Agriculture, forestry and other land use mitigation project database

Second assessment of the current status of land-based sectors in the carbon markets

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Agriculture, forestry and other land use mitigation project database

Second assessment of the current status of land-based sectors in the carbon markets

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Mitigation of Climate Change in Agriculture (MICCA) Project

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO)

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Contents

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Abbreviations

AFOLU	Agriculture, Forestry and Other Land Use
AFOLU MP	Agriculture, Forestry and Other Land Use Mitigation Project
A/R	Afforestation/Reforestation
CAR	Climate Action Reserve
CCBA	Climate, Community and Biodiversity Alliance
CCX	Chicago Climate eXchange
CDM	Clean Development Mechanism
CH_4	Methane
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
EU ETS	European Union Emissions Trading System
FAO	Food and Agriculture Organization of the United Nations
GHG	Greenhouse Gas
Gt	Gigatonnes
IPCC	Intergovernmental Panel on Climate Change
kt	kilotonne
NAMA	Nationally Appropriate Mitigation Action
MICCA	Mitigation of Climate Change in Agriculture
MRV	Measurement, Reporting and Verification
N_2O	Nitrous oxide
NGO	Non-governmental organization
REDD	Reducing of Emissions from Deforestation and Degradation
SALM	Sustainable Agriculture Land Management
SBSTA	Subsidiary Body for Scientific and Technological Advice
TIST	International Small Group and Tree Planting Program
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard

Executive Summary

This paper presents the second analysis of the Agriculture, Forestry and Other Land Use Mitigation Project (AFOLU MP) database[1]. The original analysis published in November 2010 in the second volume of the MICCA Series contained information on 497 AFOLU mitigation projects gathered from 11 different registries, both crediting scheme registries and third party databases. This follow-up study includes 78 new projects from 12 different registries. As with the first publication, this paper summarizes the insights that have been gained from the analysis of the updated database. It specifically comments on the emerging gaps in the climate change agenda as regards AFOLU projects in developing countries.

The updated AFOLU MP database confirms trends already identified in the previous paper, but it also notes certain changes. The regulatory markets continue to dominate carbon markets. Voluntary carbon projects make only a small contribution to the total. Clean Development Mechanism (CDM) projects still constitute the highest number of AFOLU projects, the majority of which are manure treatment projects and, to a lesser extent, afforestation/reforestation projects. The highest number of terrestrial carbon projects are still listed under the Chicago Climate Exchange (CCX) scheme, which is no longer active. The next most active schemes for terrestrial carbon projects are the Climate, Community and Biodiversity Alliance (CCBA) and Climate Action Reserve (CAR). The regional distribution of AFOLU projects remains similar, with the order from high to low being Latin America, North America, Africa, Asia and the Pacific and Europe and Central Asia. In Latin America and Africa, it was mainly forestry projects that have increased since the last analysis. In Asia and the Pacific, by contrast, there has been an equal increase in manure and non-manure projects. In North America, more manure projects were added. Overall, the number of AFOLU projects is on the rise again, although not as rapidly as in the years previous to 2010. Africa has experienced increasing growth in absolute numbers of AFOLU projects and hosts a few large forestry carbon projects – a positive development in comparison to the last paper. In terms of emission reductions, forestry projects, and specifically Reducing Emissions from Deforestation and Forest Degradation (REDD) projects, bring about the highest average annual and total annual emission reductions. The CCBA in particular, with several big REDD projects in Asia, accounts for a very high total of annual emissions reductions.

Many issues for smallholder terrestrial carbon projects still remain to be solved. The initial experiences highlight the fact that good institutional linkages between project developers and farmers are a success factor for projects that adopt a climate-smart agriculture approach – an approach that stresses the importance of increasing productivity for farmers; building local and national capacity on measurement, reporting and verification (MRV) and carbon project development; and partnering with investors. Agriculture soil carbon projects remain marginal. Yet, the further development of soil carbon methodologies for the voluntary market, new tools and methods for greenhouse gas (GHG) quantification at whole-farm and landscape level, and capacity building at the national level on methods and tools, will support the development of more agricultural soil carbon projects. In addition, specific work on agriculture also needs to be further promoted and supported in international climate change negotiations. At the national level, low emission strategies for the agriculture sector need to be developed. To support terrestrial carbon projects, an integrated landscape approach should be considered in policy making.

[1] Available at www.fao.org/climatechange/micca/en

1. Introduction

Summary of previous conclusions

Emissions from the AFOLU sector account for approximately 30 percent of the total anthropogenic GHG emissions (IPCC, 2007). Agriculture is responsible for about 60 percent of nitrous oxide (N_2O) emissions and 50 percent of methane (CH_4) emissions. Carbon dioxide (CO_2) emissions are mainly caused by deforestation and land use change (IPCC, 2007). At the same time, agriculture and forestry offer huge, if yet largely unrealised, mitigation potential. Agriculture could mitigate between 5.5–6 gigatonnes (Gt) of CO_2 equivalent per year, while forestry could mitigate 5.4 Gt of CO_2 equivalent per year (IPCC, 2007). So far, these sectors have only had limited involvement in most regulatory carbon markets. The CDM of the Kyoto Protocol recognizes only afforestation and reforestation as mitigating land use activities, but overlooks the carbon sequestration potential from sustainable agricultural land management activities, agroforestry systems and avoided deforestation through REDD. Under the Kyoto Protocol Joint Implementation Mechanism, projects involving reforestation activities, forest management, revegetation, cropland management and grazing land management can be implemented in developed (or Annex I) countries. The European Union Emissions Trading System (EU ETS) excludes any type of land use carbon. In the United States, only the CCX allowed for agricultural carbon projects. Given that successful AFOLU mitigation schemes also provide environmental and developmental benefits, it is worthwhile to explore the current limitations for their development.

Since its establishment in 2010, the Mitigation of Climate Change in Agriculture (MICCA) Programme at the Food and Agriculture Organization (FAO) of the United Nations has been supporting efforts to expand climate-smart agricultural practices in developing countries. Towards this end, in 2010, MICCA initiated the AFOLU MP database to provide a much-needed worldwide overview of already existing AFOLU mitigation efforts. An increasing number of new certification standards and methodologies have been created that have allowed for the development and registration of land-based carbon projects. This development is reflected in the database, which portrays the combined portfolios of all major crediting schemes' AFOLU projects, as well as the AFOLU mitigation projects undertaken outside of formalized schemes (see Annex I for the comprehensive list of its data sources).

In November 2010, MICCA published a thorough overview and analysis of the database (MICCA Series 2). As well as 'setting the scene' for MICCA's own pilot projects, the database made it possible to identify knowledge gaps regarding mitigation activities in the AFOLU sector. Between September 2011 and January 2012, MICCA revisited the original data sources and updated the database. The conclusions of the first report reflected the situation in 2010. Since then, the policy environment has changed substantially in terms of carbon markets and this paper draws further lessons and implications from the updated database.

MICCA's original analysis of the AFOLU MP database in 2010 concluded that, while AFOLU activities have established themselves on the carbon market, careful development of existing mechanisms is needed if these activities are to be sustained and expanded. Already in 2010, the MICCA paper called for a post-Kyoto agreement to address the AFOLU sectors in a way that fostered increased participation from developing countries from all regions. This recommendation was prompted by the

regional imbalances highlighted in the database. Latin America and Asia had been able to capitalize on the opportunities presented by market-based financing schemes, while AFOLU projects in Africa and Central Asia had not been able to participate fully in carbon trading. However, the notable amount of carbon projects in Africa that were developed outside of certification schemes indicated the great potential for AFOLU mitigation efforts that could be realized, if suitable financing mechanisms were in place.

MICCA's 2010 analysis also showed that, after an initial peak in 2006, especially in CDM projects, there was a marked decline in new project development. This reflected the general uncertainty about the future of the compliance market, with the Kyoto Protocol set to expire in 2012. This cautious approach is also evident in the updated database. In 2010 and 2011 combined, there were only 37 new CDM projects, whereas in 2006 alone there were 94. Future analyses of the database will indicate whether the agreement, reached at the 17th Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) in 2011, to institute a second commitment period under the Kyoto Protocol in 2013 has encouraged further CDM project development.

While discussions to include REDD and REDD+ projects in a post-Kyoto agreement are underway now, the 2010 analysis suggests that agricultural mitigation and soil carbon sequestration activities should not remain consigned to voluntary schemes. Without the certainty that binding compliance credits offer, as well as the investment security connected to large and liquid markets, it is not possible to capitalize on market incentives. Gaining this security is essential for overcoming AFOLU mitigation's heavy reliance on development aid and ensuring the sector flourishes and becomes self-sufficient. Moreover, the great mitigation potentials the AFOLU sectors in developing countries should not be wasted.

Scope of this paper

Bearing in mind the observations made in MICCA's 2010 publication, this follow-up study sets out to analyze developments and trends in 2011. It provides a brief review of the developments in the regulatory and voluntary carbon markets, as well as changes in the crediting schemes. After an explanation of the methodology for compiling and analysing the AFOLU mitigation project database, the report outlines the regional differences in carbon projects, project types and schemes. Furthermore, the reports also analyses how the different schemes' have changed over time in terms of project types and regional distribution. It concludes with a discussion of the gaps and issues that need to be addressed for smallholder projects and carbon markets, as well as for agriculture and soil carbon trading.

2. State of the Art of Carbon Markets

The latest trends show that carbon markets continue to expand but at a slower pace than in previous years. Total global markets have grown in value by 11 percent, from US$ 159 210 million in 2010 to US$ 176 027 million in 2011. Volume has increased from 8 835 to 10 189 tonnes of CO_2 equivalent per year. These markets are strongly dominated by compliance markets, both in volume (10 094 tonnes of CO_2 equivalent, 2011) and value (US$ 175 451 million, 2011). EU ETS has the biggest share (84 percent of value) of the compliance markets, followed by primary (purchased from original party that makes the reduction) and secondary (resold from a marketplace) CDM (15 percent) (Peters-Stanley and Hamilton, 2012). On the voluntary markets, credits can be either traded on private exchanges or on the 'Over The Counter' market, where buyers and sellers engage directly through a broker or a crediting institution. The CCX was a market-led, voluntary cap-and-trade system in the United States that was active between 2004 and 2010. The programme ceased trading carbon credits at the end of 2010, when members' commitments expired. In 2011, the value of voluntary transactions increased by 33 percent to US$ 576 million, as the average offset price increased slightly from US$ 6 per tonne in 2010 to US$ 6.2 per tonne in 2011. This is the second highest overall market value in the voluntary carbon market (the highest being US$ 776 million in 2008). Volumes decreased to 95 million tonnes of CO_2 equivalent – a 28 percent decrease in transaction volumes. However, if one excludes a single low-priced, high-volume outlier from the 2010 market, it represents a 28 percent increase over 2010 levels (Peters-Stanley and Hamilton, 2012).

In 2010, terrestrial carbon projects supplied 45 percent of transacted credits in the voluntary market, with REDD credits constituting the largest share of the market (29 percent). Afforestation/ Reforestation (A/R) projects constituted 6 percent. Other project types were 'improved forest management', 'agricultural soil' and 'forestry'. In 2011, the picture on the voluntary markets looked quite different, as wind projects claimed the highest share of the market at 30 percent, followed by A/R Projects with 10 percent. Terrestrial carbon projects supplied 23 percent of the market share in total, with 38 percent less volume than in 2010. The popularity of A/R projects in 2011 led to an increase in projects entering the market. A/R projects face the difficulty of the lag that exists between the time the trees are planted and the time they can store carbon and generate credits. Thus, many of these A/R projects had been already several years in the making by the time they could be registered. REDD project numbers decreased, as unsolved political and technical challenges made them less popular in 2011.

In the compliance carbon market, terrestrial carbon credits can be generated only under the CDM. The share is very small still. A/R projects constitute only 0.8 percent of all projects (67 in total) (UNEP Risoe, 2012). The BioCarbon Fund in its "Experience Report – Insights from Afforestation and Reforestation Clean Development Projects" (2011) acknowledged that the A/R sector remains underdeveloped. This is because the demand for forest carbon credits is quite limited and the GHG accounting rules are not well understood by the majority of project developers, even if the CDM Executive Board has improved and simplified the A/R CDM rules. The BioCarbon Fund calls for a further simplification of the rules and procedures to become more pragmatic and adjusted to project realities. Additionally, capacity building for local staff and project developers for the design of forest carbon projects needs to be offered. Some of the main challenges summarized from the BioCarbon Fund report are:

- Project design is time-intensive and costly.
- Delay in validations is due to limited capacity to follow the application procedures and rules, as well as the GHG accounting.
- Host countries face the complexity of proving additionality of projects.
- Many designated operational authorities are still improving their knowledge with respect to project application procedures.
- There are delays at the stages of registration and issuance, and due to the non-permanence approach (which seeks to insure against the risk of sequestration being reversed if forests are cut down or destroyed by natural disasters, see section 5).
- Demand for forest credits is reduced due to lack of fungibility between temporary credits and credits from other sectors.
- Land eligibility and project boundary rules in developing countries are difficult to respect due to usually high numbers of project participants.
- Disproportionally large investment barriers are very common in developing countries and transaction costs are high.

The BioCarbon Fund recommends institutionalizing agreements that define land use, carbon ownership rights and benefit sharing, thereby effectively improving local livelihoods. To facilitate the scaling up of A/R projects, four critical factors should be respected: regulatory improvements; access to finance; strengthened capacity; and increased demand for A/R credits (BioCarbon Fund, 2011).

Since the publication of 2010 AFOLU MP report, changes have also taken place in terms of the crediting schemes analyzed. In 2011, the Voluntary Carbon Standard scheme changed its name from Verified Carbon Standard (VCS). The AFOLU MP database now also includes projects from the American Carbon Registry (ACR), which uses the American Carbon Registry Standard as well as the Forest Carbon Project Standard and works with several methodologies for forest and REDD projects, as well as methane and energy project types. As already mentioned, the CCX has stopped trading altogether.

3. Methodology

To ensure a full understanding of the AFOLU MP database and the findings of this paper, this section details the central assumptions and methodological choices made while collecting and interpreting the data. Unless otherwise specified, all data cited in this report is taken from the AFOLU MP database.

Scope

The AFOLU MP database aims to establish an overview of current mitigation activities in the AFOLU sectors, especially in developing countries. The projects it lists are therefore all directly related to land use and livestock-keeping. They include carbon sequestration in agriculture and forestry, as well as livestock manure treatment. Processing activities such as slaughtering, milling or sawmilling are not included, nor are projects involving agricultural residues, such as rice husk or bagasse.[2]

These boundaries for the AFOLU MP database were set to concentrate its focus on primary agricultural activities (i.e. crop and livestock production) alongside agroforestry and forest management (i.e. the planting of new and maintenance of existing forests, which includes avoided deforestation). As specified by the Intergovernmental Panel on Climate Change (IPCC) in its 4th Assessment Report (2007), the technical potential for mitigation options in agriculture are 5 500-6 000 tonnes of CO_2 equivalent per year. Soil carbon sequestration accounts for 89 percent of this potential; reduction of methane emissions about 9 percent; and reductions of soil N_2O emissions about 2 percent (IPCC, 2007). MICCA's ongoing analysis of this dynamic database is intended to provide an indication of the extent to which this potential is being realized. This report looks into what is happening globally in terms of AFOLU mitigation projects and visualizes the data for ongoing projects according to region, project type and scheme, year of registration and, as of this analysis, credit volumes. This allows us to build a clear picture of the state of the AFOLU mitigation projects. Based on this overview, the report concludes with some observations and recommendations.

Data collection

The AFOLU MP database draws its data from various sources that can be divided into two broad categories: crediting scheme registries and third party databases. The original data was retrieved from these different databases in August 2010. The update that this paper deals with covers the period between September 2011 and January 2012.

The registries of individual crediting schemes provide direct access to the official data on each project. Most of the data in the AFOLU MP database comes from these registries. The third party databases are (like the AFOLU MP database) compilations of data from other sources, such as EcoAgriculture Partners, the World Agroforestry Centre (ICRAF) and the Forest Carbon Portal. These databases have been included as they give access to projects that would otherwise have been overlooked because they have not yet been formally registered with certification schemes. Their inclusion improves our understanding of what is happening on the ground.

[2] A fibrous by-product from cane sugar production.

To ensure the best possible comparability of data, pipeline projects (i.e. projects awaiting registration with a crediting scheme) have not been included.

Projects that have applied for registration with more than one crediting scheme[3] have been labelled according to the first scheme they registered with, unless transition to the second scheme is specified as a progression in the project document, in which case the project is listed under the latter. Several carbon accounting standards, such as VCS, do not include any additional social or environmental criteria. Additional certification for these co-benefits can be received through some standards, such as for example the CCBA. Some of the International Small Group and Tree Planting Program (TIST) projects have now also been registered as VCS projects. In the AFOLU MP project database transacted credits are always registered under the credit-issuing standard. However, some projects are listed under TIST and CCBA when they were not registered under any additional accounting standard. A new data source, the ACR, has been added to the AFOLU MP database, which increases the number of registries in the AFOLU MP database to 13.

For this analysis, publicly available databases and some additional data sources (for the full list see Annex I) have been used. MICCA is aware that some projects that fall within the scope of the database have been missed. Furthermore, projects carried out in Europe, especially for purely commercial purposes, have been excluded from the analysis in this report.

Unfortunately, some projects not registered with the crediting schemes or databases considered in this analysis have undoubtedly also been overlooked. We were able to include third party reports and databases from EcoAgriculture Partners (Shames & Scherr, 2010), the Africa BioCarbon Projects database from ICRAF (Wambui *et al*, 2009) and the Forest Carbon Portal (ForestCarbon Portal, 2012). This has reduced the number of overlooked projects.

The various databases use different data formats and are therefore not always directly comparable. Specifically, data on emission reductions and carbon stock increases have been registered in different formats. The historical data on the amount of credits sold has been made available by some databases, such as CAR and CCX, but not the estimates of total reduction prospects for their projects. As this report focuses more on highlighting the future potential of projects, the historical data has not been included. Due to these limitations in data availability, the conclusions that can be reached on the basis of the AFOLU MP database are somewhat limited. Conducting a narrower causality analysis, for example, is a delicate matter. However, the compiled data is solid enough to enable a broad characterisation of global mitigation activities, especially in developing countries.

[3] This applies to CCX projects switching to the CAR.

Categorization

To the extent possible, the characteristics of a project (type, former land use, etc.; see Annex II) are categorized in the database according to the definitions used by the projects themselves. When a source does not share the categorization adopted by the database, the projects' characteristics are classified according to best judgement. When it was not possible to attain reasonably certain information for some specific characteristics of some projects, the fields in question are labelled 'unknown'.

Number of projects as a measure

In the 2010 paper, the number of projects, as opposed to project size in terms of projected emissions reductions, was used as the key measure of activity. It was understood that this gives only a partial image, because a one hectare project would carry the same weight in the analysis as an 800 000 hectare project, thus favouring smaller projects over larger ones. Nevertheless, this method of organizing data provides an insight into how widely the knowledge and institutional capacity for developing projects have spread and how the individual projects' characteristics change over time. In using the number of projects as an indicator of activity, the 2010 study tested the dissemination of knowledge and capacity development to implement projects, rather than their intended impacts on atmospheric carbon concentration. Given that the data available on projected emission reductions and stock increases remains incomplete, this study also uses the number of projects as its key foundation for analysis. However, in the interest of putting the AFOLU MP database to wider use, this paper will also consider those projects that provide sufficient data on estimated emissions reductions by quantity, region, project type and crediting scheme.

New: analysis of project size by projected emissions reductions

As mentioned above, calculating data from the AFOLU MP database according to emissions size is problematic, which is why this aspect of the report is secondary to the principle analysis that focuses on the number of projects. To accommodate differences in project reporting styles, the database collects emission reduction estimates under two categories. In one category, 329 projects (59 percent) listed estimates for 'total expected GHG reduction in operational lifetime', totalling 1 005 920 kilotonnes (kt) of CO_2 equivalent. A sometimes overlapping but not identical category of 259 projects (45 percent) listed its estimates as 'maximum expected annual GHG reduction' measured in kt of CO_2 equivalent.

To be able to calculate these figures properly, estimates for the 329 projects that listed projections for 'total expected GHG reduction in operational lifetime (kt of CO_2 equivalent)' needed to be converted to a comparable unit (projects run from anything between 5 and 100 years). The average expected GHG reductions per annum were considered as the most useful unit. Since not all of these projects indicated the duration of the project's lifespan, however, only 228 of these projects (40 percent) could be used to provide annual averages.

Once the entries for total expected GHG reductions over the project's operational lifetime were converted to annual averages, the second dataset ('maximum expected annual GHG reduction measured in kt of CO_2 equivalent') could be considered when only maximum annual estimates were

available.[4] This resulted in complete information on projected annual emissions reductions for a total of 323 projects (56 percent of the database).

It must be noted that this latter addition should not be calculated in reverse. Multiplying the yearly dataset by the number of years in the project's lifespan does not provide a realistic estimate of total emissions reductions, as the estimates for individual years reflect *maximum* reduction capacity. However, this figure allows us to consider a hypothetical year of emissions reductions across region, type and scheme with a significantly improved sample size that takes into account 56 percent, rather than 40 percent, of the database entries.

[4] Where figures for both total estimated emissions reductions *and* maximum annual reductions were available, the average derived from the former was given priority. This was done to avoid inflating our total figures with maximum estimates as far as possible.

4. Regional Differences

The 2010 AFOLU MP database included 497 projects. By the end of 2011, the number had climbed to 575 projects – a 16 percent increase (+78 projects). In general terms, the highest relative increase in projects was in Asia and the Pacific, where there was an increase of 29 percent. Figure 1 shows that Latin America remains the region with the most AFOLU projects (35 percent), followed by North America (30 percent), Africa (20 percent), Asia and the Pacific (13 percent) and Europe and Central Asia (2 percent). This is the same regional distribution as in the previous AFOLU MP database publication. See Annex III, Table 1 for the numbers of projects per region.

Project types

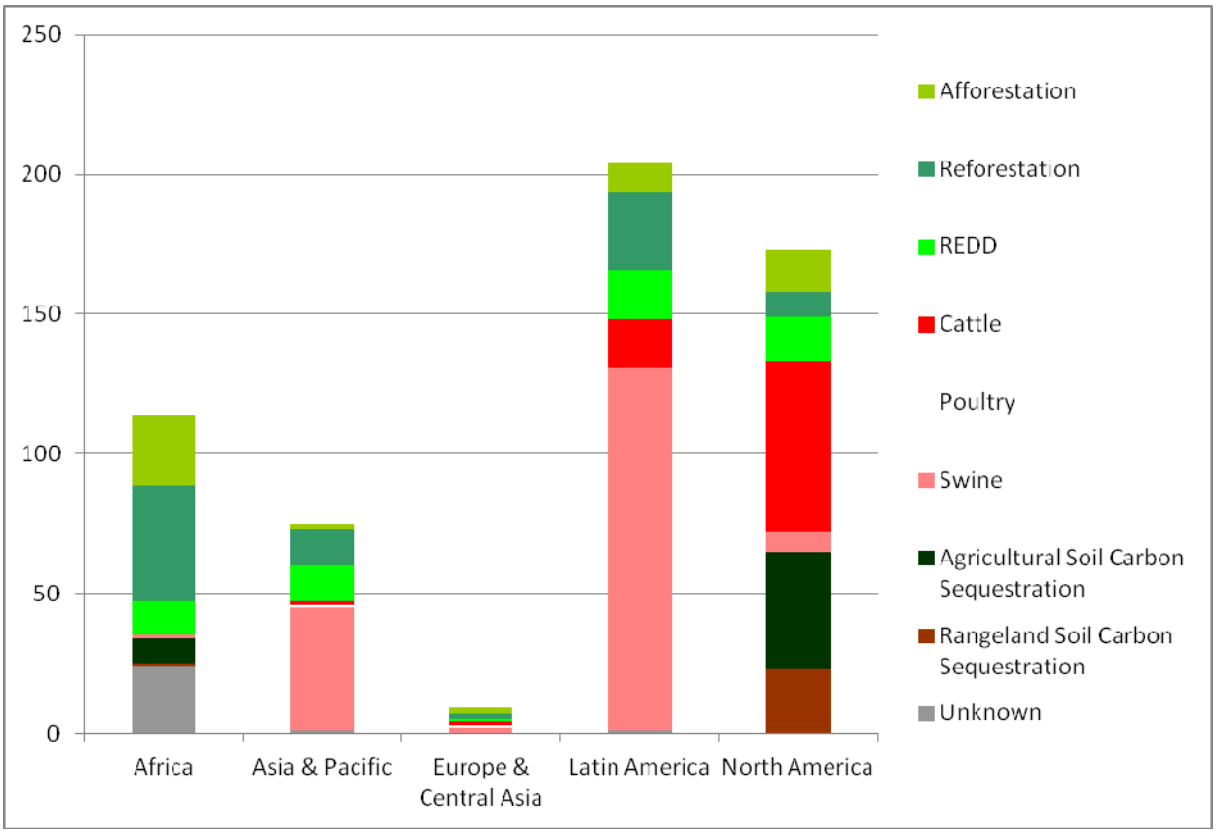

Figure 1. Project breakdown by region and project type (all projects 2004-2011)

As with the last analysis, the majority of projects remain swine manure projects. However, reforestation has now moved from third place to second place, overtaking cattle manure projects, which now ranks third.

Since the last analysis, the number of forestry projects (afforestation, reforestation and REDD) have increased in Latin America. A similar trend is evident in Africa. In Asia and the Pacific, by contrast, there has been an equal increase in manure and non-manure projects. In North America, more

manure than non-manure projects were added. There have been no new soil carbon projects registered since 2010.

As was the case in 2010, the majority of manure projects are located in Latin America, followed by North America and Asia and the Pacific. Africa and Central Asia have hardly any manure livestock projects.

Scheme development

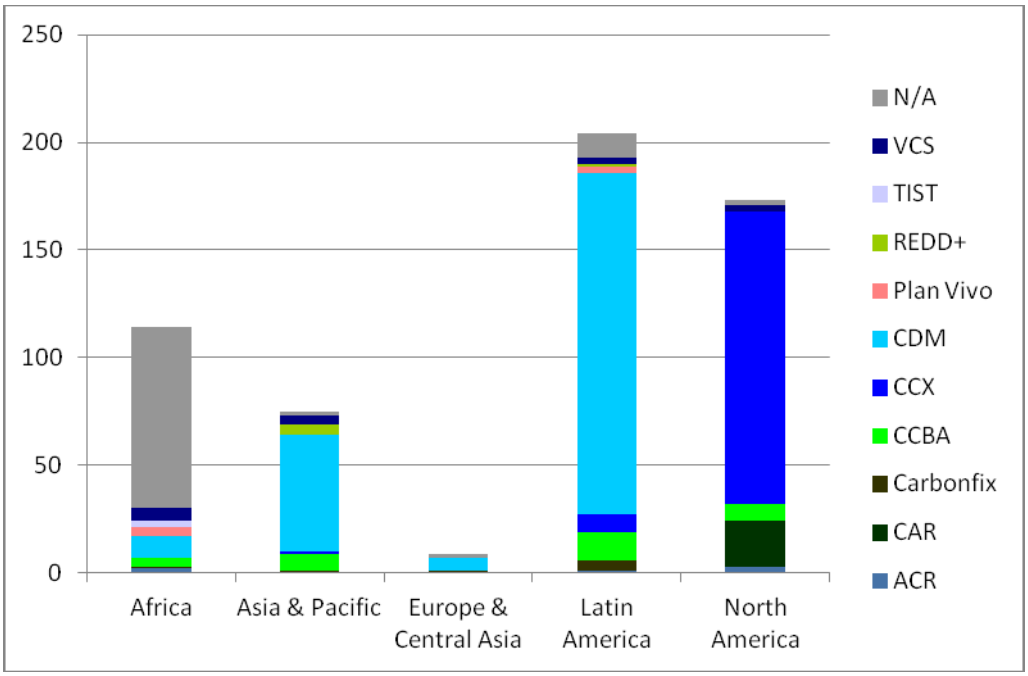

Figure 2. Project breakdown by region and scheme (all projects 2004-2011)

The distribution of AFOLU projects among the different schemes has not changed significantly. CDM still accounts for the highest number of projects (40 percent). Even though it is no longer operating, the CCX has the second highest number (25 percent). The CCBA scheme ranks third (6 percent) but hosts significantly less projects.

The additional CDM projects are mainly in Latin America, and Asia and the Pacific. It should be noted that Africa has seen an increase of 7 additional CDM projects since 2010. The VCS scheme now also shows more registered AFOLU projects, more or less equally distributed across Africa (+5), Asia and the Pacific (+4), Latin America (+3) and North America (+3). The CAR and CCBA have an additional 10 projects each. CAR works exclusively in North America; the CCBA mainly in Latin America. ACR, a scheme new to the database, includes 6 projects, half of which are in North America, the others hosted in Africa and Latin America.

As indicated in Figure 3, since the 2010 analysis, an additional 51 forestry projects have been registered. These are mainly CDM projects (+17), followed by VCS (+13) and CCBA (+10). Some of the TIST projects are now also registered under the VCS. These projects are therefore now listed as VCS

projects in the updated database to avoid double counting. As regards manure projects, 27 additional projects were added to the database, mainly CDM projects (+15) and some CAR projects (+9). As mentioned already, no further soil carbon projects were added.

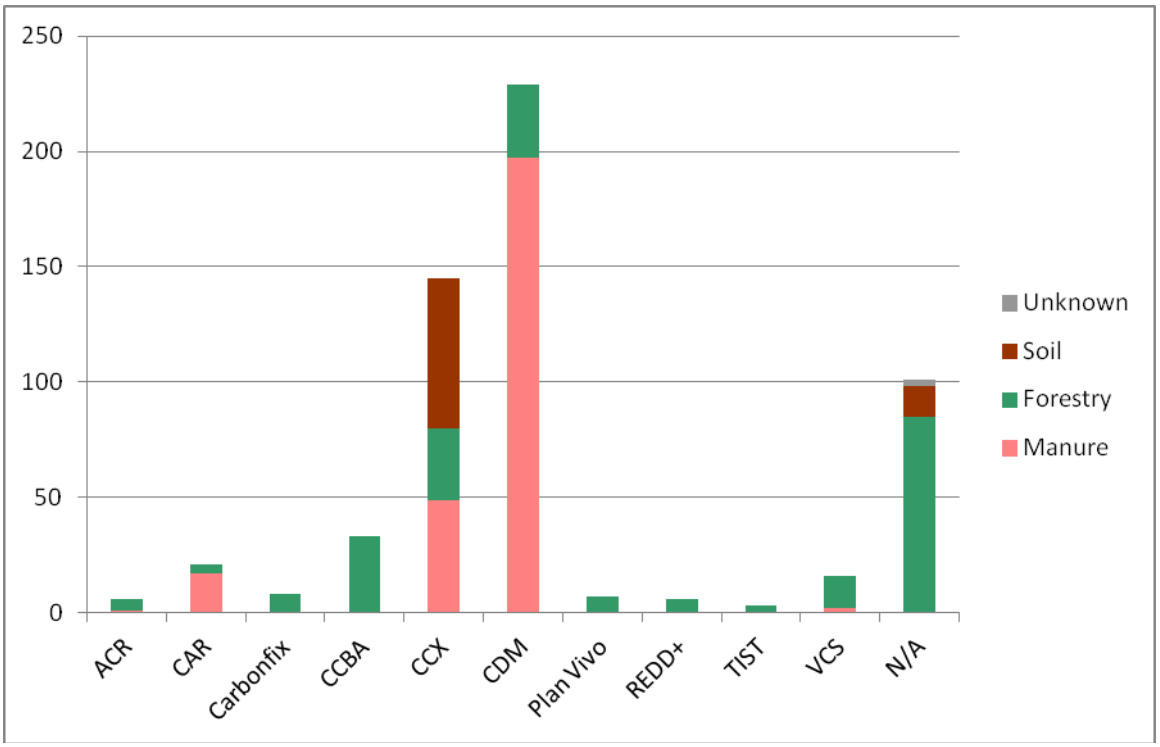

Figure 3. Project breakdown by scheme and project type (all projects 2004-2011)

5. Changes over time

Brief summary of trends commented in previous paper

A constant increase in AFOLU carbon projects between 2005 -2009 had been already noted in the previous publication. The highest number of new projects was registered in 2006. In 2010, there was a significant drop in numbers.

The 2006 peak was attributed to the rise in methane avoidance projects registered under the CDM. After 2006, the first enthusiasm for CDM wore off, and new project registration decreased the following year. This decrease was also due to the lack of progress in developing the full range of potentially applicable methodologies. Nevertheless, increases in new projects of all types continued between 2007 -2009. It was only in Latin America that a drop in new activities was apparent. In all other regions, the number of projects rose. During the first half of 2010, the number of new project registrations fell.

Post-2010

As the data collection of the first AFOLU Mitigation Project publication ended in mid-2010, there was still time for the development of more projects over the remainder of the year. In fact, an additional 21 projects from 2010 have been added to the updated AFOLU mitigation project database (see Figure 4). Nevertheless, the total number for 2010 remained low compared to the four previous years. This low total can be linked to the general uncertainty about the state of international carbon markets after 2012. The international post-Kyoto framework (the Kyoto Protocol was set to expire in 2012), and the role of CDM itself were unclear, and restrictions in the EU ETS were pending. In addition, the lack of progress in several developed economies, such as the United States, in setting up cap-and-trade programmes contributed to the international decline in activity on the carbon markets in 2010. In 2011, there was a small increase in the number of projects, which suggests that the number of AFOLU projects is on the rise again, if not as rapidly as in the years before 2010.

In 2010 and 2011, mainly CDM and some VCS projects were developed in the AFOLU sectors. VCS projects in particular have picked up in 2011. CCBA and Plan Vivo registered several new projects in 2011 as well.

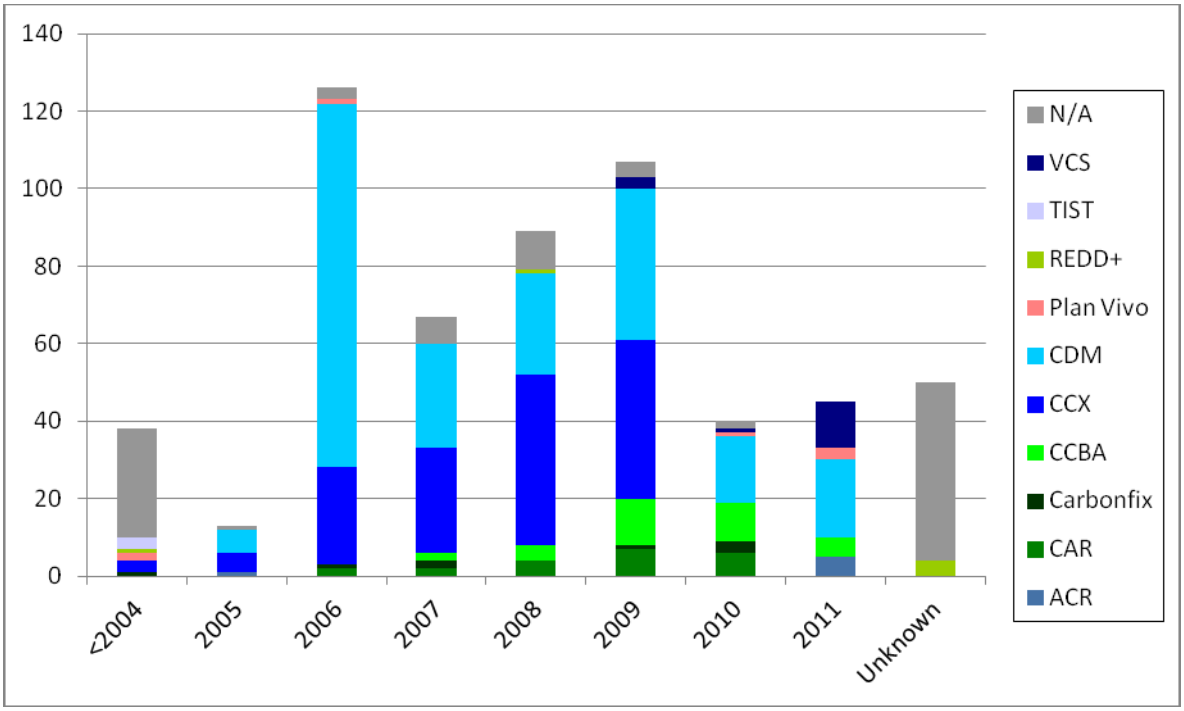

Figure 4. Project breakdown by year and scheme (all projects 2004-2011)

In 2010 and 2011, mainly forestry projects were registered, including reforestation, afforestation and REDD projects (see Figure 5). Some swine manure projects (+15) were registered, but in general, manure projects have decreased considerably.

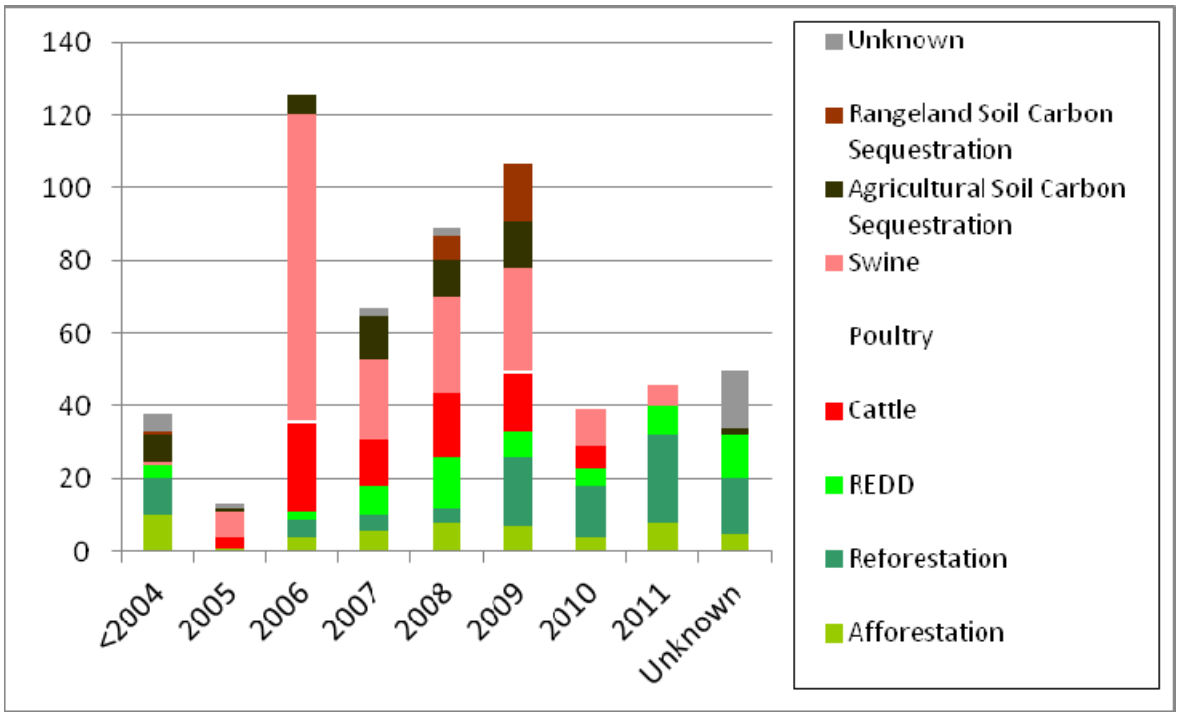

Figure 5. Project breakdown by year and project type (all projects 2004-2011)

Between 2010-2011, Latin America was the region with the highest number of new projects (+28). Asia and the Pacific, North America (both +17) and Africa (+16) experienced a similar growth in absolute numbers. Only in Europe were no additional projects developed. As Figure 6 shows, Africa has seen a substantive increase (20 percent) in relative terms in AFOLU mitigation projects over the last two years, thus becoming a more important host for AFOLU projects.

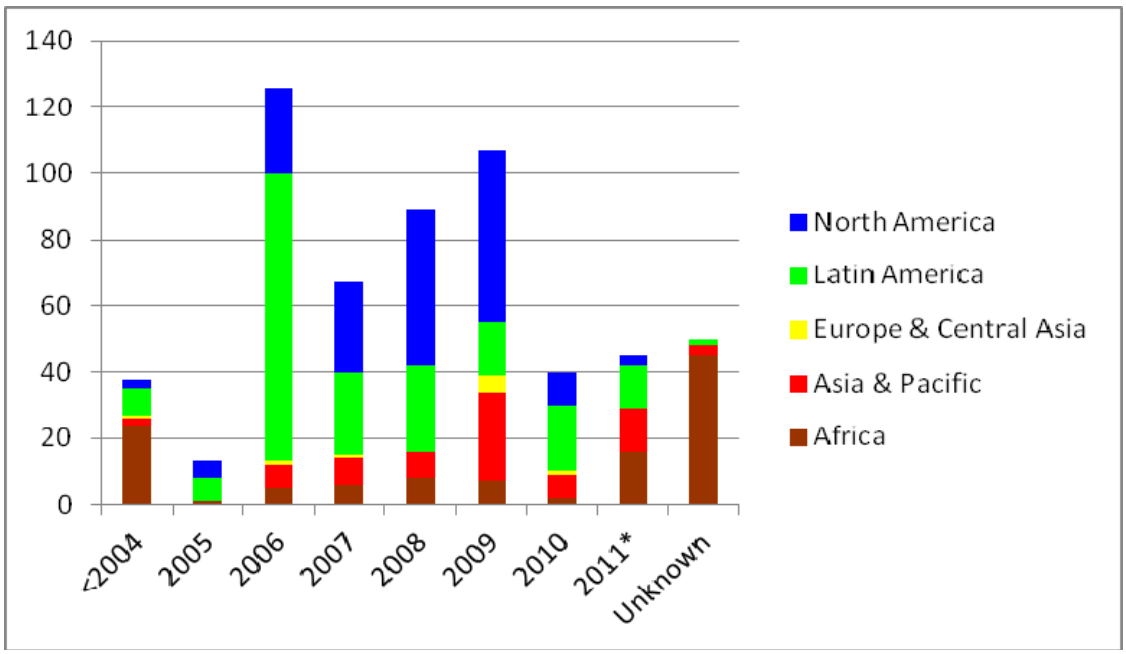

Figure 6. Project breakdown by year and by region (all projects 2004-2011)

Credit volumes of AFOLU projects

When examining the average annual emission reductions of the AFOLU projects in the database, it is clear that forestry projects, and specifically REDD projects, bring about the highest average annual emission reductions (Figure 7) and the highest total annual emission reductions (27 250 kt of CO_2 equivalent per year for all forestry project types, see Annex III, Table 9). In comparison, manure projects achieved total annual emmision reductions of 6 000 kt of CO_2 equivalent peryear).

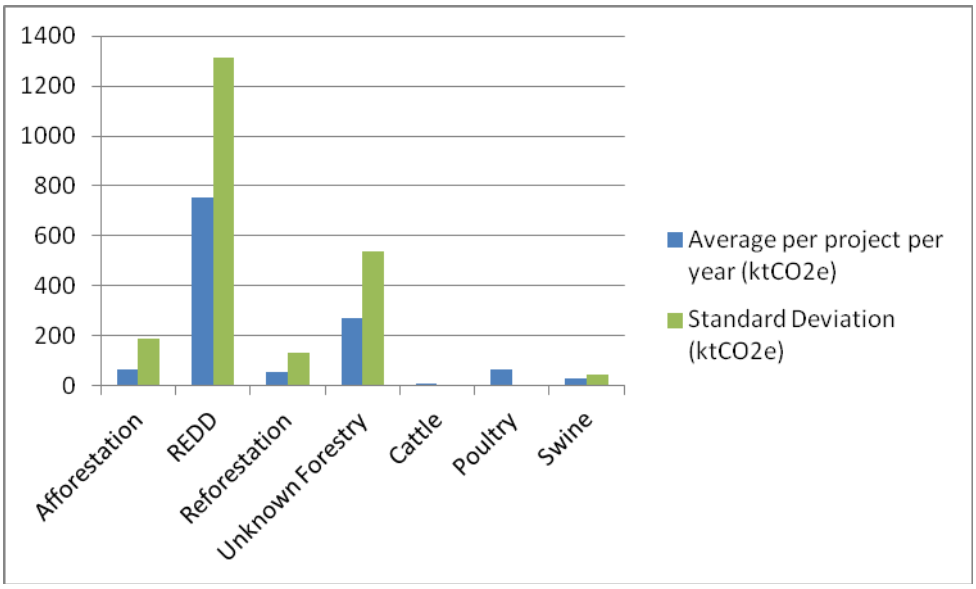

Figure 7. Average annual emission reductions per project type (all projects 2004-2011)

Table 1 displays the average annual emission reduction estimates for the different schemes. The highest total annual emission reductions are projected by the CCBA scheme, even though it does not certify many projects. Five very large REDD projects covering extensive areas, several of them also protecting very old, valuable rainforest, account for these enormous reduction projections. These projects include: the Juma Sustainable Development Reserve Project in the Brazilian Amazonas State that covers 589 000 hectares; the Ulu Masen REDD project in Indonesia covering 750 000 hectares; and the April Salumei Sustainable Forest Management Project in Papua New Guinea extending over 521 000 hectares. Moreover, the Mawas Peatlands Conservation Area Project registered with REDD+ also covers an area of 240 000 hectares. When assessing average annual emission reductions per project, it become clear that projects under the REDD+ and CCBA schemes have the highest reduction potential.

Table 1: Emission reductions by scheme

Scheme	Average per project per year (ktCO2e)	Median (ktCO2e)	Standard Deviation (ktCO2e)	Total annual emissions reductions (ktCO2e)	Number of projects
ACR	28	12	44	140	5
CAR	50	50	45	100	2
Carbonfix	1	1	0	2	2
CCBA	442	6	81,627	12,814	29
CDM	34	14	56	7,685	229
N/A	166	65	309	5,463	33
Plan Vivo	68	70	24	340	5
REDD+	2,198	2,198	2,787	4,397	2
VCS	145	29	395	2,314	16
Sum	**3,131**	**2,445**	**85,286**	**33,254**	**323**

Considered by region, average annual emission reductions per project amount to 153 kt of CO_2 equivalent per year per project in Asia and the Pacific; 144 kt of CO_2 equivalent per year per project in Africa; and only 83 kt of CO_2 equivalent per year per project in Latin America (Figure 8). However, in terms of total annual emission reductions, Latin America ranks highest with 15 630 kt of CO_2 equivalent per year (shared between 188 projects), followed by Asia and the Pacific with 10 236 kt of

CO_2 equivalent per year (over 67 projects) and Africa with 6 777 kt of CO_2 equivalent per year (47 projects).

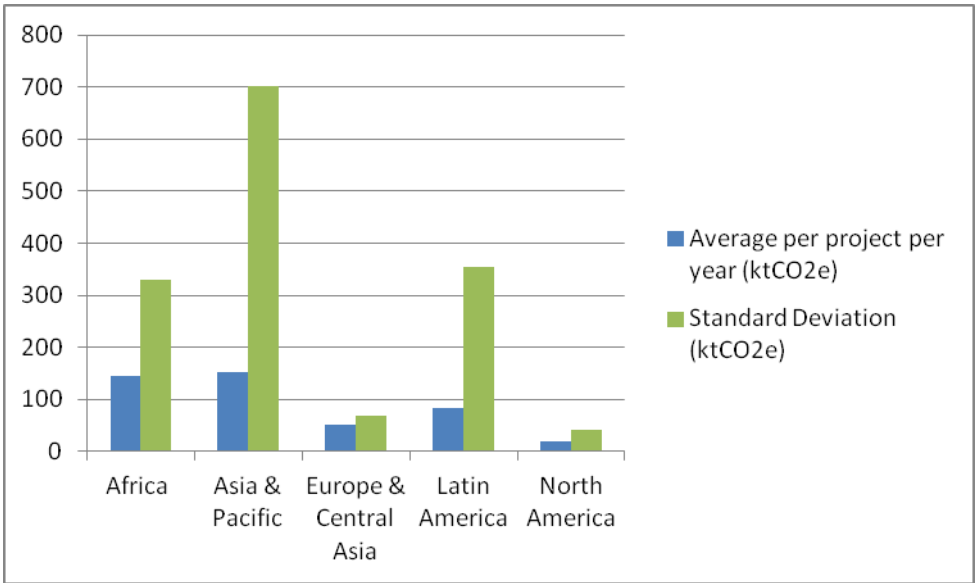

Figure 8. Average annual emission reduction size per region (all projects 2004-2011)

These results indicate that the predominance of large REDD projects in Asia (registered either under CCBA or REDD+) account for the very high annual emission reduction potential of the region. Latin America exhibits the highest total amount of annual reductions, as the region hosts the highest number of AFOLU projects. It should be noted that Africa now also hosts some large forestry carbon projects and is beginning to access the AFOLU carbon markets.

6. Issues and gaps identified

…for smallholder projects and carbon markets

Smallholder carbon projects in general are still quite scarce. The observations and experiences from planned and ongoing projects, as well as from the BioCarbon Fund (2011) outlined above, indicate that particular challenges are faced by smallholders in comparison to projects from other sectors. As AFOLU carbon projects involving smallholders usually work with a high number of farmers, the project developer needs to have access to good institutional infrastructure to be able to collaborate with the farmers. Extension services, capacity building and support for the registration of contracts are required. The longer and better the relationship between the project participants and the developer are, the better this already established trust can contribute to fostering project development and implementation.

Lessons learned from the Kenya Agricultural Carbon Project (International Finance Corporation, 2012) indicate that farmers' interests have to be prioritized, and the project design will need to take these interests into account explicitly. For this reason, improved productivity and food security are goals to be prioritized in the project design, along with fostering the resilience of the agro-ecosystem and farmer livelihoods. Usually, farmers perceive carbon sequestration and mitigation as a co-benefit, but not as a priority. The carbon revenues to be expected from the project are very low compared to revenues from increased productivity, although carbon finance can make a significant contribution to removing adoption barriers (Tennigkeit *et al*., 2011). These findings support the climate-smart agriculture approach currently applied by many development institutions and governments. Climate-smart agriculture aims for a transformation of agriculture that sustainably increases productivity, resilience (adaptation) and reduces/removes greenhouse gases (mitigation), while enhancing the achievement of national food security and development goals. Another lesson is that MRV systems need to be cost-effective and user-friendly to keep overall transaction costs down as much as possible. They should integrate existing monitoring and evaluation systems of the project. Furthermore, project developers are key. They should be innovative and flexible, willing to learn how to implement a carbon finance project technically, and able to attract some financial resources. Technical assistance and capacity building are essential to support smallholder farmers in building the project, which requires expertise in MRV issues. This knowledge also needs to be passed on to local and national institutions to develop their capacities (FAO, 2011). Finally, when planning for a carbon project location, the area needs to have high agricultural potential; the carbon sequestration and mitigation potential of the agro-ecosystem is a decisive factor.

To access carbon markets, smallholder carbon projects need to be tied to competent project developers with experience in preparing projects and connections to strong institutions, such as for example the World Bank and its associated funds like the BioCarbon Fund or the Forest Carbon Partnership Facility, that can provide financial support or link them to entities interested in buying the credits. Several partnerships have emerged between investors and carbon projects as a means of attesting to corporate social responsibility. Over half of the for-profit corporate buyers of voluntary carbon credits purchased credits for reasons linked to corporate social responsibility, public relations and branding purposes (Peters-Stanley and Hamilton, 2012). Examples include: Merril Lynch, which bought credits from the Ulu Masen project; Marriot International, which bought credits from the

Juma Sustainable Development Reserve Project ; and the insurance company Allianz, which took on a 10 percent stake in Wildlife Works (Ecosystems Marketplace, 2012), which develops REDD projects, such as the Kasigau Corridor REDD Project in Kenya, and is validated through VCS.

…for agriculture and soil carbon trading

As can be seen from the updated AFOLU MP database, agricultural soil carbon projects, have not seen any increase in numbers over the past two years. Several limiting reasons are apparent:

The first methodology dealing with agricultural land management was only accepted at the end of 2011 under the VCS scheme, which is the most widespread crediting standard for carbon AFOLU projects (excluding livestock methane projects). During 2012, the VCS will register its first soil carbon project. The project is located in western Kenya and based on Sustainable Agriculture Land Management (SALM). The project is implemented by the Swedish non-governmental organization (NGO) VI Agroforestry and works with 60 000 smallholder farmers on approximately 45 000 hectares. VI Agroforestry sells the emission reductions to the World Bank's BioCarbon Fund on behalf of the project's farmer groups. As the VCS methodology for the adoption of SALM was only recently adopted (December 2011), more projects of this kind are expected in the near future. Other agricultural methodologies addressing soil carbon sequestration under the VCS are also currently under development. These include:

- the Methodology for Sustainable Grassland Management developed by FAO;
- the VCS Methodology for Agricultural Land Management: Improved Grassland Management developed by GreenCollar Climate Solutions;
- the ALM Adoption of Sustainable Grassland Management through Adjustment of Fire and Grazing developed by Soils for the Future and Jadora International; and
- Methodology for Soil Carbon developed by The Earth Partners.

When more methodologies under the VCS are available, it will become less laborious to develop soil and crop management projects.

Currently, different tools and methods have been developed to support agricultural GHG quantification, both at the whole-farm level and landscape level. Not all of them can be used for the accounting or certification of carbon credits, but they do allow farmers or project developers to identify and manage greenhouse gas emission, and assess their farm-level mitigation potentials for possible accounting. Emissions from one farmer might not be high, but in the aggregate they are significant. Smallholder emissions are expected to rise in the future if land management practices continue to be carried out as they are now. Therefore, approaches for quantifying GHG emissions from complex, diverse systems and landscapes that ultimately contribute to national accounting systems will be increasingly required. Ensuring these improved approaches are low-cost, easy to follow and allow for monitoring at the farm level, is essential for fostering the development of validated methodologies.

The demand for agricultural carbon credits and for AFOLU carbon credit in general needs to be increased for more projects to be developed. The lack of liquidity in the voluntary markets, as is the

case with the EU ETS, restricts the development of agricultural carbon projects. Also, the political processes in the UNFCCC negotiations and in individual countries are an important factor supporting this development. Once the Subsidiary Body for Scientific and Technical Advice (SBSTA) commences its work on modalities for agriculture activities under the CDM, the political process can develop more easily. Furthermore, the formulation of Nationally Appropriate Mitigation Actions (NAMAs), and developments within national programmes of activities, sectoral CDMs and other low-emission strategies for the agriculture sector that are ongoing in many countries, as well as the capacities being developed to plan and implement these, will probably increase the demand for agriculture carbon projects. The further development of these activities is likely to be a clear signal to the voluntary market and individual, corporate and even governmental and NGO buyers to accept further soil carbon projects.

Addressing non-permanence, or the risk of reversal of GHG reductions, is a major issue for GHG accounting in land-based projects as opposed to the swine or cattle biogas projects included in the database. There are different mechanisms to manage this risk, and different GHG schemes are applying them in different combinations. For example, crediting rules can be adjusted, as is done under the CDM, where crediting expires within certain time frames. Other schemes, such as VCS, use risk buffers and reserve a proportion of the credits in a buffer account. Land restrictions requiring project land to be maintained in a certain way, or transfer rights, are other alternatives, as are specific insurance requirements.

Finally, a project needs to achieve GHG reductions that are 'additional' to reductions that would have occurred otherwise. This is a very controversial aspect for land-based GHG projects, and different requirements have been established by different programmes and schemes. As cited above, the BioCarbon Fund's experience shows that proving additionality for terrestrial carbon projects is often very difficult. Demonstrating properly documented evidence of barriers to implementation remains a demanding issue for project development. Capacities need to be built in national institutions and among national project developers to ensure the appropriate expertise and knowledge is available in all the technical aspects involved in preparing terrestrial carbon projects.

7. Conclusions

AFOLU projects continue to be developed in all regions. Several noteworthy developments have taken place, and future developments will be monitored.

After the decline in numbers of AFOLU projects in 2010, there has been a slow renewed growth, especially for forestry projects, which have picked up considerably. Since the last AFOLU MP database analysis, no more soil carbon projects have been registered. However, with the new SALM methodology having been accredited under VCS and several new methodologies under development, MICCA anticipates that during 2012 and 2013 several soil and crop management projects will be registered.

The number of AFOLU projects in Africa is on the rise – a trend that is being strongly supported and fostered by different international, regional and national institutions and programmes, and private and public initiatives. Africa is the continent with the third highest number of AFOLU projects and has seen a 20 percent increase in carbon projects over the last two years. Average annual emission reductions per project are second highest in Africa, as it hosts some large forestry projects. This general trend has been noted on the voluntary carbon market and the regulated carbon markets (Ecosystems Marketplace, 2012 and International Finance Corporation, 2012). The soil carbon project, for which the first Emissions Reductions Purchase Agreement has been signed with the World Bank, is located in Africa. Different developments are underway, such as the TIST that empowers small groups of subsistence farmers in three African countries and India to reverse deforestation and combat drought and famine by planting trees and engaging in sustainable agriculture. The project partners are usually local small groups. Therefore, TIST is well-placed to promote 'best practices' in agroforestry and agriculture. TIST has over 44 000 members and has received the world's first dual validation and verification from VCS and CCB. The Africa Soil Information Service provides a practical and timely soil health surveillance service to map soil conditions; sets a baseline for monitoring changes; develops global standards and methodologies; and provides options for improved soil and land management in Africa. Their soil carbon measurement methods contributed to the United Nations Environment Programme - Global Environment Facility (UNEP-GEF) Carbon Benefits Project: Modelling, Measurement and Monitoring. The tools from this project are expected be used in GEF sustainable land management projects. Several countries are developing NAMAs, in Africa, 12 agricultural NAMAs (out of 18 globally) and 17 forestry NAMAs (out of 29 globally) are already publicly available on the UNFCCC webpage. Again this indicates a high interest in taking formal steps toward integrating mitigation planning in the AFOLU sectors into general climate change planning.

Experience from A/R projects for the CDM and the first soil carbon project prepared for the carbon market have already provided good lessons that need to be considered when further developing methodologies and regulations, and designing projects. Building capacity at the country level to prepare and design carbon projects is urgently needed, as are access to finance and the development of cost-effective accounting and monitoring methodologies.

Swine manure projects are the most popular AFOLU project types, followed by reforestation projects, which, together with afforestation projects, constitute around 25 percent of all AFOLU

projects. Even though REDD+ projects only represent 14 percent of all projects, they generate the highest emission reduction potential of all AFOLU projects. Nevertheless, in 2011, they declined in comparison to previous years. Political discussions are still not giving an unqualified green light to AFOLU mitigation projects, which complicates their complete acceptance and success.

In conclusion, MICCA notes an increase in the development of AFOLU projects in the carbon markets. The international climate change process could possibly consider including soil carbon agriculture and REDD+ projects in its negotiations and begin work under the SBSTA. This could support the development of modalities and procedures for soil carbon sequestration linked to agriculture and other land uses in the international climate change regulations. It would give the go-ahead for the general development of methodologies for agricultural carbon projects on the voluntary market and stimulate an increased demand for such credits, providing a positive environment for buyers to purchase them. Additional elements to support this growth include building MRV measures into AFOLU projects and ensuring safeguard mechanisms are put in place to protect communities, their livelihoods and their environment.

For all land uses to be brought together in a cohesive way, an integrated landscape approach for all land use activities needs to be considered in policy making. There are very strong linkages between the different activities and land uses. For example, agriculture is often a driver of deforestation. Decisions taken and market developments in one sector have repercussions on resource availability and use in others. Thus, considering one sector in isolation makes cohesive policy development increasingly difficult. Different institutions and initiatives are developing tools, supporting discussions and conducting research at policy level to foster the integration of land uses in policies, programmes and also project development.

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Annex I: Data Sources

ACR: http://www.americancarbonregistry.org/carbon-registry

CAR: https://thereserve2.apx.com/myModule/rpt/myrpt.asp?r=111

Carbonfix: http://www.carbonfix.info/Project.html?PHPSESSID=c044l25emng2ilna5bmgs2f8n3

CCBA: http://www.climate-standards.org/projects/index.html

CCX: https://registry.chicagoclimatex.com/public/projectsReport.jsp?sortBy=type&sortDir=asc

CDM: http://cdm.unfccc.int/Projects/projsearch.html

EcoAgriculture Partners carbon inventory:

http://www.ecoagriculture.org/documents/index.php?pubID=335

Forest Carbon Portal: http://www.forestcarbonportal.com/projects

ICRAF: http://www.asb.cgiar.org/PDFwebdocs/biocarbon%20database.pdf

Plan Vivo: http://planvivo.org.34spreview.com/?page_id=51

REDD+: http://redd-database.iges.or.jp/redd/

VCS: https://vcsprojectdatabase1.apx.com/myModule/rpt/myrpt.asp?r=111

Annex II: Project characteristics

Full list of characteristics stored in the database:

- Reference Number
- Title
- Scheme
- Standard/Methodology used
- Type
- Sub-type
- Former land use
- Region
- Country
- City, State or Province
- Implementing organization (project developer)
- Other partners/stakeholders
- Size (ha) (if applicable)
- No of farmers
- No of cattle
- No of swine
- No of poultry
- Timespan (years)
- Crediting period (years)
- Max. expected annual GHG reductions (ktCO2e)
- Total expected GHG Reduction in operational lifetime (ktCO2e)
- Creditable reductions (1st crediting period, if applicable)
- Public funding
- Investment costs ($'000s)
- Registration date
- ID-Number
- Data source
- Project website

Annex III: Tables for Figures

Table 1. Total number of AFOLU projects per continent

Region	Sum mid 2010	Sum mid 2010-2011	Sum
Africa	98	16	**114**
Asia & Pacific	58	17	**75**
Europe & Central Asia	9	0	**9**
Latin America	176	28	**204**
North America	156	17	**173**
Sum	**497**	**78**	**575**

Table 2. Project breakdown by region and type

Region\ Type	Afforestation	Reforestation	REDD	Cattle	Poultry	Swine	Agricultural Soil Carbon	Rangeland Soil Carbon	Unknown	Sum
Africa	25	42	12	0	0	1	9	1	24	**114**
Asia & Pacific	2	13	13	1	1	44	0	0	1	**75**
Europe & Central Asia	2	2	1	1	1	2	0	0	0	**9**
Latin America	10	28	18	17	0	130	0	0	1	**204**
North America	15	9	16	61	0	7	42	23	0	**173**
Sum	**54**	**94**	**60**	**80**	**2**	**184**	**51**	**24**	**26**	**575**

Table 3. Project breakdown by region and scheme

Region\Scheme	ACR	CAR	Carbonfix	CCBA	CCX	CDM	Plan Vivo	REDD+	TIST	VCS	N/A	Sum
Africa	2	0	1	4	0	10	4	0	3	6	84	**114**
Asia & Pacific	0	0	1	8	1	54	0	5	0	4	2	**75**
Europe & Central Asia	0	0	1	0	0	6	0	0	0	0	2	**9**
Latin America	1	0	5	13	8	159	3	1	0	3	11	**204**
North America	3	21	0	8	136	0	0	0	0	3	2	**173**
Sum	**6**	**21**	**8**	**33**	**145**	**229**	**7**	**6**	**3**	**16**	**101**	**575**

Table 4. Project Breakdown by project type and scheme

Type\Scheme	ACR	CAR	Carbonfix	CCBA	CCX	CDM	Plan Vivo	REDD+	TIST	VCS	N/A	Sum
Manure	1	17	0	0	49	197	0	0	0	2	0	**266**
Forestry	5	4	8	33	31	32	7	6	3	14	85	**228**
Soil	0	0	0	0	65	0	0	0	0	0	13	**78**
Unknown	0	0	0	0	0	0	0	0	0	0	3	**3**
Sum	**6**	**21**	**8**	**33**	**145**	**229**	**7**	**6**	**3**	**16**	**101**	**575**

Table 5. Project breakdown by year and scheme

Year\Scheme	ACR	CAR	Carbonfix	CCBA	CCX	CDM	Plan Vivo	REDD+	TIST	VCS	N/A	Sum
<2004	0	0	1	0	3	0	2	1	3	0	28	**38**
2005	1	0	0	0	5	6	0	0	0	0	1	**13**
2006	0	2	1	0	25	94	1	0	0	0	3	**126**
2007	0	2	2	2	27	27	0	0	0	0	7	**67**
2008	0	4	0	4	44	26	0	1	0	0	10	**89**
2009	0	7	1	12	41	39	0	0	0	3	4	**107**
2010	0	6	3	10	0	17	1	0	0	1	2	**39**
2011*	5	0	0	5	0	20	3	0	0	12	0	**46**
Unknown	0	0	0	0	0	0	0	4	0	0	46	**50**
Sum	**6**	**21**	**8**	**33**	**145**	**229**	**7**	**6**	**3**	**16**	**101**	**575**

Table 6. Project breakdown by year and type

Year\Type	Afforestation	Reforestation	REDD	Cattle	Poultry	Swine	Agricultural Soil Carbon	Rangeland Soil Carbon	Unknown	Sum
<2004	10	10	4	0	0	1	7	1	5	**38**
2005	1	0	0	3	0	7	1	0	1	**13**
2006	4	5	2	24	1	84	6	0	0	**126**
2007	6	4	8	13	0	22	12	0	2	**67**
2008	8	4	14	18	0	26	10	7	2	**89**
2009	7	19	7	16	1	28	13	16	0	**107**
2010	4	14	5	6	0	10	0	0	0	**39**
2011	8	24	8	0	0	6	0	0	0	**46**
Unknown	5	15	12	0	0	0	2	0	16	**50**
Sum	**53**	**95**	**60**	**80**	**2**	**184**	**51**	**24**	**26**	**575**

Table 7. Project breakdown by year and region

Vintage\Region	Africa	Asia & Pacific	Europe & Central Asia	Latin America	North America	Sum
<2004	24	2	1	8	3	**38**
2005	1	0	0	7	5	**13**
2006	5	7	1	87	26	**126**
2007	6	8	1	25	27	**67**
2008	8	8	0	26	47	**89**
2009	7	27	5	16	52	**107**
2010	2	7	1	20	10	**40**
2011*	16	13	0	13	3	**45**
Unknown	45	3	0	2	0	**50**
Sum	**114**	**75**	**9**	**204**	**173**	**575**

Table 8. Average emission reductions per project per year and total annual emission reductions by continent

Reduction size/region	Average per project per year (ktCO2e)	Median (ktCO2e)	Standard Deviation (ktCO2e)	Total annual emissions reductions	Number of projects
Africa	144	33	331	6,777	47
Asia & Pacific	153	7	701	10237	67
Europe & Central Asia	52	20	67	309	6
Latin America	83	18	354	15,631	188
North America	20	6	40	300	15
Sum	**452**	**85**	**1,493**	**33,254**	**323**

Table 9. Average emission reductions per project per year and total annual emission reductions by type

Reduction size/subtype	Average per project per year (ktCO2e)	Median (ktCO2e)	Standard Deviation (ktCO2e)	Total annual emissions reductions	Number of projects
Afforestation	68	14	189	1427	21
REDD	753	162	1313	20334	27
Reforestation	55	8	130	3862	70
Unknown Forestry	271	66	540	1627	6
Cattle	9	10	4	180	20
Poultry	64	64	3	128	2
Swine	32	15	43	5694	177
Sum	**1253**	**339**	**2223**	**33254**	**323**

Table 10. Average emission reductions per project per year and total annual emission reductions by type

Reduction size/type	Average per project per year (ktCO2e)	Median (ktCO2e)	Standard Deviation (ktCO2e)	Total annual emissions reductions	Number of projects
Forestry	220	22	688	27251	124
Manure	30	14	41	6003	199
Sum	**250**	**36**	**729**	**33254**	**323**

Table 11. Average emission reductions per project per year and total annual emission reductions by standard

Reduction size/scheme	Average per project per year (ktCO2e)	Median (ktCO2e)	Standard Deviation (kCO2e)	Total annual emissions reductions	Number of projects
ACR	28	12	44	140	5
CAR	50	50	45	100	2
Carbonfix	1	1	0.014	1.82	2
CCBA	442	6	81627	12814	29
CDM	34	14	56	7685	229
N/A	166	65	309	5463	33
Plan Vivo	68	70	24	340	5
REDD+	2199	2198	2787	4397	2
VCS	145	29	395	2314	16
Sum	**3131**	**2445**	**85286**	**33254**	**323**

This paper presents the second analysis of the Agriculture, Forestry and Other Land Use Mitigation Project (AFOLU MP) database. This follow-up study includes 575 projects from 12 different registries. As with the first publication, this paper summarizes the insights that have been gained from the analysis of the updated database.

The updated AFOLU MP database confirms trends already identified in the previous paper, but it also notes certain changes. The regulatory markets continue to dominate carbon markets. Voluntary carbon projects make only a small contribution to the total. Many issues for smallholder terrestrial carbon projects still remain to be resolved, and agriculture soil carbon projects remain marginal. To support terrestrial carbon projects, an integrated landscape approach should be considered in policy making.

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