNFCCC's Kyoto Protocol. Other governments and regions have also enacted their own legislation to create regulated carbon markets. Although in 2011 the total value of the regulated markets was US$175 billion, this was principally for energy projects (Peters-Stanley and Hamilton 2012). In the past, carbon sequestration in the land sector of developing countries has largely been omitted because of the relative difficulty in meeting CDM standards and the ban by the European Union Emissions Trading Scheme (ETS).

Still, investment flowing into projects through the CDM is the easiest to track, with estimates suggesting that between US$9.45 – $13.5 billion flowed to developing countries as a result of the carbon markets in the period 2008-2012 (Delbosc 2011). However, sub-Saharan Africa has only accounted for about 2.11% of the carbon credits registered. Therefore it can be approximated that flows to the region have been roughly US$200 – $285 million during this period. This may be a slight under-estimation, as many projects do not pass to the Certified Emissions Reduction (CER) registration phase, although they may have received investment. Also, this is just the finance for the credits; additional financing may be attached to the project, such as for other products.

It is difficult to assess the demand for carbon credits from the region past 2013, and thereby to get an estimate of potential funding flows. Fragmentation in the global carbon markets introduces even greater complexity. For example, carbon markets are emerging in Australia, South Korea, and parts of North America, but it is unclear if or when they will accept African credits. The Western Climate Initiative (WCI) will probably only allow credits from North America, and the openness of the South Korean market is unclear. Australia recently announced that it will link its new cap and trade system to the European Union's ETS by 2018, with an interim link allowing for Australian entities to meet their requirements with EU allowances beginning in 2015. However, Australia's cap and trade system is still in its infancy, and the linked arrangement is in part seen as a first step towards connecting existing markets with others in development in the Asia Pacific (European Commission 2012). There are currently no plans to link directly with Africa, but this market has the potential to open indirectly for Australia through the EU. Japan has launched a bilateral offset mechanism (BOM) and is likely to use this instrument post-2013. However, how much funding will be channeled to Africa remains to be seen.

The European Union probably represents the greatest potential source of demand (and therefore funding). Going forward, the EU has laid the groundwork for a new ETS, which will start in 2013. In this next phase, credits from least developed countries (LDC) and those with which the EU has a bilateral deal with gain some access (Kossoy and Guigon 2012). The EU has tended to have strategic alliance with sub-Saharan African countries, and it is possible that some bilateral deals will be signed opening opportunities for them in the EU ETS.

Voluntary carbon markets

The VCMs have mobilized approximately US$433 – $576 million annually. According to the most recent State of the Voluntary Carbon Market report, around 10% of projects were in sub-Saharan Africa (Peters-Stanley and Hamilton 2012). This provides an estimated value of US$43 – $58 million per annum for projects in the region. And even though the number of land-based projects like those in the agriculture, forestry, and other land uses (AFOLU) sector has grown in the past year, over 78% of the validated Verified Carbon Standard (VCS) projects are still energy-based. Less than 4% of VCS projects are land based (31 of 820) (VCS Project Database database). The number of methodologies in agriculture and sustainable land management has grown, with the American Carbon Registry (ACR), Climate Action Reserve (CAR), and VCS exploring such areas as rice cultivation, fertilizer management, and soil carbon sequestration. Pilot projects currently underway by these entities indicate that this may be a growing area for potential investment in climate-smart landscapes.

Certification and standards

Market demand for eco-certified agricultural products is growing rapidly, particularly in Europe and North America, and these markets totaled approximately US$64 billion in 2010 globally (Ecosystem Marketplace unpublished). While some of these include certification criteria that have indirect climate benefits (e.g., improved soil management, incorporation of shade trees in crop fields, protection of riparian vegetation) only a small proportion of these systems are linked explicitly to climate. However, this is beginning to change with the work of the sustainable commodity roundtables and the development of climate certifications such as Rainforest Alliance's climate module.

Philanthropic funding

A growing cohort of private foundations and international NGOs, such as Rockefeller Foundation, CARE, Oxfam, and Conservation International, are joining with national NGOs and farmer organizations to invest in climate-smart agriculture. For example, the Rockefeller Foundation supports climate resilience for smallholder farmers through its Developing Climate Change Resilience initiative. The Howard G. Buffett Foundation supports conservation agriculture projects – with adaptation and mitigation benefits - in Tanzania, Burundi, Sierra Leone and Sudan through a partnership with CARE.

AGRICULTURAL FINANCE

The agriculture sector has similarly complex channels through which financing flows. Foreign investment comes from a multitude of sources. ODA has received much of the past attention for agriculture and rural development funding. But more recently, foreign direct investments (FDI), through infusions of private capital for land acquisition or agricultural production, has increased in scale. Still, domestic investment within African countries, which includes spending by both governments and private enterprises, and smallholders on their own farms comprises the majority of Africa's agricultural investment. We estimate the scale of annual African agricultural investment in the tens of billions of dollars per year.

Foreign investment

Public sector

Globally, FAO has estimated public investment in agriculture and hunger reduction as averaging US$33 billion annually during 1997-2007 (Ghanem 2009). International public investment channels include bilateral assistance from national governments and multilateral agencies, estimated from levels of official development assistance (ODA). This is a major source of funding for agricultural development in Africa. In 2008, the OECD DAC, the international forum of 24 of the largest funders of aid, contributed approximately US$2.8 billion dollars to agricultural production, policy, extension, water management, rural development, forestry, and fishery activities in sub-Saharan Africa (OECD 2011b). Similarly, Brown (2009) found that US$2.6 billion in aid went to those activities in 2007, in addition to another US$2.2 billion in food aid. For the agriculture, forestry, and fisheries sector (only the production element in the value chain) for all of Africa, the OECD reported nearly US$2 billion from DAC member country bilateral aid in 2009 and US$1.5 billion in multilateral contributions in 2010 (calculated from values in OECD 2012).

Overall, ODA to the agricultural sector has fallen since its peak in the 1980s, but recent commitments by the Group of Eight (G8) indicate increased support for food security initiatives, with a focus in Sub-Saharan Africa. In 2009, US$22 billion was pledged for food security and nutrition activities at the L'Aquila G8 Summit. While it is still unclear how much of these funds represent new investments versus repurposing from other aid activities, the commitments do indicate renewed recognition for the importance of agricultural development. At the May 2012 meeting of the G8, the New Alliance for Food Security and Nutrition was announced. It is a commitment by G8 members, African countries, and private sector partners to support agricultural growth. Private companies have already committed US$3 billion dollars, to support the mission of the alliance.

Private philanthropy

Private foundations also play a considerable role in funding agriculture and rural development in sub-Saharan Africa. It is estimated that in 2009 US$52.5 billion in charitable giving from organizations, companies, and academia in the OECD DAC member states to developing countries (Chen and Joshi 2012), with US$30 billion coming from all private philanthropy (not just foundations) (ECOSOC 2012). However, there is no data on philanthropy that is consolidated or disaggregated by sector available, so it is unclear what percent of this value goes towards agriculture and how much goes to Africa. Even so, it is apparent that private foundations are very active in agricultural development, particularly in Africa, such as the Bill and Melinda Gates Foundation (over US$1.8

billion committed since 2005), and Rockefeller Foundation.

Foreign direct investment

FDI in African agricultural land has risen significantly in recent years. Investors are a heterogeneous group including private agribusiness and sovereign wealth funds, among others. Estimates for this investment vary significantly depending on the accounting methodology. Lowder and Carisma (2011) estimated FDI in sub-Saharan Africa for food and tobacco, which includes activities along the value chain such as processing and marketing in addition to farm production, at US$900 million in 2009. The UN Conference on Trade and Development (UNCTAD) World Investment Report maintains that FDI in primary agricultural production activities is considerably lower than this, at only US$38 million for sub-Saharan African in 2007.

Foreign land acquisitions, a subset of FDI, have risen dramatically since the food price spikes in 2007 and 2008 (Anseeuw et al. 2012). Approximately 83.2 million hectares of land in developing countries, 56.2 million of which is in Africa, have been documented as part of these agricultural land deals. Investors consist of private (the majority) or state-owned companies, investment funds, and public-private partnerships based outside of Africa in countries that are net importers of food (IIED 2012). Moreover, while media attention has centered on those foreign deals, many land deals are also transacted by foreign entities through local incorporated subsidiaries, by national investors, or between African countries (Cotula 2012). While calculating a value for the expenditure in these land deals is highly uncertain and varies considerably, the scale of acquisitions indicates that this sum is likely in the hundreds of millions per year. For example, UK-based Emergent Asset Management is planning to raise US$450 – $750 million to invest in sub-Saharan African farmland (Mhlanga 2010). However, so far not all of these land transactions have led to agricultural activities on the ground. Some investments in land have been made on the assumption that land values will increase, without any changes in land management taking place.

Multi-national corporations also play a significant role in the agricultural investments in Africa. For example, Coca Cola has a presence in almost all sub-Saharan African countries. These companies also have considerable resources available to invest in food production and the agricultural value chain as a whole. The world's nine largest transnational corporations in the food and beverage sector control about US$20 billion in assets each (UNCTAD 2009). And even though much smaller in scale, global agriculture-based corporations, such as the Malaysian oil palm plantation operator Sime Darby, manage an average of US$1 billion in assets apiece.

Domestic investment

Most financing for agriculture in developing countries is from domestic sources, either through national government budgets or private sources (Havemann 2011). These investments come in a variety of forms – informal or personal family loans and formal trade credit, commercial lending, or contract farming. About 70% of current investment for the Comprehensive Africa Agriculture Development Programme (CAADP) is private, mainly domestic (Branca et al. 2012). The majority of resource investment in African agriculture originates from farmers themselves, and there has not been much in the way of attracting private commercial capital (Odhiambo 2007).

Private sector

While domestic private sector agribusiness investment has traditionally been low in Africa, it has recently been rising (Mhlanga 2010). Small and medium scale enterprises are Africa's primary investors. Investments are largely for inputs such as seeds and fertilizer, but not necessarily for the complementary investments in natural resources management. Because the operations are often more informal and difficult to track, calculating an exact value for private domestic investment in African agriculture presents a particular challenge. Mhlanga (2010) approximates this value as US$2.1 billion based on domestic commercial bank lending to the agricultural sector in eleven sub-Saharan African countries (Botswana, Gambia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Nigeria, Sierra Leone, Uganda, Tanzania).

However, access to credit for African agriculture is a substantial barrier to investment (Kloeppinger-Todd and Sharma 2010; Doran, McFadyan and Vogel 2009; Mhlanga 2010). Agriculture receives less than 10% of domestic lending. Foreign-owned enterprises comprise 65% of agribusiness on the continent, and another 28% are joint domestic-foreign ventures (Mhlanga 2010). CAADP, AGRA, and new national policies are attempting to augment the African-based private sector and spur investment. An estimated annual US$17 billion is needed to adequately implement the CAADP program (Odhiambo 2007).

Public sector

A range of estimates have been made for public domestic spending on agriculture. Lowder and Carisma (2011) calculated national spending for agriculture along the entire value chain (excluding auxiliary development-related activities) for low and mid-income countries to be around US$160 billion annually between 2005 and 2007. Sub-Saharan Africa represented slightly less than US$10 billion per year of that value, which was measured in terms of purchasing power parity. Another study that only looked at sub-Saharan Africa approximated public spending for the agriculture, forestry, and fisheries sector (activities related to production and not processing or marketing) to be just under US$10 billion for 2005 (Fan, Omilola and Lamberty 2009). Moreover, portions of national budgets in sub-Saharan Africa can come from donor countries, and therefore could potentially overlap with finance classified as bilateral or multilateral funding.

In 2003, 38 African states signed onto the Maputo Declaration, by which pledging to devote 10% of national budgets to agriculture by 2008. Nine countries have so far met this goal, with another four spending 5-6% of national budget on agriculture (Odhiambo 2007).

BARRIERS TO COORDINATED FINANCING FOR CLIMATE-SMART AGRICULTURE

The analysis of climate and agricultural development funds did yield powerful insights about the barriers to streamline and scale-up funding for climate-smart agriculture, although estimating the total scale with a high level of precision proved to be quite challenging. Insights from the data

include: 1) International public funding sources are uncertain; 2) Climate finance is fragmented; and 3) Private agriculture investments are the main drivers of land use decisions, although climate finance would be substantial if international funding commitments were honored; and 4) Public funds supporting climate action and those supporting agriculture remain largely separate.

INTERNATIONAL PUBLIC FUNDING SOURCES ARE UNCERTAIN

One of the reasons it is difficult to clearly track levels of climate change and agricultural development by international donors is that there are often substantial differences between funds they commit and those that they disperse. While fast-start climate financing is supposed to stand at US$10 billion per year from 2010 to 2012 and then US$100 billion per year by 2030, actual distributions are a much smaller. This pattern is mirrored in agricultural development funding, as well. Promises of US$22 billion for agricultural investment were made at L'Aquila for the period of 2009-2012, but the most recent G8 accountability report shows that only 58% of commitments have been disbursed to date (G8 2012). An important consequence of these missed funding targets is that countries are not able to implement long-term programs to build the institutional capacity required across sectors to support large-scale transitions to climate-smart agriculture.

There is also an important element of uncertainty with respect to the future structures of climate finance. In Durban at the 17th UNFCCC Conference of the Parties (COP), an agreement was reached on the makeup of the GCF board, and nearly nine months later the newly-elected board has met for the first time. The host country of the GCF Secretariat still has yet to be decided. Most importantly, it is still unclear what the actual volume of the fund will be and where new and additional funding will be sourced from, particularly in the long term. Regarding carbon markets, the post-2012 period is highly uncertain in general, and particularly for land-use carbon projects. NAMAs show promise, but have not yet been fully defined or funded. Voluntary carbon markets have been supportive of developing country land use mitigation projects, including in Africa, but they are quite small compared to other carbon markets.

CLIMATE FINANCE IS FRAGMENTED

Climate finance streams for adaptation and mitigation have been treated separately within the UNFCCC negotiations, and consequently, it has been difficult to blend these funds strategically into unified initiatives that can be implemented throughout on agricultural landscape (Beddington et al. 2012). While this arrangement may be appropriate for many sectors, it can create confusion and inefficiency for agriculture because the interventions that produce mitigation benefits are often identical to the ones that will be necessary for adaptation.

Without greenhouse gas regulation in more countries, private sector investment in mitigation will be relatively low. Voluntary markets, while important for innovation, have not demonstrated an ability to attract investment at the scale of regulated markets. And even if regulated markets are operational, for them to facilitate the flow of funds to agriculture, they will have to include land use carbon, which the world's largest regulated exchange, the EU ETS, currently does not. Even though the majority of climate finance globally is currently directed towards mitigation activities, most of the funds going to agriculture in Africa are for adaptation, primarily from international public and philanthropic sources.

PRIVATE AGRICULTURE INVESTMENTS ARE THE MAIN DRIVER OF LAND USE DECISIONS; ALTHOUGH CLIMATE FINANCE WOULD BE SUBSTANTIAL IF INTERNATIONAL PUBLIC FUNDING COMMITMENTS WERE HONORED

Private agriculture investment throughout the world is on the rise. This is particularly true in Africa with the recent rise in FDI and land acquisitions, where there are billions of dollars per year flowing towards agricultural production and management in Africa. If the full agricultural value chain is included, investment could approach a hundred billion dollars, or more per year.

Current sources of climate funds are very small by comparison, and they are potentially undermined by other flows of financial incentives within the landscape that currently encourage high-GHG emitting activities and undermine adaptive capacity and resilience (Ayensu et al. 2010). Given this reality, they will need to be used strategically to influence agricultural investment. Climate funds directed towards African agriculture at present, optimistically, total in the hundreds of millions per year. Climate funds have the potential to grow and become more significant if the GCF is fully funded in the future - US$100 billion per year globally - and agriculture begins to play a more significant role in carbon markets and NAMAs. However, the extent to which this happens will largely be a question of policy decisions made over the next few years.

PUBLIC FUNDS SUPPORTING CLIMATE ACTION AND THOSE SUPPORTING AGRICULTURE REMAIN LARGELY SEPARATE

In addition to growing private sector investment in agriculture, public sector funds are growing as well, particularly in Africa where institutions and investment plans are developing quickly. These public investments can support the public goods provided by agriculture, which include not only increases in production, but other potential benefits including poverty reduction, the provision of environmental services, and even climate change adaptation and mitigation. With this broad view of the role of agriculture, the line between public investment in agriculture, climate, and sustainable land management would begin to blur.

While this does not yet appear to be happening on a large scale, there are some donors that are beginning to work across these sectoral boundaries. For example, the Great Green Wall Initiative funded partly by the GEF aims to expand sustainable land and water management in the Sahel and West Africa in order to address the impacts of severe land degradation and drought on both rural livelihoods and the environment. The Initiative supports communities in adapting production systems to climate change. At the farm level, agroforestry and other climate-smart practices are being applied. Planned as a mosaic of land uses, the Initiative will contribute to landscape restoration, climate change mitigation, biodiversity conservation, and managing international waters. The GEF

funds specific focal areas of the Initiative and funding is also provided by the LDCF and SCCF (IBRD 2011).

RECOMMENDATIONS TO IMPROVE COORDINATION OF FINANCE IN SUPPORT OF CLIMATE-SMART AGRICULTURE

If we are to effectively manage the complex set of challenges facing agriculture, funding for climate-smart agriculture will just be funding for agriculture or integrated agricultural landscapes, and there will be enough of it to fill the enormous need. While there is a considerable gap between that world and today's reality, there are concrete actions that can be taken now to substantially narrow it. This section describes some the most important steps.

1) DONORS SHOULD MEET CURRENT COMMITMENTS AND INCREASE SUPPORT FOR CLIMATE-SMART AGRICULTURE

There is a substantial gap between the promised funding for agricultural development and climate change from donors and the amount that has materialized. The consequence of missing these targets is not only that critical initiatives are underfunded, but that policy-makers are not able to effectively plan for the long-term investment programs that will be required to build the institutional capacity across sectors necessary to support large-scale transitions to climate-smart agriculture. The first step towards meeting climate-smart agriculture funding needs will be fulfilling these commitments. However, these funds would not be sufficient to meet estimated needs and additional political will be required among donors to scale-up support in the future.

2) USE INTERNATIONAL CLIMATE FUNDS TO MAINSTREAM CLIMATE PRIORITIES INTO AGRICULTURAL INVESTMENTS

The modest scale of climate finance directed towards land-based activities relative to the rising investment in the agriculture sector - as well as the rising needs for climate adaptation and mitigation within agriculture - implies that climate funds will be most effectively used if they strategically leverage agricultural investment in support of climate-smart agriculture. The parallel development of climate finance opportunities along with increased agricultural development also provides a valuable, but likely small, window of time to develop models for how climate funds can best leverage agricultural investment to support climate-smart agriculture. Ideally, climate funds would be targeted towards areas that would help to mainstream climate concerns into agricultural institutions so that in the future all agriculture is climate-smart. Therefore, these funds could be used towards supporting the integration of climate concerns into usual agricultural sector investments such as policy formation and planning, research and development of new crop varieties and animal breeds, extension, marketing support, and the creation and maintenance of infrastructure. In addition, a climate-smart agriculture investment agenda could include new types of investment in the agriculture sector such as integrated landscape planning exercises, cross-sectoral policy integration and the development of standards and certification systems around

climate criteria.

3) DEVELOP FUNDING MECHANISMS AND MODELS THAT SUPPORT INTEGRATED CLIMATE-SMART AGRICULTURE

If climate concerns are fully mainstreamed in the agricultural sector there will be no climate-smart agriculture specific funding. However, in the meantime models need to be developed to facilitate this mainstreaming process. One option would be to integrate some of the public sources of climate finance (for mitigation and adaptation) with those supporting agricultural development or food security into a single funding window that could flexibly support multi-objective climate-smart agriculture initiatives. At the international level, perhaps an element of the Green Climate Fund could develop to manage such a mechanism, blending adaptation and mitigation funds and attracting other public finance from international funding agencies previously targeted towards agricultural development. The same principle could apply to philanthropic funds, and national investment structures.

These kinds of fully integrated mechanisms would require significant institutional changes, and it is unclear if they will emerge in the immediate future. In the meantime, investment program designers are developing models that work within current institutional environments to stitch together climate-smart agricultural projects drawing from diverse sources of funds. These initiatives are not necessarily branded as climate-smart agriculture, and they have varying entry points and framings including adaptation, mitigation, agricultural development, food security and sustainable land management. Adaptation funds are a natural entry point for climate-smart agricultural projects in Africa. As NAMAs are further defined, they could provide opportunities to support climate-smart agriculture.

4) PRIVATE INVESTORS CAN TAKE ADVANTAGE OF EMERGING CERTIFICATIONS AND STANDARDS

Private sector agriculture investors, and agribusiness generally, will need to consider the ways in which they can manage risk by climate-proofing investments, while also working to reduce emissions. Individual investors and companies will not be able to do this on their own in cases where there multiple stakeholders active within a landscape. In addition to building partnerships with public sector agencies, opportunities are growing for the private sector to take advantage of partnerships and incentives to support their own sustainable and climate-smart investments. Certification systems such as Rainforest Alliance – which certifies based on a wide range of environmental and social criteria - are gaining popularity throughout a range of commodities as are pre-competitive commodity roundtables (e.g. palm oil, cocoa) that often create industry-wide standards. For land purchases, in particular, it will be useful to consider FAO's newly adopted Voluntary Guidelines on Responsible Governance of Tenure of Land, Fisheries and Forests (FAO 2012). Partnerships with local actors will be particularly important if they would like to participate in landscape planning processes.

5) COORDINATE INVESTMENTS ACROSS SECTORS

To effectively support climate-smart agricultural initiatives, national government actors will need

the flexibility to plan and work across sectors. Cross-sectoral linkages are new to many countries, particularly for those connecting agriculture and climate, but some are beginning to respond to the need. For example, Kenya has developed a model in which a national Climate Change Secretariat based at the Ministry of Environment and Mineral Resources, coordinates Climate Change Units which have been established within the relevant government ministries, including the Ministry of Agriculture (MoA). The mandate of MoA's Climate Change Unit is to ensure the mainstreaming of climate change into all of the Ministry's projects and programs. Along with investments linking the agriculture and climate sectors, funds targeted for other natural resource including water, forestry and biodiversity conservation can also be incorporated into climate-smart agriculture planning. This type of broader natural resource investment integration was not examined explicitly in this study, and could be useful area for future work.

6) IMPROVE MONITORING SYSTEMS TO TRACK THE MULTIPLE BENEFITS OF CLIMATE-SMART AGRICULTURE

A critical need for the developers and advocates of streamlined climate-smart agriculture financing is improved systems for monitoring and communicating the multiple benefits that these initiatives produce including adaptation and mitigation along with yield improvements, food security, biodiversity conservation and other ecosystems services. A fuller accounting of

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LIST OF ACRONYMS

ACR	American Carbon Registry
AFOLU	Agriculture, Forestry and Other Land Use
AGRA	Alliance for a Green Revolution in Africa
BOM	Bilateral Offset Mechanism
CAADP	Comprehensive Africa Agriculture Development Programme
CAR	Climate Action Reserve
CDM	Clean Development Mechanism
CIF	Climate Investment Funds
COP	Conference of the Parties
CSR	Corporate Social Responsibility
DAC	Development Assistance Committee
EAC	East African Community
EACCP	East African Community Climate Change Policy
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
FIP	Forest Investment Program
GCCA	Global Climate Change Alliance
GCF	Green Climate Fund
GEF	Global Environment Facillity
G8	Group of Eight
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
MoA	Ministry of Agriculture
NAMA	Nationally Appropriate Mitigation Actions
NAPA	National Adaptation Programs of Action

ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PPCR	Pilot Program on Climate Resilience
REDD	Reducing Emissions from Deforestation and Forest Degradation
SCCF	Special Climate Change Fund
SCF	Strategic Climate Fund
UNCTAD	United Nations Conference on Trade and Development
UNFCCC	United Nations Framework Convention on Climate Change
VCM	Voluntary Carbon Market
VCS	Verified Carbon Standard
WCI	Western Climate Initiative