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REDD+ projects in 2014: an overview based on a new database and typology

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Considering the lack of clarity about what 'REDD+ projects' are, this paper suggests defining them as "*Local or landscape projects, with an explicit aim of reducing emissions from the forestry sector; financed by REDD+ funds and/or carbon markets; located in non-Annex I countries*". We then provide a snapshot of REDD+ projects globally, based on a new database and typology. We show that 'REDD+' functions as a logo to attract specific financing, with limited innovation in terms of approach. Moreover, REDD+ projects differ from Kyoto carbon projects by their limited focus on climate change mitigation and low dependence on carbon revenue.

Keywords: Climate change; REDD+ projects; definition; tropical forests; greenhouse gas emissions; worldwide.

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Content

1 Introduction

Tropical forests play a key role in conserving biodiversity and supporting the livelihoods of millions of forest-dependent people. In the last two decades, an additional focus has emerged that emphasizes the role of tropical forests in mitigating climate change. Indeed, tropical forests offer two levers for climate change mitigation. First, emissions from deforestation are estimated at around 10% of global greenhouse gas (GHG) emissions or 12% of global CO_2 emissions (Werf, 2009; Harris et al. 2012). This figure reaches 18% of global GHG emissions when including forest degradation, peatland degradation, and fires (Grace et al., 2014). Consequently, a large quantity of emissions could be avoided by slowing global rates of deforestation and of forest degradation, and by promoting peatland conservation and fire prevention. Secondly, afforestation and reforestation could capture a large stock of carbon dioxide, turning forests globally into net carbon sinks rather than sources of GHG emissions. Indeed, 6.79 billion tons of CO_2-equivalent are sequestered yearly by tropical forests, through plantation, the natural growth of primary forests, and the regrowth of secondary forests (Grace et al., 2014). There are thus two options for the role of tropical forests in climate change mitigation: reducing emissions from deforestation and degradation (REDD) or promoting afforestation, reforestation, and revegetation (ARR).

Both REDD and ARR have been discussed in the context of the international negotiations on climate change, with ARR included under the Clean Development Mechanism (CDM) of the Kyoto Protocol and, since the mid-2000s, under the REDD+ mechanism. The REDD+ mechanism was officially introduced at the 11th Conference of Parties (COP) in 2005. The official meaning of REDD+, as defined by the United Nations Framework Convention on Climate Change (UNFCCC), is "reducing emissions from deforestation and forest degradation in developing countries, [including] the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" (UNFCCC 2011, FCCC/CP/2010/7/Add.1).

Since 2005, the term 'REDD+ projects' has been widely used to refer to on-the-ground efforts that aim to achieve the objectives of REDD+. Although the development of REDD+ at a local scale is well advanced, the term 'REDD+ project' is still poorly defined. This poses several problems.

First, 'REDD+ project' is often used interchangeably with other terms like 'forest carbon project', 'pilot project' or 'REDD+ initiative'. The extent to which these terms are analogues or distinct is not always made clear. Appendix 1 provides a detailed explanation of these terms, explaining their differences and overlap. The lack of clarity leads to confusion among researchers and practitioners. For example, the Global Database developed by the Center for International Forestry Research (CIFOR), contains "site-specific REDD+ projects" (Lawlor et al. 2013; CIFOR, 2014) whereas the Office National des Forêts International (ONFI) worldwide inventory contains 'forest carbon projects' (Chenost et al., 2011). These two inventories use different terminology, but have many projects in common, suggesting that the terms are not well-defined in the literature or in practice. This hinders communication between actors and constrains the advancement of knowledge on the issue.

Second, in spite of several portals dedicated to identifying and tracking REDD+ projects (Forest Trends (2014a), CIFOR (2014), REDD desk (2014)), there is imperfect information about the exact number of 'REDD+ projects' globally, due in large part to the lack of definitional clarity surrounding terminology. For example, CIFOR's database contains "over

300 site-specific REDD+ projects [and other forest carbon projects] under development across the world", while ONFI contains 434 'forest carbon projects', and other estimates range as high as 513 'forest and land-use projects' (Peters-Stanley et al. 2013).

Finally, due to a lack of information and clarity about what exactly constitutes a 'REDD+ project', there has been no global analysis of the structure of these projects and of the extent to which existing projects are likely to achieve the objectives of REDD+, as formulated by the UNFCCC.

This paper aims to clarify the concept of "REDD+ project" through the proposition of a definition and a typology of these projects globally. This clarification may help to avoid misunderstandings and to facilitate discussions between REDD+ negotiators, project developers, governments, and other actors involved in REDD+. The paper also seeks to improve transparency and knowledge of 'REDD+ projects' by providing a comprehensive global overview of REDD+ projects.

In this paper, we will focus on REDD+ at the local scale, and 'REDD+ project' will refer to site-specific REDD+ activities. We will exclude larger readiness activities that do not consist of on-the-ground interventions but that are instead focused on national REDD+ development (e.g. establishing national reference levels, strengthening institution, developing national strategies).

2 Materials and methods

2.1 Definition of the concept of 'REDD+ project'

An important step of this research has been to discuss the definition of 'REDD+ project'. Based on an analysis of the history of REDD+, we identified explanations for the current ambiguity surrounding the definition of 'REDD+ project'. Using these results, we suggest a more robust definition of 'REDD+ project', presented in section 3.5. This definition has been used to select the projects that have been included in the construction of the global database of REDD+ projects, described in section 2.2.

2.2 ID-RECCO: a new REDD+ database

A new database was created by the authors to improve knowledge on REDD+ projects[1]. This International Database of REDD + projects, linking Economic, Carbon and Communities data (hereafter, ID-RECCO), compiles data on 410 REDD+ projects globally. It also provides information on the 57 host countries and 362 project developers associated with these projects.

The construction of the ID-RECCO involved three main steps: 1) Identifying a set of 110 parameters common to all REDD+ projects, which describe the project's objectives, economic structure, carbon-related variables (e.g., carbon accounting methodologies, certifications standards, emissions reductions, and offset sales), and expected socio-economic impacts; 2) Organizing these concepts into a conceptual database schema; and 3) Populating the database with data extracted from the REDD+ literature, using Microsoft Access.

[1] The ID-RECCO database is available on http://www.reddprojectsdatabase.org/

The database was completed using publicly available information. The main sources of information were Project Design Documents (PDD) issued by project developers to enable certification by a standard of the voluntary carbon market where REDD+ projects can sell carbon offsets (CarbonFix (2014), CCBA (2014), CDM (2014), Plan Vivo (2014), VCS (2014)). We also used internet portals that specialize on REDD+ projects (Forest Trends (2014a), REDD desk (2014)), reviews (IGES 2014, CIFOR 2014), as well as press articles and the websites of project proponents.

2.3 Data analysis

Using the ID-RECCO database, project characteristics were classified and analyzed following ten axes, detailed in section 4 and listed in Appendix 2.

We excluded from the analyses projects that had been discontinued or not implemented[2]. As of 31 October 2014, we recorded 65 such projects that had not been implemented or had been discontinued (14% of all projects recorded). The following analyses exclude these projects and are based on a total of 345 projects.

3 What are REDD+ projects?

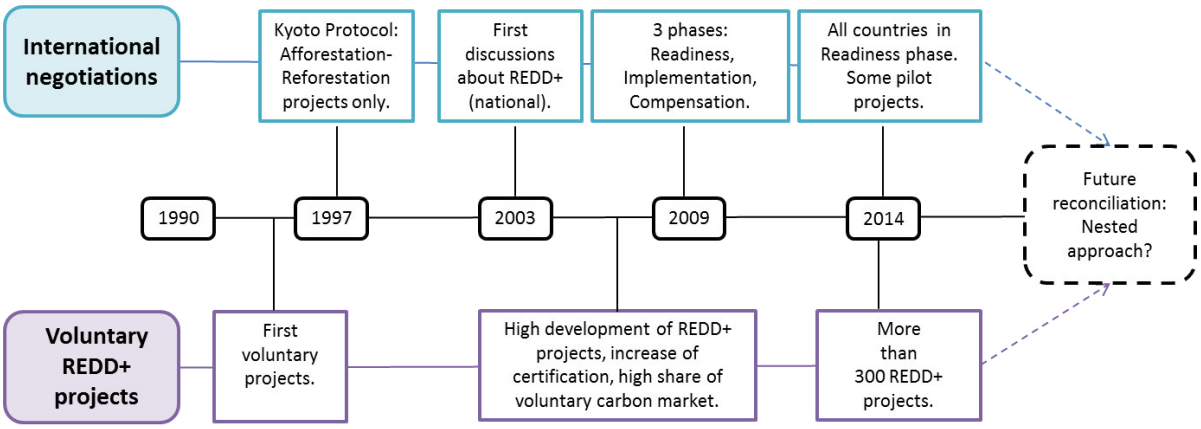
The complex history of the integration of forests in climate change negotiations has created three main sources of ambiguity surrounding the definition of a REDD+ project (Table 1). These ambiguities concern a) the scale at which REDD+ is operationalized, with a conflict between the national scale of the REDD+ mechanism as conceived by the UNFCCC and the local scale of many projects using the 'REDD+' tag ; b) the use of 'forest carbon projects' as a synonym of REDD+ projects, whereas 'forest carbon project' makes no distinction between developed and developing countries; and c) the activities encompassed, with some actors rejecting ARR projects from the scope of REDD+ projects, for the reason that ARR was already part of the CDM. Here, we discuss these three sources of ambiguity in detail.

3.1 Ambiguity regarding the level of action of REDD+

International REDD+ negotiations and readiness initiatives involving nation-states as the primary locus of REDD+ action and oversight have evolved in parallel to sub-national, local-scale REDD+ projects (Fig. 1). These concurrent processes have contributed to the ambiguity regarding the definition of REDD+ projects.

[2] The database contains a variable to indicate such projects (e.g. those that had been planned but abandoned, or planned with pending implementation, but with no on-the-ground activity, for example due to lack of financing or other difficulties).

Figure 1: Illustration of the evolution of REDD+ at national and local scales.



3.1.1 History of REDD+ and the lack of coordination between national and local scales

The preliminary intention of REDD+ was to create an international compensation mechanism for developing countries that would succeed in reducing their forest sector emissions (Pistorius, 2012). The initial proposition, presented by Papua New Guinea and Costa Rica at COP 11 (2005), included a proposition to implement REDD+ at national scale, in order to reduce the risk of leakage (Santilli et al., 2005). At COP 15 (2009), it was agreed that the mechanism would progress through three phases, beginning with capacity-building, proceeding to demonstration activities, and finally to full implementation and performance-based payments. At present, most countries are formally still in the first phase, also called the "readiness phase", meaning that neither implementation nor payments are expected to have occurred yet. However, numerous 'REDD+ projects' are blossoming around the world, with on-the-ground implementation and, in many cases, payments occurring.

There is thus a discrepancy between the intended implementation of REDD+ at a national scale, and the developmental trajectory that REDD+ has followed, which has led to hundreds of local initiatives. After COP 13 (2007) in Bali, pilot activities were encouraged (Pistorius, 2012) and at COP 16 (2010) in Cancun, article 71 of the Cancun Agreement authorized the development of subnational implementation, but without providing any detail. In parallel to pure readiness phase capacity-building activities (see examples in Table 1), several countries have begun developing REDD+ pilot or demonstration projects, which are local initiatives integrated into the national REDD+ strategy of the countries (see Appendix 1 for definition). There are for example four pilot projects in Peru, eight in Tanzania, and five in Indonesia (REDD Desk, 2014).

However, in parallel to UNFCCC negotiations, conservation organizations and carbon investors appropriated the REDD+ acronym to additionally label all forestry projects aimed at reducing CO_2 emissions in developing countries that involve direct remuneration for their results. Hundreds of self-defined 'REDD+ projects' are being developed around the world, many of them without coordination with the readiness activities of their host country. For example, in Peru 19 REDD+ projects are identified by the REDD Desk (2014), of which only four are classified as 'REDD+ pilot projects' (REDD Desk, 2014).

3.1.2 Different sources of funding for national- and local-scale REDD+

National REDD+ readiness is financed mainly by bilateral and multilateral public funds, with only small investments from private foundations and the private sector (Forest Trends, 2014b).

Among the main multilateral funds are the UN-REDD Programme (FAO, UNEP, UNDP), the World Bank's Forest Carbon Partnership Facility (FCPF) and Forest Investment Program (FIP), and the Congo Basin Forest Fund (African Development Bank). Norway is the principal provider of bilateral funds, with USD 2.8 billion committed through 2011 (Creed and Nakhooda, 2011).

Unlike national REDD+ activities, local REDD+ initiatives tend to attract private investments, often mixed with public financing. Anticipating the admittance of REDD+ activities into a global carbon market, some project developers have designed projects oriented towards generating carbon offsets. A carbon offset is an emission reduction made in order to compensate for an emission made elsewhere. Carbon offsets can access both compliance and voluntary carbon markets. In a voluntary market, participants are not subject to emission reductions requirements and buy carbon offsets for public relations, Corporate Social Responsibility (CSR), or personal reasons. In contrast, a compliance market is a market for carbon credits - a certificate or permit representing the right to emit one ton of CO_2 equivalent - created by the need to comply with a regulatory act. For example, in a Cap-and-Trade system, actors purchase carbon credits to comply with the cap or limit imposed on their emissions. In some cases, participants can also use offsets to reach their target, although in a limited way. For example, in the Kyoto Protocol, participants can buy offsets created by the Clean Development Mechanism (CDM) and the Joint Implementation (JI). Although their use is limited, the production of such offsets is uncapped.

Forestry offsets are currently excluded from the main compliance carbon markets (e.g. the European Union Emission Trading System). Therefore, forest carbon offsets are mainly sold in the voluntary carbon market, similarly to offsets generated by clean cookstoves and wind projects. In 2013, forestry offsets dominated the voluntary carbon market for the first time, totaling 44% of the volume of offsets transacted on this market (Peters-Stanley and Gonzalez, 2014).

3.1.3 Reconciling national and local scales of REDD+

Action on moving REDD+ forward at national and local scales has lacked coordination, with the "development of, on the one hand, the REDD+ UNFCCC policy framework […] and on the other, the multiplicity of initiatives and actors involved in the voluntary carbon market and pilot projects across geographical scales" (Corbera and Schoeder, 2011). REDD+ investors promoted project-based approaches instead of the national approach recommended by Santilli et al. (2005) since "they do not want to depend on the goodwill of governments to share REDD+ remuneration" (Karsenty, 2012). Project investors and developers also saw potential to make more profit by selling carbon offsets directly to selected clients, with total control over the contracts, and wanted to forge ahead with project implementation rather than waiting for UNFCCC and national REDD+ protocols to be debated and decided upon.

Most of these local and sub-national projects are not integrated into the national REDD+ strategies of the host countries and are thus not recognized by the UNFCCC as part of the

formal REDD+ mechanism. A REDD+ negotiator stated that for him "REDD+ projects do not exist" (personal communication, November 2012) because the mechanism is still in its readiness phase, and because the REDD+ scheme envisaged projects as means to curb *national* emissions. This lack of coordination, and the fact that local actions moved ahead more quickly than national strategies, causes negotiators to think about the future reconciliation between local and national activities. A "nested approach" is one possibility (Pedroni et al., 2009), which would aim to reconcile local-level project activities with national-level accounting systems and financial disbursement mechanisms. One option is that projects could receive the share of the credits corresponding to the emission reductions that they generate, with the remainder of funds directed to the government, in recognition of emissions reductions attributable to national policies and measures. The difficulty is that this formula is based on an ideal scenario, with complementary positive outcomes (i.e. emissions reductions) at both the project and the national level, and no 'leakage' of emissions occurring from one project location or region to another. If this is not the case, for example if some REDD+ projects reduce deforestation in one area of the country while in other areas or at the national level deforestation or forest degradation simultaneously increase compared to the baseline scenario, it would be impossible to accept the credits in a compliance market (Deheza and Bellassen, 2012a). Such a situation could occur as a result of sub-national leakage, for example if a government strategically selected the most accessible forests to develop agribusiness, while promoting REDD+ projects for more remote and less profitable forests. This scenario would lead to a shift of emissions from one location to another, with no overall reduction.

3.2 Ambiguity regarding forest carbon projects implemented in Annex I countries

The term 'forest carbon project' is sometimes used to avoid the ambiguity of using the REDD+ acronym to designate activities which are outside the UNFCCC mechanism (Chenost et al. 2011, Caplow et al. 2011, Peters-Stanley et al., 2013; see Appendix 1). However, forest carbon projects are also implemented in developed countries, including Canada, the United States, Australia, and New Zealand. Forest carbon projects in developed and developing countries are divided into similar categories of project (Avoided deforestation/conversion, afforestation/reforestation and improved forest management) and have some standards in common, the main one being the Verified Carbon Standard (VCS) (Table 1). Therefore, using 'forest carbon project' as a synonym for 'REDD+ project' can lead to ambiguity.

3.3 Ambiguity regarding the scope of activities

When focusing on REDD+ at the project scale, another debate arises, concerning the scope of activities that should be taken into account. In particular, there is disagreement as to whether ARR projects should be considered as REDD+ projects if they are not associated with an avoided deforestation component (Sunderlin 2010; Cerbu 2010; Calmel et al. 2010). In 1997, when the Kyoto Protocol was ratified, ARR projects were integrated in the CDM, whereas avoided deforestation was excluded for technical reasons - principally because of the risk of leakage. ARR projects were therefore originally introduced as a component of the Kyoto Protocol, rather than of the REDD+ mechanism. However, although REDD+ was initially limited to RED (i.e. avoided deforestation only), it then became REDD+ (i.e. to include avoided degradation and carbon stock conservation and enhancement), which

encompasses ARR activities. ARR activities thus qualify under both UNFCCC instruments: CDM and REDD+. Further, the low success of ARR-CDM projects means that most ARR projects no longer target the Kyoto market, but rather the voluntary carbon market. ID-RECCO data show that, as of October 2014, 30.8% of ARR projects were registered under CDM, 20.5% were not certified, and the rest (48.7%) were certified by voluntary market standards, including VCS, CarbonFix, and Plan Vivo (see Appendix 3).

There is less debate about the integration of Improved Forest Management (IFM) projects in the definition of 'REDD+ project' (see Appendix I). IFM projects are also included in the UNFCCC definition of REDD+ (UNFCCC, 2011), in the "sustainable management of forests" category. Moreover, IFM projects sell carbon offsets in the voluntary carbon market, using the same standards as REDD and ARR.

3.4 Examples illustrating the three sources of ambiguity

A wide diversity of projects are encompassed by the terms 'REDD+ projects' and 'forest carbon projects' (Table 1).

Table 1: Examples of 'REDD+ projects' and 'forest carbon projects'.

Examples illustrate the different levels of action. The first three rows provide examples of local-level actions; the fourth row provides an example of a national-level action. Examples are separated into those in Annex 1 and non-Annex 1 countries. Finally, the first three rows of the table provide examples of the different activities that could be included in REDD+ projects.

Sca-le	Activities ↓ Location→	Non-Annex I countries	Annex I countries
LOCAL	**Activity 1 : REDD –** Project aiming at Reducing Emissions from Deforestation or from forest Degradation	Oddar Manchey REDD project (Cambodia). Certified CCBA[3]. Goal: partner with local communities to establish Community Forest groups that implement project activities to reduce deforestation, improve livelihoods and protect biodiversity.	Denman Island Avoided Conversion of Forestlands Project (Canada). Certified CCBA[4]. Goal: protect over 750 hectares of ecologically sensitive lands in British Columbia.
	Activity 2 : ARR – Project aiming at increasing carbon sequestration in trees through Afforestation, Reforestation and Revegetation	Reforestation of degraded land in Chhattisgarh (India). Certified VCS[5]. Goal: rehabilitation of degraded lands by plantation of indigenous species and enhancement by establishment of carbon sink.	Reforestation Across the Lower Mississippi Valley (United States). Certified VCS[6]. Goal: The project sequesters carbon by planting forests on former agricultural land.
	Activity 3: IFM – Project aiming at Improving Forest Management in order to reduce carbon emissions	Kamula Doso Improved Forest Management Carbon project (Papua New Guinea). Ongoing CCBA certification[7]. Goal: improve natural resource based livelihoods by preventing logging in the Kamula Doso project zone through development of a carbon finance revenue stream.	Bethlehem Authority Improved Forest Management Project Area (United States). Certified VCS[8]. Goal: put a Pennsylvanian forest under a 60-year term conservation easement, employ a sustainable level of harvesting and facilitate improvements in the overall health of the forest.
NATIONAL	**Activity 4: –** Construction of a national strategy to curb GHG emissions (Readiness initiatives for South countries)	Example of Readiness initiative: Making the Cameroon forest sector transparent (Cameroon)[9]. Goal: increase access to information on forest sector activities and support a network of Civil Society Organizations working on forest governance. Other example: Capacity building for the use of satellite imagery for forest monitoring (Cameroon)[10].	Although Readiness is not defined for developed countries, as they are not involved in the UNFCCC REDD+ mechanism, several present or are preparing a national or regional schemes aiming at curbing carbon emissions, mainly in industrial sectors (countries involved in the European carbon market, China, New-Zealand, California).

[3] http://www.climate-standards.org/2013/08/30/reduced-emissions-from-degradation-and-deforestation-in-community-forests-oddar-meanchey-cambodia/

[4] http://www.climate-standards.org/2012/05/11/denman-island-avoided-conversion-of-forestlands-project/

[5] https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=689&lat=21%2E7306184510487&lon=83%2E4491609171772&bp=1

[6] https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=774&lat=35%2E238785&lon=-91%2E602826&bp=1

[7] http://www.climate-standards.org/?s=kamula

[8] https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=1060&lat=40%2E980961&lon=-75%2E548083&bp=1

[9] http://theredddesk.org/countries/initiatives/making-forest-sector-transparent-cameroon

3.5 Proposal for a definition of REDD+ project

Local and national REDD+ activities will have to be reconciled before the REDD+ UNFCCC mechanism enters into its compensation phase. Therefore, we contend that the concept of 'REDD+ project' should encompass all local projects that might, in the future, be integrated into the national or other jurisdictional REDD+ accounting of a country. We build on the UNFCCC definition of REDD+ (section 1) and argue that REDD+ projects should include not only the activities of avoided deforestation and degradation, but also all the activities leading to the "conservation, sustainable management of forests and enhancement of forest carbon stocks". We will therefore define 'REDD+ projects' as all projects that meet all of the following criteria (Figure 2):

1) *Projects at the local or landscape, but not national, scale* that "operate in a geographically defined site or sites, with predetermined boundaries, including activities that aim to incorporate carbon into land use decisions and planning across heterogeneous landscapes at a subnational scale" (Sunderlin, 2010).

2) *Projects with the explicit aim of reducing emissions from deforestation and forest degradation, improving forest conservation or management, or enhancing forest carbon sequestration:* This encompasses projects of avoided deforestation and degradation (REDD), afforestation/reforestation/revegetation (ARR) and improved forest management (IFM), with or without logging. The three project types are explained in Table 1.

3) *Projects financed by REDD+ funds and/or carbon markets:* Although most REDD+ projects are involved in the process of certification and sale of carbon offsets in the voluntary market, many also depend, in whole or in part, on public funds focused on climate change, conservation, or development. A prominent example is the Amazon Fund, which participates in the financing of many REDD+ projects in Brazil, and which aims to raise "donations for non-reimbursable investments in efforts to prevent, monitor and combat deforestation, as well as to promote the preservation and sustainable use of forests in the Amazon Biome" (Decree N. º 6,527, dated August 1, 2008).

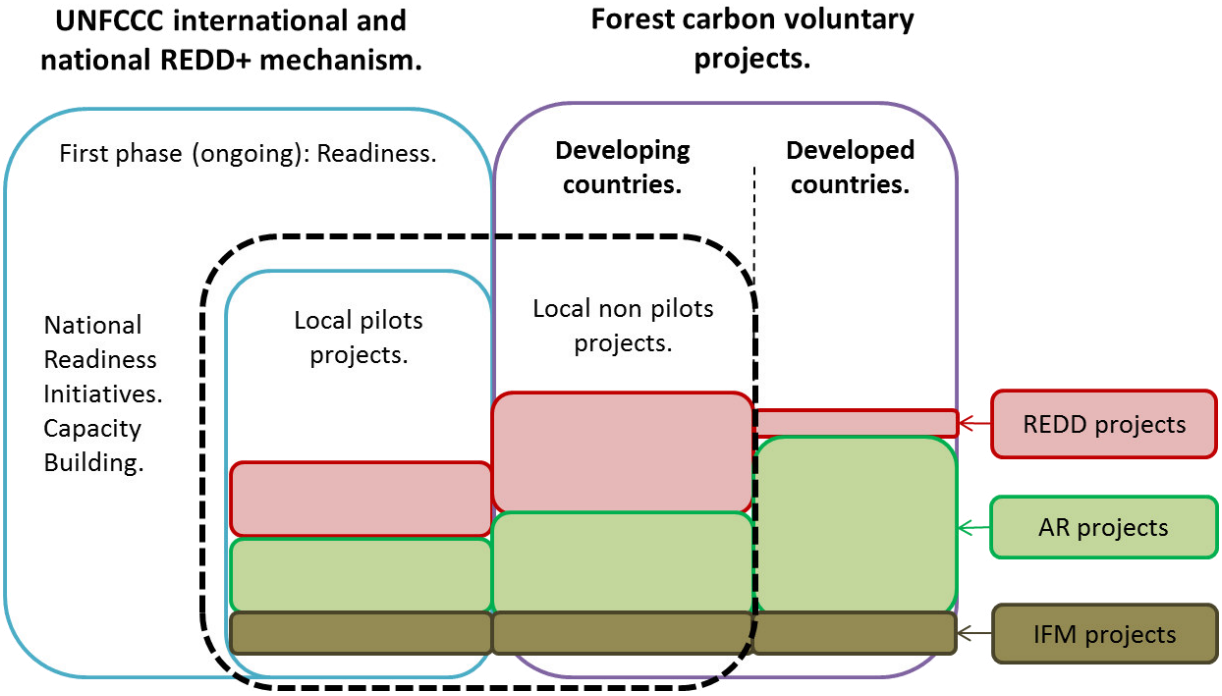
4) *Projects located in forested, non-Annex I countries and thus potentially involved in the UNFCCC REDD+ mechanism:* Among these countries, we include both those which are involved in one of the main collaborative initiatives on REDD+ (UN-REDD and FCPF) and those which are pursuing REDD+ readiness outside of the main multilateral partnerships (e.g. Brazil).

We distinguish between projects implemented in coordination with the national government (pilot or demonstration projects) and those which are not, keeping in mind that both should have their emission reductions accounted for when countries will reach the third, compensation-phase of REDD+.

For the purposes of the ID-RECCO database, we do not consider as REDD+ projects (Fig. 2) forest carbon projects located in an Annex I country. Only forest carbon project in a non-Annex I country will be considered as a 'REDD+ project'. REDD+ initiatives located in a developing country but which operate at a national scale (rather than a local or landscape scale), such as national capacity-building initiatives (Table 1), will also not be considered as REDD+ projects.

[10] http://reddplusdatabase.org/arrangements/1337

Figure 2: Delineation of the scope of 'REDD+ project' as defined in this study.



4 Typology of REDD+ projects

The murkiness surrounding the concept of REDD+ projects is in part associated with a lack of information about the details of these projects. To enhance the knowledge and transparency of REDD+ projects, we here provide an overview of REDD+ projects globally, as of October 2014. This overview is based on a new typology that we propose as a tool to help in classifying REDD+ projects and reducing the complexity that arises from their diversity.

A few attempts have been made to classify REDD+ projects. Calmel et al. (2010) classified REDD+ projects using four criteria: location, type, size, and certification standard. Madeira et al. (2010) proposed a typology of REDD+ pilot projects in Indonesia, identifying three main criteria: degree of spatial planning and heterogeneity of forest classification (site level versus landscape level), strategy for establishing long term claims of carbon, and predominant driver and agent of deforestation and degradation. Sunderlin et al. (2010) highlighted four main criteria: project objective and scope, project type (e.g. REDD, ARR), project strategy and activities, and project developer status. Finally, May et al. (2004) distinguished between commercial projects, conservation projects, and developmental projects, depending on the project's main priorities and objectives.

Based on the literature and ID-RECCO, we propose a novel typology of REDD+ projects, based on the ten following themes: location, type, size, time period, project developer, conservation co-benefits, social co-benefits, forest context, financing, and carbon-related component (see Appendix 2 for associated variables).

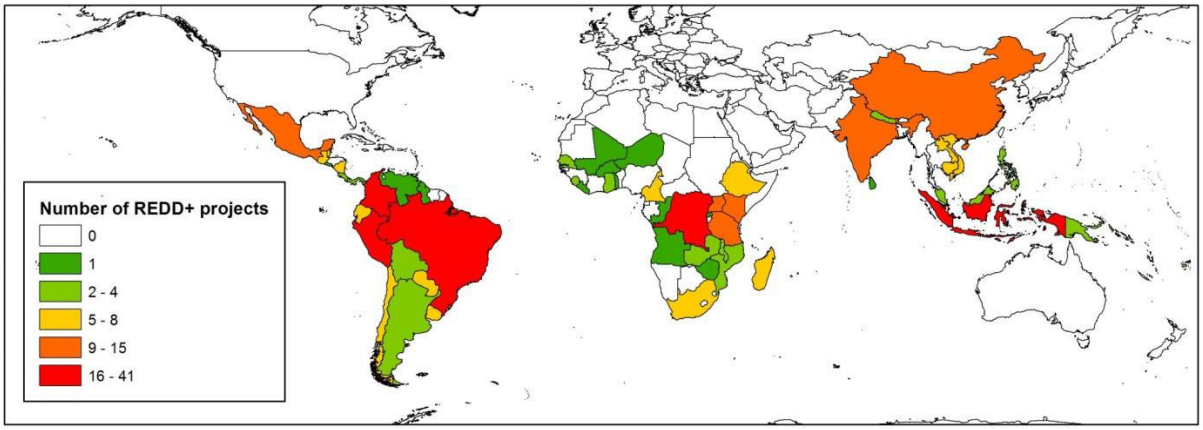
Here, we present the ten themes adopted in the typology and use the data collected in the ID-RECCO database to provide a snapshot of the global distribution of REDD+ projects as of

October 2014. We focus particularly on the "carbon-related component" criterion, as it is a core element of REDD+ projects.

4.1 Location: concentration in Latin America and in tropical humid forests

Location is a key variable in a global analysis of REDD+ projects (Calmel et al. 2010, Cerbu et al. 2011). Location can be considered on two scales: continent and country, to analyze both global and national trends (Figure 3).

Figure 3: Location of REDD+ projects in 2014.



As of October 2014, Latin America had the most REDD+ projects globally, with 43% of all ID-RECCO projects located there. This finding confirms previous suggestions of bias toward Latin America in the location of REDD+ demonstration projects (Cerbu et al. 2011). Of the remaining projects, 31% were located in Africa (mainly East Africa), while 26% were located in Asia. Previous studies (Cerbu et al. 2011) suggested that a smaller proportion of projects were located in Africa, but our larger sample size, and inclusion of ARR projects, represent a more complete picture, at least using our broader definition of REDD+ projects. At the country level, the five countries with the largest number of projects were Brazil, Indonesia, Peru, Colombia and the Democratic Republic of Congo (41, 29, 21, 20 and 18 projects respectively).

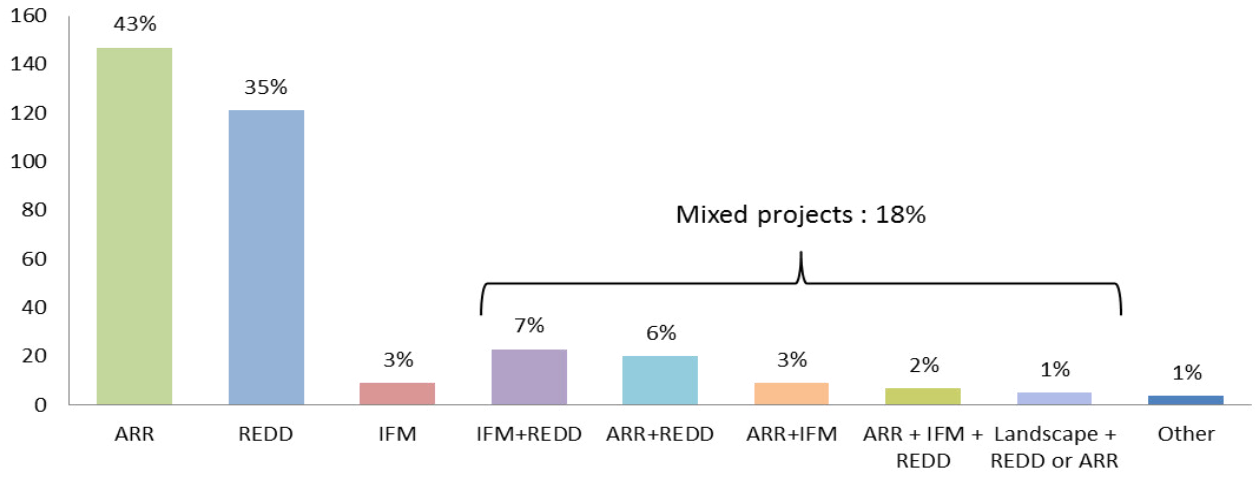
The issue of the link between the number of REDD+ projects and some national characteristics can be raised. In terms of corruption, the map shows that there is not a clear indication on whether corruption acts as an incentive or a brake on the development of REDD+ projects. While Brazil has the most REDD+ projects of any country and also has a low level of corruption (control of corruption estimated at -0.1 in 2012 by the World Bank), this trend does not hold in countries such as Indonesia and the Democratic Republic of the Congo, which have many projects but also higher reported levels of corruption (control of corruption estimated at -0.7 and -1.3 respectively). The main criterion determining the number of REDD+ projects within a country seems to be the existence of a large area of humid forest, with a possible high potential to generate carbon offsets, as discussed in section 4.8.

4.2 Project type: ARR dominates in spite of the limited success of CDM

We suggest that two aspects should be analyzed under this criterion. First, it seems important to distinguish between pilot vs non-pilot REDD+ projects. As of October 2014, 95 projects captured in the ID-RECCO database are coded as pilot projects (27.5% of total projects), meaning that they are formally integrated into the national REDD+ strategy and readiness process. The fact that nearly three-quarters of projects identified by ID-RECCO are not integrated into national REDD+ preparation processes speaks to the lack of coordination between national and subnational actors and initiatives, and suggests that the process of 'nesting' these independent projects within national accounting schemes could prove challenging.

Secondly, the project type can be characterized by the nature of activities developed on the ground. As explained in section 3, we consider that REDD+ encompasses REDD, ARR and IFM activities.[11] These typologies were defined by the VCS (VCS, 2013) and are now commonly used. Figure 4 shows that REDD and ARR projects are almost equally represented – with a small trend towards ARR projects – whereas IFM projects are still a minority. Moreover, 18% of the projects encompass multiple project categories, highlighting the complementarity that often exists between REDD, ARR and IFM.

Figure 4: Repartition of REDD+ project types



Regarding ARR projects, we can note that although they are largely inspired by the CDM, only 31% of them are certified by the CDM standard. The majority use standards of the voluntary market.

The limited number of projects seeking and/or obtaining CDM certification can be explained by the cumbersome procedures required by the UNFCCC, the complexity of methodologies (from which the majority of VCS methodologies derive) and mainly the lack of demand for

[11] Although they also address forests, carbonization projects are not included in REDD+ projects but in energy projects.

CDM forestry offsets. As of December 2014, only 55 forestry projects were registered under the CDM (Unep-Risoe, 2014).

The dominant project type varies by location. As of October 2014, Asia shows a trend toward REDD projects, with 48 REDD projects and 35 ARR projects. On the contrary, Latin America and Africa (mainly East Africa) contain more ARR projects (54 ARR and 48 REDD in Africa, and 75 ARR and 70 REDD in Latin America). This trend can also be observed at the country scale, with some countries being more specialized in ARR projects (Uruguay, Kenya, Peru, China and India for example) whereas others have more REDD projects (Cameroon, Vietnam and Indonesia).

These trends in project type clustering can be analyzed in relation to countries' features, most notably the likely position of countries in the forest transition curve (Simonet and Wolfersberger, 2013).

4.3 Size: a direct correlation with project types

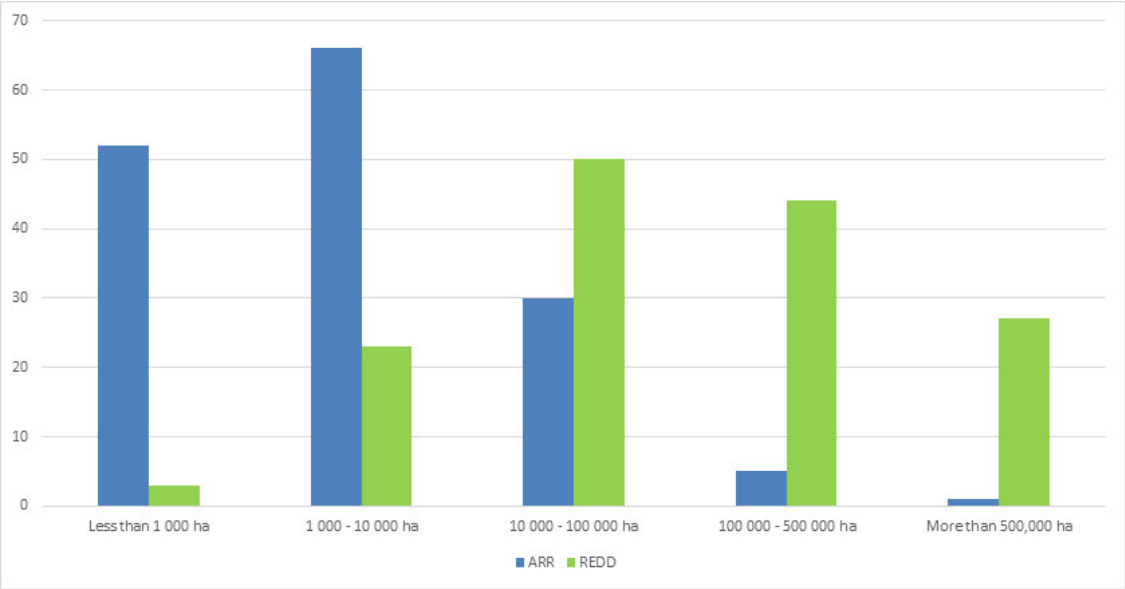
This criterion can be divided into two closely related categories: the scale of the project and its total area.

In terms of scale, we use the classification of Sunderlin et al. (2010) who differentiate between projects that "directly reduce carbon emissions from forests or increase carbon stocks in forests in a quantifiable way in a specific local area (i.e., site-level project)" and projects that "incorporate forest carbon into land use policies and spatial planning at the landscape level". A methodology specific for mosaic and landscape-scale REDD projects was approved by the VCS in January 2014[12]. The ID-RECCO database currently contains only four landscape scale projects, including the Kurela Landscape REDD+ Program in Malawi, which received VCS landscape certification in August 2014.

Although the mean area of all projects studied is around 227,000 hectares (ha), project areas vary from less than 1,000 ha to more than 10 million ha, in correlation with the type of project. As illustrated in Figure 5, most ARR projects are logically small-sized, with a third of the projects taking place on less than 1,000 ha. The average ARR project size is 17,000 ha. On the contrary, the majority of REDD projects take place on a larger scale; half of the projects are larger than 100,000 ha, with an average size of 466,000 ha.

[12] http://www.v-c-s.org/methodologies/methodology-carbon-accounting-mosaic-and-landscape-scale-redd-projects-v21

Figure 5: Number of ARR and REDD projects by area



Projects with the largest area are located in countries where REDD readiness preparation and implementation is already well underway: Brazil, Indonesia, Peru, Cameroon and Democratic Republic of Congo. Many of these projects are still in their early stages and are therefore not active in the whole area of the project, but are focusing primarily on preliminary activities like the identification of deforestation drivers or the clarification of tenure rights.

As of October 2014, the total geographic area covered by all of the REDD+ projects registered in our database is around 72 million hectares, or nearly the size of Chile or Zambia.

4.4 Time: a recent crisis of the carbon model?

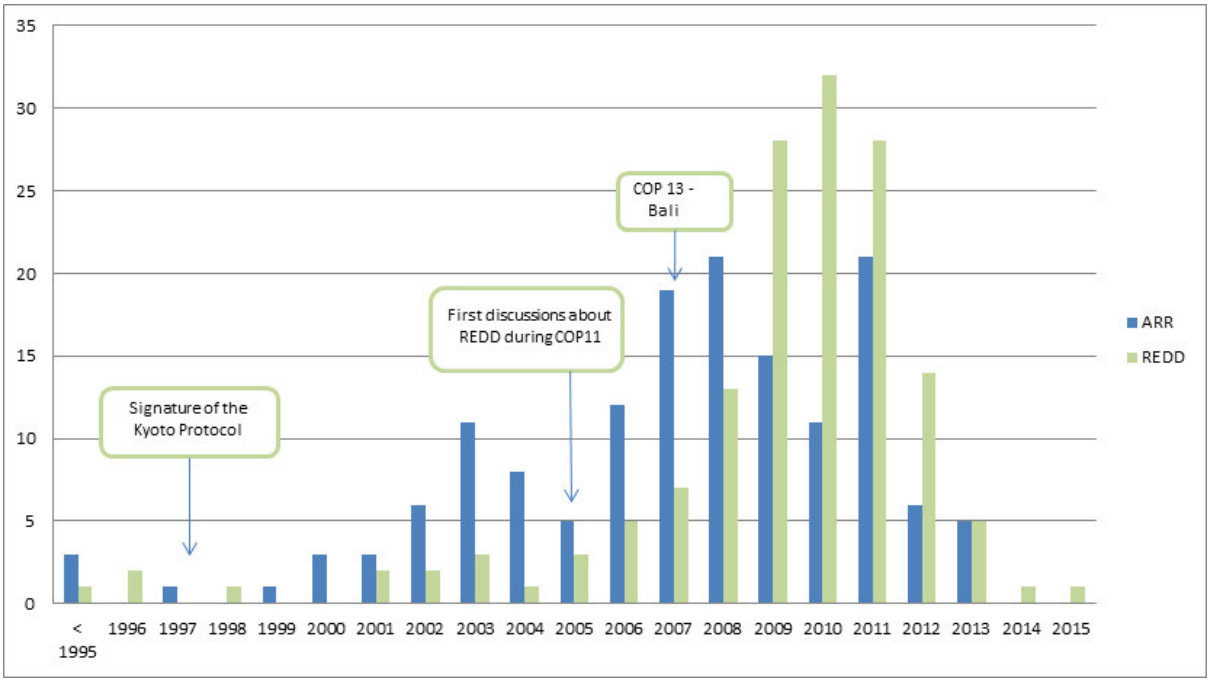
The time frames of project initiation are interesting to study as they show a significant correlation with the outcomes of international climate change negotiations. As the CDM mechanism was part of the Kyoto Protocol, ratified in 1997, numerous CDM-ARR projects started from this date. This can explain the trend towards ARR projects from 1997 to 2005, with a peak in new project initiation over this period in 2003. However, it is important to note that these projects are not necessarily CDM; as shown in section 3.2, many ARR projects are integrated into the voluntary carbon markets and certified by voluntary standards.

Contrary to ARR, REDD only became an integrated part of the global mitigation agenda in 2007 during COP 13 in Bali, and numerous projects were created after this date. More than half of REDD projects started in 2009 and 2010, as illustrated in Figure 6. Yet, some REDD projects started in 2005 and 2006, probably as a result of the discussions that occurred during COP 11 (2005) in which Costa Rica and Papua New Guinea first raised the idea of the so-called 'RED mechanism'. Projects which started before 2005 are either ARR CDM or

projects which were originally simply focused on conservation but have since evolved toward the REDD+ mechanism.

The slowdown observed for 2012 and 2013 is in line with the difficulties faced by carbon finance, particularly in the European carbon market, and with the uncertainty surrounding the future of the REDD+ mechanism. Although data are often more difficult to collect in the most recent years of a study due to updating delays, we believe that this is a genuine decrease rather than an artifact of the data, as the portals we used for data collection are regularly updated.

Figure 6: Starting dates of REDD+ projects, by project type (ARR and REDD)



NB: 31 projects had no data on starting date and were not included in the graph. IFM projects (11) were not taken into account.

Projected project duration varied from one year to more than 100 years in a few cases, with an average of 30 years. About 16% of the projects are expected to last between one to five years; usually, those projects are REDD pilot projects which do not necessarily seek to continue their activity after the first demonstration phase. As shown in Table 2, non-certified projects have a shorter duration than certified projects. This can be explained by the fact that certification standards require project developers to have a long-term vision and monitoring plan for their project – usually 30 years (which corresponds to three crediting periods) or more.

Table 2: Project duration and certification status

Project status	Average duration (in years)
Average certified/pipeline	**34.4**
- Certified	36
-In process	30.3
-Intended	28.1
Average not certified	**16.9**
Average all projects	**30**

4.5 Project developers: the dominance of the private sector

As of October 2014, 362 project developers have been identified in the ID-RECCO database. The large majority of them belong to the private sector, either from for-profit organizations (38%) or NGO/not-for-profit organizations (41%). A smaller portion of project developers belong to the public sector (16%) or are research institutes (3%).

These findings indicate that REDD+ project developers largely fall within two main profile types: conservation or development NGOs which customized their projects to fit the requirements of REDD+; and private sector actors looking to seize the opportunity of newly developing carbon finance markets to start capital-generating projects focused on carbon. The involvement of the public sector in site-specific or landscape-scale REDD+ projects is often linked to readiness activities, that is, pilot projects integrated into national strategies. Out of 72 projects developed by the public sector, 40 projects (55%) are listed as pilot projects.

4.6 Conservation co-benefits: a strong focus on conservation and an over-representation of protected areas, which questions the additionality of projects

The sixth criterion of our project classification system refers to conservation co-benefits. As of October 2014, conservation is presented as the main objective for 38% of REDD+ projects, and 36% of projects chose conservation as their second or third objective.

Although conservation is more often quoted as a primary objective, climate and development objectives are mentioned with the same frequency when including secondary and tertiary objectives. This is consistent with the multi-objective character of the REDD+ mechanism, highlighted by the social and biodiversity safeguards validated after COP 16 in Cancun (2010). The frequency with which project developers cite conservation and development as core project objectives is mainly due to the fact that REDD+ projects are in many ways very similar to the model of conservation and development projects which preceded REDD+, most notably in terms of approaches and proponents.

Of the 410 REDD+ projects coded in the database, 108 projects overlap spatially with protected areas[13] – either partly or totally. This represents almost a third of analyzed projects. This trend, which concerns 37% of REDD projects and 24% of ARR projects, might question the legal additionality of these projects, particularly in the case of REDD projects (McFarland, 2010). In fact in several cases, as for instance REDD projects in Madagascar, conservation of protected areas was not fully effective before the implementation of the project. REDD+ thus became a way to finance existing protected areas. Even though the legal additionality of the carbon sequestration can be validated in this case, the use of REDD+ projects to finance conservation implies a long-term risk similar to that highlighted by Tirole et *al*. (2009) regarding CDM. Indeed, the potential to receive REDD+ financing might become a disincentive for governments to invest in an effective forest conservation policy.

4.7 Social co-benefits: ICDP approach dominates

In November of 2013, COP 19 in Warsaw reaffirmed the importance of accounting for local populations in the development of REDD+ strategies. Moreover, several authors focus on the impact of REDD+ projects on local populations (Lawlor et al. 2013, Jindal et al. 2012, Palmer and Silber 2012, etc.), and this issue is at the core of many criticisms of REDD+. Our seventh criterion thus focuses on social co-benefits of REDD+ projects.

A first element to consider is the degree to which economic development or livelihood enhancement is expressed as an explicit goal of the projects. As of October 2014, 75% of ID-RECCO projects had included 'development' as one of their goals, of which 20% listed development as their main goal. A majority of the projects have development as a secondary goal, but very often in those cases, development was considered as an integral part of the project, equally as important as climate or forest conservation.

A second key element is the degree of participation of local populations in the implementation of projects. Of all projects listed in the database, 77% claimed to have adopted a participatory approach. However, a participatory approach can include many forms and degrees of involvement, ranging from integrating communities into management and decision-making, to conducting consultations and Participatory Rural Appraisals (PRA), to simply informing the population about the project. In most projects, local populations are informed and consulted through a PRA, but they are rarely involved in decision-making and project design or in the management of the project (Table 3). We also considered the receipt of Free, Prior and Informed Consent (FPIC) from project-affected populations as a good indicator of community participation. Projects applying FPIC guidelines almost always mention these efforts in project documents; thus, it was relatively easy to identify the 15.7% of projects which had an FPIC objective.

[13] Five projects had no data regarding protected area. IFM projects are included in the calculations.

Table 3: Level of participation in REDD+ projects, as described by project developers

Activities conducted as part of the participatory approach	**Number of projects**	**% out of the 345 projects**
Participatory approach claimed but not defined	10	2.9%
Only Informed	26	7.6%
Informed + PRA	159	46.2%
Informed + PRA + involved in decision-making	37	10.8%
Informed + PRA + involved in decision-making AND management	33	9.6%
FPIC	54	15.7%
No participatory approach or no data	79	23%

Although participation is mentioned in 77% of projects' documents, it is very difficult to assess the degree to which participation actually occurred on the ground. The same applies for efforts to comply with FPIC guidelines. Participation will always be put forward by project developers to paint projects in as positive a light as possible, to avoid potential contestations, and to guarantee that the project meets the social requirements of REDD+ certifications standards and voluntary market offset buyers. The depth of participation in REDD+ projects by local populations should be explored further, as it will be a key element for the ultimate success of projects.

A third evidence of social co-benefits is the use of a social standard such as the Climate, Community and Biodiversity (CCB) certification system. As of October 2014, 115 projects (33.4%) were certified or in the process of being certified by a social standard. Most of them (89 projects) adopted the CCB certification, while 26 projects chose the Plan Vivo standard. This relatively high number illustrates the perceived importance among project developers of having a social certification label to be able to successfully sell offsets in the voluntary market. In the database, 77 projects chose to combine CCB certification with another standard – VCS in most cases. According to Peters-Stanley et al. (2013), there had been an unprecedented demand for forestry offsets combining VCS and CCB certification in 2012 (12.2 MtCO2), showing a specific demand among buyers for co-benefits in the voluntary carbon market.

Finally, we suggest that the existence of social co-benefits could also be analyzed through core components of project design and benefit distribution systems, including the design and implementation of payments for local populations (i.e. conditional or unconditional), the creation of jobs, the creation of income generating activities and the existence of development activities focused on education, health, water provision and other benefits.

More than half (53.8%) of the projects have, at least in design, included payments to communities, following the approach of Payment for Environmental Services (PES). This can be direct and unconditional payment, or payment linked to practice – for example, providing a share of the revenues from the sale of carbon offsets on the condition that community members comply with agreed upon behaviors and practices initiated by the project[14].

At the same time, most REDD+ projects are structured along the lines of Integrated Conservation and Development Projects (ICDP), with economic activities implemented in half of the projects and development activities mentioned in nearly all of them. The use of ICDPs as a conservation tool has been criticized for insufficient results in terms of forest conservation and changed land-use practices (Fearnside, 1997; Wunder, 2006; Ferraro and Kiss, 2002). Yet, despite the fact that the PES approach is increasingly promoted by researchers and policy-makers, the ICDP approach is still widely used by REDD+ projects globally, perhaps because it is often easier and less costly to implement than PES. The two approaches can be combined, and most REDD+ projects implementing PES are also using ICDP approaches.

Numerous researchers, including Agrawal et al. (2011), highlight the potential negative impacts that REDD+ could have for biodiversity and local populations. However, we can make the hypothesis that these feared negative impacts might be mitigated by the importance given to certification in the voluntary carbon market. As further detailed in section 5, certification is becoming a *de facto* prerequisite to sell in this market; the reputation of project developers is too important to allow them to take any risks that their projects may be perceived to be causing negative impacts. However, as jurisdictional REDD+ continues to develop, the role of voluntary market certification standards will likely be greatly reduced, pointing to the importance of developing and enforcing rigorous social and environmental safeguards for jurisdictional REDD+ programs. The VCS anticipated this evolution and, in 2013, launched a methodology to certify Jurisdictional and Nested REDD+ programs[15].

4.8 Forest context: agriculture as the main deforestation driver

A large majority of REDD+ projects are located in humid forests (42%, compared with 14% in dry forests, 7% in dry and humid forests, and the rest being “other” or “no data”). This finding is in line with Wertz-Kanounnikoff et al. (2009) who found that REDD+ demonstration projects were located mostly in humid forests which are very rich in carbon.

This trend might have several explanations. First, in the initial proposal made by the Coalition of Rainforest Nations, the REDD+ mechanism was intended to be limited to tropical forests. We can also consider the fact that conservation NGOs, which make up a large percentage of project developers, had already established extensive conservation agendas in humid forests before REDD+ started. Finally, humid forests have a higher above-ground carbon stock than dry forests (Skutsch and Ba, 2010), which suggests that they are better able to generate carbon offsets through avoided deforestation and degradation. However, this statement should be nuanced by the fact that human population densities are much

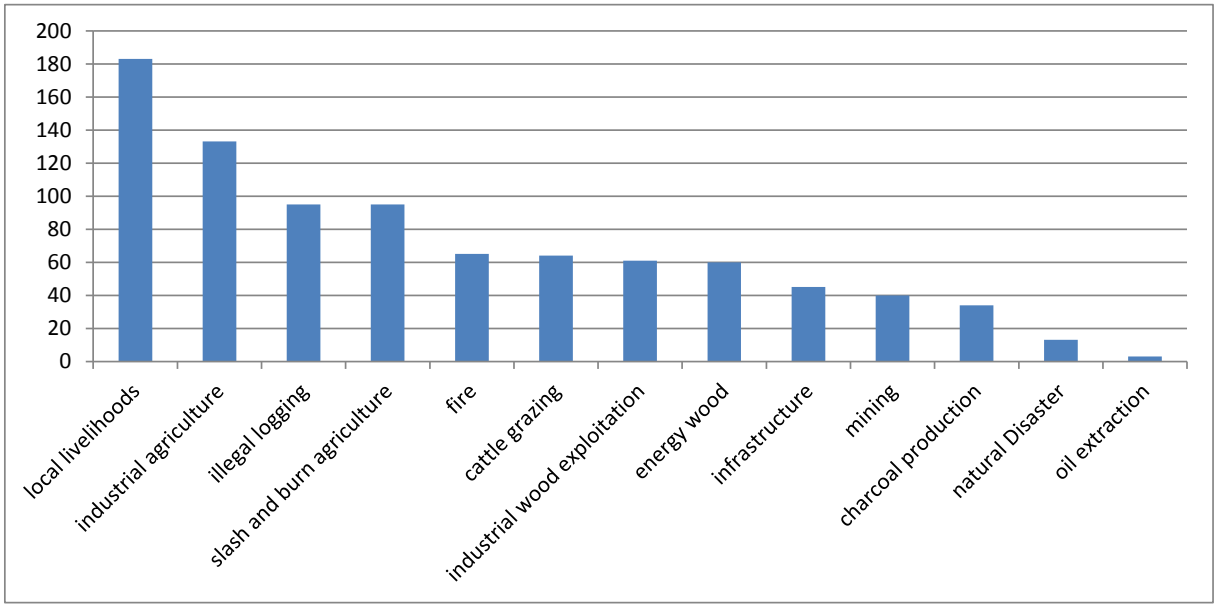
[14] As this information comes from project design documents and project descriptions, these claims and intentions have to be treated with caution – it is not certain whether these contract payments will happen on the ground.

[15] http://www.v-c-s.org/JNR

higher in dry forests than in humid ones, meaning that dry forests are more subject to degradation and could represent a considerable source of emissions (Skutsch and Ba, 2010).

In addition to forest type, a second sub-criterion of the overall forest context of REDD+ projects concerns deforestation agents and drivers. The importance of this criterion is demonstrated by the decision taken during COP 19 (Warsaw, 2013) to "reaffirm the importance of addressing drivers of deforestation and forest degradation in the context of the development and implementation of national strategies and action plans by developing country Parties[16]".

Figure 7 : Occurrence of deforestation drivers in ID-RECCO projects



As shown in Figure 7, the most common deforestation driver is "local livelihoods", which confirms the idea that REDD+ projects most commonly focus on small scale agents of deforestation, who are often perceived as having a lower opportunity cost. "Industrial agriculture" is the second most cited deforestation driver, showing that large agents of deforestation might also be tackled through REDD+ projects. In reality, large agents of deforestation are rarely mentioned in project activities. Many of the projects with industrial agriculture as a primary driver are located in Brazil, where cattle ranchers are described as a main driver of deforestation but are generally not the main target of the project.

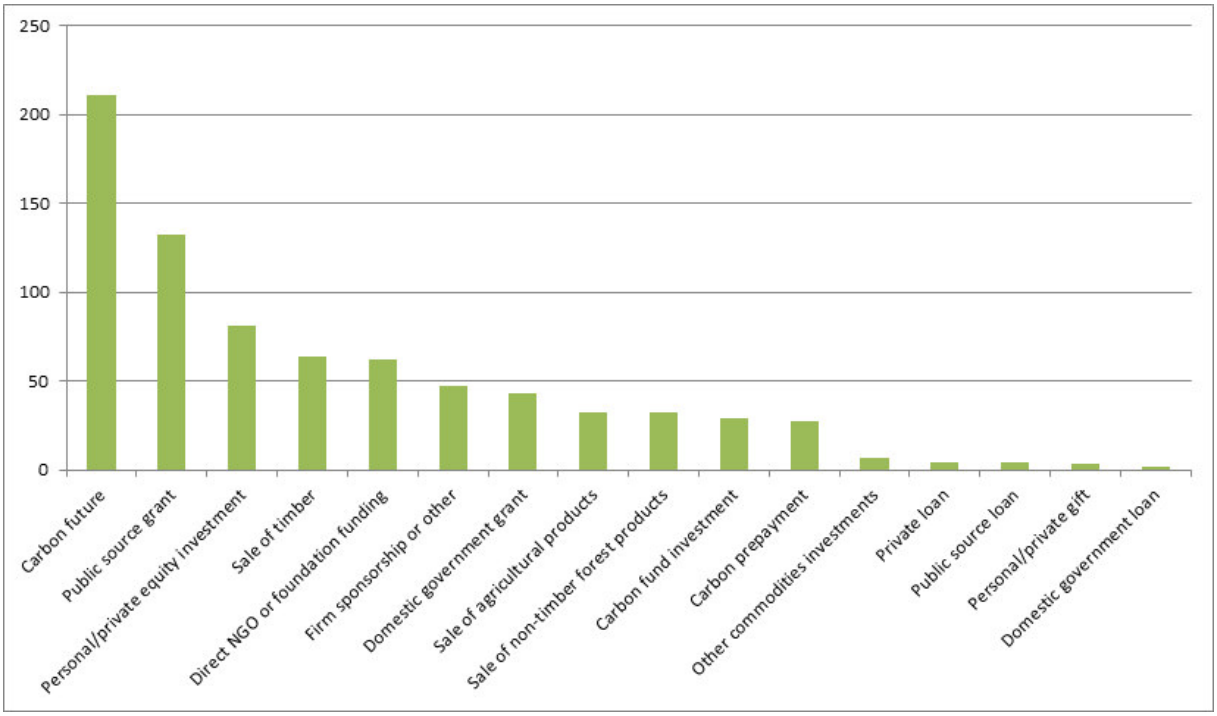
4.9 Financing: carbon as a secondary source of revenue

Information on financing should be analyzed cautiously as we only have access to bits and pieces of the full scope of information, which corresponds to what the project developer (and other actors) chose to make public. In particular, as project developers seek to receive carbon financing, it is logical that they highlight this type of financing in particular.

[16] Decision 1/CP.16, paragraphs 72 and 76.

A primary reason that many project developers oriented their projects toward REDD+ was the expectation of new and additional revenue streams. These sources of revenue can be income from the sale of carbon offsets or the receipt of public funds dedicated to REDD+. As seen in figure 8, the most frequently mentioned financing source is the sale of carbon offsets (61% of the projects). In most cases, this revenue is projected and dependent on future transactions, which may or may not actually occur. As supply currently exceeds demand in the forest carbon market (Deheza and Bellassen 2012b), it will likely prove difficult for project developers to find buyers.

Figure 8: Occurrence of financing sources mentioned by project developers



The prepayment of carbon offsets provides more flexibility for project developers, but only about 16% of projects appear to have accessed funding from the *ex-ante* sale of carbon offsets. These factors help to explain why most projects rely on other financing sources in addition to carbon financing. We found that 24% of projects rely, at least in part, on the private financial resources of the project's developers, and 32% of projects received external private financing – equally split between corporate sponsorship and NGO/foundation funding. Another main financing source for REDD+ projects is public aid: 52% of projects received public financing, with 13% of projects receiving funding from the project's host country, either from a domestic grant or a domestic loan. Finally, 37% of projects rely, at least in part, on the sale of agricultural, wood or other forestry products, which benefit from more stable markets than carbon offsets. Projects are using, on average, 2.4 distinct categories of funding sources, showing a trend towards revenue diversification.

Our analysis shows that carbon finance is only a small part of the financing model of REDD+ projects, which have been forced to rely on diversified financing sources in the face of uncertainty and low prices on the voluntary carbon market. This could be referred to as a crisis of carbon finance, since the demand for REDD+ carbon offsets is not at all ensured.

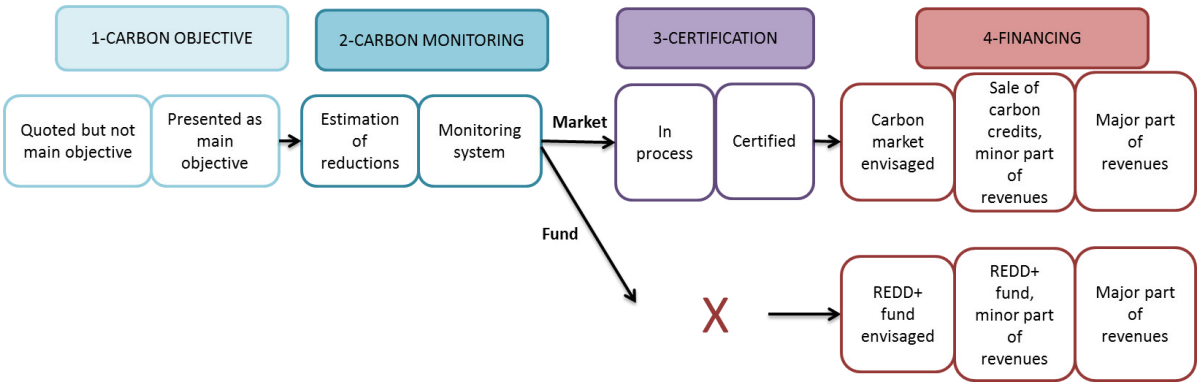
Although the financial additionality of projects is required by the various certification standards, project developers are forced to use a variety of financing in order to avoid total dependence on the uncertain future of the voluntary carbon market.

4.10 Carbon component: a common and core characteristic in all REDD+ projects

Unlike the nine themes previously presented in this section, the existence of a carbon component is the only criterion which is common and specific to all REDD+ projects. The carbon chapter could be defined as all the elements developed by the project proponent in order to prove that the project effectively contributes toward climate change mitigation, justifying its "REDD+" status and its eligibility to access REDD+ related financing.

As illustrated in Figure 9, considering the diversity of REDD+ projects and the different levels of attention devoted to climate change mitigation metrics by both project developers and certification standards, the carbon component of REDD+ projects can be divided into four main categories: 1) Declaration of a climate objective; 2) Monitoring of the emission reductions and/or carbon sequestration generated by the project; 3) Certification of the impact on climate change mitigation and 4) Existence of carbon-related financing.

Figure 9: Scale representing the carbon chapter of REDD+ projects



These four categories are described in more detail in section 5 to highlight the originality of REDD+ projects compared to other carbon projects.

5 Discussion: an original model of carbon projects

By analyzing the carbon component of the REDD+ projects registered in the ID-RECCO, and by crossing this theme with others of our typology, we highlight three main characteristics of REDD+ projects.

5.1 REDD+, a logo to attract financing

First, as in any carbon project, all project developers display an interest in climate change and carbon accounting, expressed notably through the publication of an estimate of the contribution of their project to climate change mitigation. On average, ARR projects are expected to sequester around 78,000 tCO_2 per year and 3.35 million tCO_2 over the life of the project, whereas these figures reach 920,000 tCO_2 and 21 million tCO_2 for REDD projects. Although methodological questions can arise (notably about the baseline of REDD projects), the potential impact of REDD+ projects in contributing toward climate change mitigation is thus undeniable.

However, when we look deeper into the structure of these projects, it appears that carbon sequestration is rarely at the core of the projects, raising the question of their additionality. Indeed, climate is presented as the main objective of only 20% of the projects, far behind conservation (38%). Moreover, only half of the projects chose the path of carbon certification (mainly VCS, CDM or CarbonFix) and only 25% of projects actually engaged in carbon credit transactions.

To understand these surprising figures, we must first go back to the "project developer" and "co-benefits" criteria. As seen in section 4.5, conservation NGOs are among the most common actors in REDD+ project development. These NGOs have been historically accustomed to developing conservation projects, and in many cases appear to have used REDD+ as an opportunity to access new financing sources without having to change the fundamental structure of their planned or existing projects. Indeed, sections 4.6 and 4.7 show that REDD+ projects are still using classic instruments of conservation and other forestry projects, such as protected areas, ICDP approaches, PES and plantation establishment. Finally, REDD+ projects appear to be closely linked to traditional forest projects, with little innovation on the ground except a generally more rigorous monitoring of the project. This monitoring is linked to the demand for a guarantee – through certification – about the impacts of the project.

The main innovation and common characteristic of REDD+ projects is thus to use REDD+ as a logo to attract new financing. As shown in Figure 9, two financing strategies exist, which can be complimentary and are often mixed even within a single project. The first strategy focuses on REDD+ funds, which do not require third-party certification[17]. For these projects, which represent 39% of ID-RECCO projects, REDD+ functions as a logo which opens the way towards public financing specifically oriented to REDD+ activities. In Brazil for example, the Amazon Fund is the main source of financing for REDD+ projects. It does not require any third-party carbon certification, but rather follows its own rules.

[17] While REDD+ funds do not require the same type of third-party certification utilized on the voluntary market, most are still in the early stages of development, and will likely eventually require some sort of mechanism for oversight and compliance.

The second path, adopted by 61% of ID-RECCO projects, consists in selling carbon offsets on the voluntary market. Projects following this path are generally certified. Contrary to the CDM, there is no legal authority that controls and certifies the carbon offsets sold in the voluntary carbon market, where transactions are "over-the-counter" (OTC). However, buyers of these offsets have rapidly required a guarantee about the quality of the offsets they have been buying. As a consequence, several standards emerged in the voluntary market, the most common being the VCS. This emergence of a private governance system has similarities with the creation of standards for tropical wood harvesting such as the Forest Stewardship Council (Cashore, 2004). Although certifying a REDD+ project is a complex and costly process, 51% of the projects identified in the database are certified by an external third party, and 11% more are in the process of obtaining certification. This shows that certification is a key component that drives the demand for carbon offsets and will become an almost compulsory step to access the voluntary market. We can note that the share of ARR projects that are certified is greater than the share of certified REDD projects, which can be explained by a larger number of ARR methodologies and the prior experience on ARR projects, thanks to the CDM.

5.2 Questioning the financial additionality of REDD+ projects

In the methodologies developed by the CDM and taken up by the VCS, a project developer must show that its project depends on carbon revenue for its financial viability. However, if we consider the difficulty of finding buyers, the low prices of forestry offsets, the *ex-post* issuance of offsets and the requirement for creating a buffer, the money earned through the sale of carbon offsets might hardly be decisive for a project's profitability.

As we saw in section 4-9, few projects rely exclusively on the sale of carbon offsets for their financing, and project developers typically combine carbon credit revenues with public and private funds. Several pieces of evidence show that carbon might not be the core element of the financial model of REDD+ projects.

First, there is currently a lack of demand for REDD+ offsets. Following the estimates made by project developers and included in ID-RECCO, our assessment indicates that about 40 million tCO_2 should be avoided/sequestered yearly and, if all projects were entirely developed, their total delivery would reach 1.3 billion tCO2. These data must be compared to the predictions of demand for REDD+ offsets. Peters-Stanley and Gonzalez (2014) estimated that 26.2 million tons of forestry offsets were transacted in 2013, including forestry offsets from Annex I countries; this figure has been fairly stable since 2010. This means that, even taking into account that a small share of emission reductions is set aside as a buffer, it is likely that overall global demand for forest carbon offsets will continue to be lower than supply. This finding is strongly supported by the fact that we found only 25% of ID-RECCO projects that have completed at least one carbon credit transaction[18] as of October 2014. Except for five CDM-certified ARR projects which sold their offsets to public actors (States) on the compliance market, the large majority of REDD+ offsets were transacted in the voluntary market and were purchased by private actors (for sponsorship or Corporate Social Responsibility reasons).

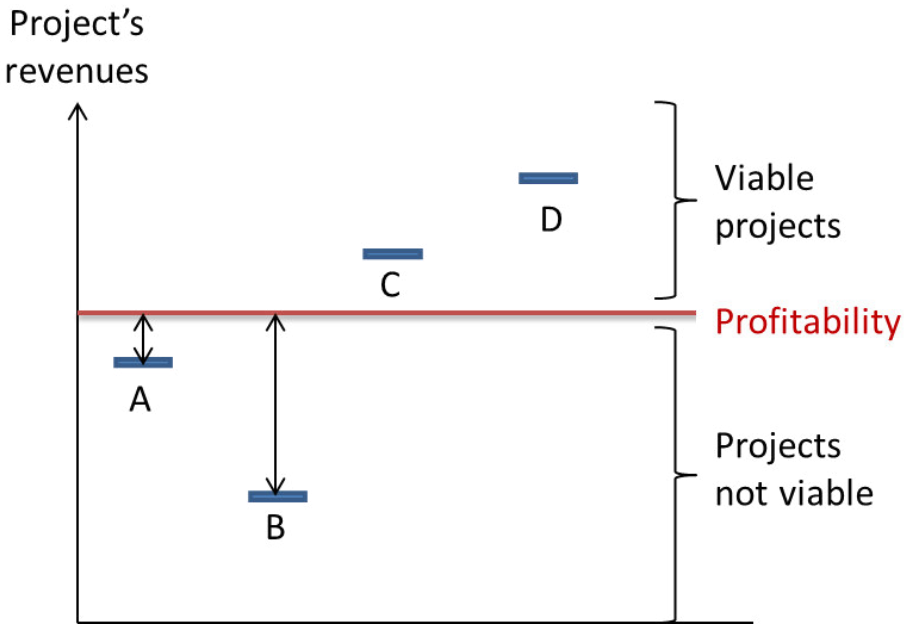
[18]This must be considered as a lower limit (or conservative estimate), as transactions are not always transparent and information regarding transactions is not always publicly available.

Secondly, carbon financing is likely not the core source of financing for REDD+ projects because overall transaction prices on the voluntary carbon market are low, and prices for REDD offsets specifically, which were among the highest on the voluntary market, have fallen from US$7.4/tCO2e in 2012 to US$4.2/tCO2e in 2013 (Peters-Stanley and Gonzalez, 2014).

Finally, in the case of the VCS, proponents must set aside offsets as a buffer to ensure permanence, and carbon offsets are issued *ex-post,* meaning that proponents are not even able to sell all of the offsets they generate, and must at least start their projects with other sources of financing.

As illustrated in Figure 10, considering these limits, only REDD+ projects with an initial revenue already close to the threshold of profitability (in red), like project A, will be able to prove their additionality. The fact that REDD+ projects are still being implemented in the current context of uncertainty and low transaction prices reveals that most projects might have been viable even without carbon revenue, like projects C and D.

Figure 10: The role of carbon revenue for projects' profitability



5.3 Future integration of REDD+ projects into national policies and programs

Finally, we can wonder whether REDD+ projects will continue to expand in the future. Indeed, the currently low and unstable prices of offsets in voluntary transactions, combined with low demand and high certification costs, can be deterrents for proponents who would have chosen a market approach to finance their REDD+ projects. For those who chose the path of REDD+ funds the situation might also worsen. Indeed, Norway and the World Bank's Forest Carbon Partnership Facility (FCPF), two key funders of REDD+ projects, are both standing against a project approach for REDD+. According to Peters-Stanley and Gonzalez (2014), the FCPF "will invest in and support activities exclusively at the jurisdictional scale". During the Climate change conference that took place in Bonn in October 2014, "Norway and Brazil called for moving away from project based approaches to finance [REDD+], with a

step-wise approach to building readiness and capacity" (IISD, 2014). This shows that public funds might become increasingly scarce outside of jurisdictional or national approaches, despite the fact that 52% of ID-RECCO projects mentioned having received public funds.

Even though already active REDD+ projects might not disappear, and a limited flow of new projects fueled by CSR motivations might be maintained, the situation appears to be heading towards jurisdictional and national approaches. We can note that this is not incompatible with projects. In Brazil, for example, many REDD+ projects are being financed by the government (through the Amazon Fund) as a means of achieving a national target in terms of deforestation. The future of REDD+ projects might lie in their integration within jurisdictional and national accounting and benefit distribution systems to ensure their coherence and integrity within larger-scale government strategies to fight deforestation.

6 Conclusion

This paper constitutes a step toward a better understanding of REDD+ projects. We have shown that the complex history of REDD+ led to an ambiguity in the definition of REDD+ projects regarding their scale, scope, and location. Considering the current lack of definition, we suggest that REDD+ projects be defined as "*All local or landscape projects, with an explicit aim of reducing emissions from deforestation and forest degradation, improving forest conservation or management, or enhancing forest carbon sequestration; financed by REDD+ funds and/or carbon markets; located in a non-Annex I country*".

Relying on this definition, this study constructed, populated, and analyzed a new global database of 345 REDD+ projects (410 including planned and abandoned projects), exploring ten themes as a basis for a typology of REDD+ projects: Location, Type, Size, Time, Project developer, Conservation co-benefits, Social co-benefits, Forest context, Financing, and Carbon component. This analysis served as a basis to highlight three main findings.

First, REDD+ appears to be functioning as a logo that allows project developers to benefit from new streams of climate-related financing (either through public funds or market-based carbon offsets), without necessarily requiring that REDD+ projects constitute an innovative approach over and against traditional conservation and development-oriented forestry projects. On the contrary, path-dependency is visible in the sense that REDD+ projects generally have the same types of proponents as prior iterations of forest conservation projects, and are using already known instruments, such as protected areas, ICDPs, or PES.

Secondly, we show that the additionality of REDD+ projects might be questioned. Indeed, although REDD+ projects participate in climate change mitigation, they are not necessarily exclusively focused on climate issues, and in many cases are not dependent on carbon revenue for their viability.

Finally, the future sustainability of REDD+ projects can be questioned. Indeed, the oversupply and low transaction prices of REDD+ offsets, as well as the likelihood that diminishing amounts of money will be allocated to REDD+ projects which are not 'nested' within jurisdictional REDD+ programs, make the current model of REDD+ projects seem increasingly untenable. In the coming years, REDD+ projects will probably be displaced by or integrated within subnational and national approaches.

This work has several key implications. First, we propose a more robust definition of REDD+ projects and a ten-theme typology of characterization and classification, which could lead to a better understanding among REDD+ actors of what exactly REDD+ projects are and the contours of their characteristics, allowing for more effective future comparisons between projects and evaluations of their impacts. The overview of REDD+ projects which we present is helpful for all REDD+ actors to have a better idea of how REDD+ is evolving at the local scale in developing countries throughout the world. In particular, it should be useful for government policy makers and negotiators in the difficult task of clarifying and constructing the links between local and jurisdictional/national scales of REDD+, notably the accounting of REDD+ offsets already sold in the voluntary carbon market

Future steps of this work will include discussions with REDD+ experts to explore refinements to the definition of REDD+ project, notably to include the current trend toward a jurisdictional approach. Similarly, the list of themes selected for the typology is not exhaustive and could be extended. Finally, the ID-RECCO database could help answer several research questions; for example, identifying the criteria that explain project location, or analyzing the synergies and trade-offs between the multiple objectives of REDD+.

References

Agrawal, A.; Nepstad, D. & Chhatre, A. (2011), 'Reducing emissions from deforestation and forest degradation', *Annual Review of Environment and Resources* **36**(1), 373-396.

Burley, J. (2002), 'Forest biological diversity: an overview', *UNASYLVA-FAO-*, 3--9.

Calmel, M.; Martinet, A. & Grondard, N. (2011), 'REDD+ à l'échelle projet. Guide d'évaluation et de développement.', Technical report, ONFI.

Caplow, S.; Jagger, P.; Lawlor, K. & Sills, E. (2011), 'Evaluating land use and livelihood impacts of early forest carbon projects: Lessons for learning about REDD+', *Environmental Science & Policy* **14**(2), 152--167.

CarbonFix (2014), http://www.carbonfix.info/, last visit January of 2014.

CCBA (2014), http://www.climate-standards.org/category/projects/ last visit January of 2014.

CDM (2014), http://www.mdpi.com/1999-4907/4/2/296, last visit January of 2014.

Cerbu, G. A.; Swallow, B. M. & Thompson, D. Y. (2011), 'Locating REDD: A global survey and analysis of REDD readiness and demonstration activities', *Environmental Science & Policy* **14**(2), 168--180.

Chenost, C.; Gardette, Y.; Demenois, J.; Grondard, N.; Perrier, M. & Wemaere, M. (2010), *Bringing forest carbon projects to the market*, UNEP.

CIFOR (2014) http://www.forestclimatechange.org/redd-map/#, last visit October of 2014.

Corbera, E. & Schroeder, H. (2011), 'Governing and implementing REDD+', *Environmental Science & Policy* **14**(2), 89--99.

Creed, A. & Nakhooda, S. (2011), 'REDD+ finance delivery: lessons from early experience', *Climate Finance Policy Brief of the Overseas Development Institute (ODI)*.

Deheza, M. & Bellassen, V. (2012a), 'La transmission des incitations REDD+ aux acteurs locaux : leçons de la gestions du carbone forestier dans les pays développés', *Etude Climat* **35**.

Deheza, M. & Bellassen, V. (2012b), 'Developping the forestry sector with carbon markets', Technical report, Proparco.

Fearnside, P., 1997. Transmigration in Indonesia: Lessons from its Environmental and Social Impacts, Environmental Management 21 (4): 553–570.

Ferraro, P. J. and A. Kiss (2002). Direct Payments to Conserve Biodiversity. Science 298: 1718-1719.

Forest Trends (2014a), http://www.forestcarbonportal.com/project/, Forest Trend, last visit in October of 2014.

Forest Trends (2014b), Canby, K.; Silva-Chávez, G.; Breitfeller, J.; Lanser, C.; Norman, M. & Schaap, B., 'Tracking REDD+ Finance: 2009-2012 - Finance Flows in Seven REDD+ Countries', Technical report, Forest Trends.

Grace, J.; Mitchard, E. & Gloor, E. (2014), 'Perturbations in the carbon budget of the tropics', *Global Change Biology*.

Harris, N. L., Brown, S., Hagen, S. C., Saatchi, S. S., Petrova, S., Salas, W., Hansen, M. C., Potapov, P. V. and Lotsch, A. (2012). "Baseline Map of Carbon Emissions fromDeforestationinTropicalRegions." Science 336 (2012).

IGES (2014), http://redd-database.iges.or.jp/redd/ last visit in January of 2014.

IISD (2014), 'Bonn Climate change conference: Tuesday 21 October 2014', *Earth negotiations bulletin* **12**.

Jindal, R.; Kerr, J. M. & Carter, S. (2012), 'Reducing Poverty Through Carbon Forestry? Impacts of the N'hambita Community Carbon Project in Mozambique', *World Development* **40**(10), 2123--2135.

Karsenty, A.; Vogel, A. & Castell, F. (2012), '"Carbon rights", REDD+ and payments for environmental services', *Environmental Science and Policy*.

Lawlor, K.; Madeira, E. M.; Blockhus, J. & Ganz, D. J. (2013), 'Community Participation and Benefits in REDD+: A Review of Initial Outcomes and Lessons', *Forests* **4**(2), 296--318.

Madeira, E.; Sills, E.; Brockhaus, M.; Verchot, L. & Kanninen, M. (2010), 'What is a REDD+ pilot? A preliminary typology based on early actions in Indonesia', *InfoBrief* **26**.

May, P. H.; Boyd, E.; Veiga, F. & Chang, M. (2004), 'Local sustainable development effects of forest carbon projects in Brazil and Bolivia: a view from the field'', The International Conference on Rural Livelihoods, Forests and Biodiversity', International Institute for Environment and Development London.

McFarland, B. J. (2010), 'Carbon Reduction Projects and the Concept of Additionality', *Sustainable Dev. L. & Pol'y* **11**, 15.

Palmer, C. & Silber, T. (2012), 'Trade-offs between carbon sequestration and rural incomes in the N'hambita Community Carbon Project, Mozambique', *Land use policy* **29**(1), 83--93.

Pedroni, L.; Dutschke, M.; Streck, C. & Porrúa, M. E. (2009), 'Creating incentives for avoiding further deforestation: the nested approach', *Climate Policy* **9**(2), 207--220.

Peskett, L.; Seth, P. & Gernot, B. (2011), 'Carbon livelihoods: social opportunities and risks of carbon finance', Technical report, World Bank.

Peters-Stanley, M.; Gonzalez, G. & Yin, D. (2013), 'Covering new ground: state of the forest carbon market 2013', Technical report, Ecosystem Marketplace.

Peters-Stanley, M. & Gonzalez, G. (2014), 'Sharing the Stage State of the Voluntary Carbon Markets 2014', *A Report by Forest Trends' Ecosystem Marketplace: Executive Summary, Washington DC* .

Pistorius, T. (2012), 'From RED to REDD+: the evolution of a forest-based mitigation approach for developing countries', *Current Opinion in Environmental Sustainability*.

Plan Vivo (2014), http://www.planvivo.org/projects/registeredprojects/, last visit in October of 2014.

REDD desk (2014), Collaborative resource for REDD Readiness by the Global Canopy Programme (2014), http://www.theredddesk.org/countries, last visit in October 2014.

Simonet, G. and Wolfersberger, J. (2013), 'Forest Transition and REDD+ in developing countries: challenges for climate change mitigation', *Climate Economics in Progress 2013*, Perthuis and Jouvet Eds.

Santilli, M.; Moutinho, P.; Schwartzman, S.; Nepstad, D.; Curran, L. & Nobre, C. (2003), 'Tropical Deforestation and the Kyoto Protocol: a new proposal', Paper presented at CoP-9, UNFCCC.

Skutsch, M. M. & Ba, L. (2010), 'Crediting carbon in dry forests: The potential for community forest management in West Africa', *Forest Policy and Economics* **12**(4), 264--270.

Sunderlin, W. & Atmadja, S. (2009), 'Is REDD+ an idea whose time has come, or gone?', *Realising REDD*, 45.

Sunderlin, W. D.; Larson, A. M.; Duchelle, A.; Sills, E. O.; Luttrell, C.; Jagger, P.; Pattanayak, S.; Cronkleton, P. & Ekaputri, A. (2010), Technical guidelines for research on REDD+ project sites with survey instruments and code book, CIFOR.

Tirole, J.; Mistral, J.; Sиve, R. & Barberis, J. (2009), *Politique climatique: une nouvelle architecture internationale*, La Documentation française.

Unep-Risoe (2014), http://www.cdmpipeline.org/index.htm, last visit in January of 2015.

UNFCCC (2011). Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010. http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf., United Nations Framework Convention on Climate Change.

VCS (2013), Agriculture, Forestry and Other Land Use (AFOLU) Requirements, VCS version 3, 8 October 2013.

VCS (2014), http://www.vcsprojectdatabase.org/, last visit in October of 2014.

van der Werf, G. R. (2009), 'CO2 emissions from forest loss', *Nature GeoScience* **2**, 737-738.

Wertz-Kanounnikoff, S.; Kongphan-apirak, M. & others (2009), 'Emerging REDD+: a preliminary survey of demonstration and readiness activities.', *CIFOR Working Paper*(46).

WUNDER, S. « Are Direct Payments for Environmental Services Spelling Doom for Sustainable Forest Management in the Tropics? », Ecology and Society 11(2), 2006

Appendix 1: Table of terms used to designate REDD+ and associated projects.

For each term, the table below specifies the scope, scale, location and integration in Readiness. Different actors might refer to different definitions.

Term	Actors/ sources	**Scope** [REDD, ARR, IFM]	**Scale** [Project site, Landscape, Political Jurisdiction, National, Other]	**Location** [Annex I countries only; Annex I and non-Annex I countries]	**Integration with national level REDD+ Readiness** [Yes, No, Sometimes]
REDD+ projects	ONF (REDD guidebook)	REDD and IFM	Project site	Non-Annex I countries	Not mentioned.
	Several research papers (e.g. Sunderlin et al. 2014[19] ; Lawlor et al. 2013) and REDD+ portals (CIFOR 2014, REDD Desk 2014)	REDD, ARR and IFM	Project site and Landscape	Non-Annex I countries	Sometimes (pilot projects mentioned for example on REDD Desk 2014).
Forest carbon projects	Rainforest Alliance. Forest trends[20]. NGOs and project developers.	REDD, ARR and IFM	Project site	Annex I and non-Annex I countries	Sometimes (pilot projects)
REDD+ initiatives	Lawlor et al. (2013)	REDD, ARR and IFM	Project site, Landscape, Political Jurisdiction	Annex I countries	Yes
REDD+ activities	REDD Desk 2014	REDD, ARR and IFM	Project site, Landscape, Political Jurisdiction	Annex I countries	Yes
	Murdiyarso et al. (2012) – using the definition of CIFOR Global Comparative Study.	Not specified, but the projects must have result-based or PES	Project site, Landscape,	Annex I countries	Sometimes
REDD+ pilot or	Peskett (2010)[21]	REDD, ARR and	Project site,	Annex I	Yes

[19] Sunderlin, W. D.; Larson, A. M.; Duchelle, A. E.; Resosudarmo, I. A. P.; Huynh, T. B.; Awono, A. & Dokken, T. (2014), 'How are REDD+ proponents addressing tenure problems? Evidence from Brazil, Cameroon, Tanzania, Indonesia, and Vietnam', *World Development* **55**, 37--52.

[20] http://www.forest-trends.org/documents/files/doc_2555.pdf

[21] Peskett, L.; Seth, P. & Gernot, B. (2011), 'Carbon livelihoods: social opportunities and risks of carbon finance', Technical report, World Bank.

demonstration projects	Brandon and Wells (2009)[22] Jagger et al. (2012)[23].	IFM	Landscape, Political Jurisdiction	countries	
Readiness activities	UN-REDD[24]	REDD, ARR and IFM for pilot project	National, Project site only for pilot projects	Annex I countries	Yes
Subnational REDD+ activities	The REDD Desk[25]	REDD, ARR and IFM actitivies may be included and mixed	Other: large project scale (e.g. an eco-region), program-level approach, or subnational administrative unit such as a state, province, or district		
Jurisdictional activities	VCS[26]	REDD, ARR, IFM	Political Jurisdiction	Annex I countries	Yes

[22] Brandon, K. & Wells, M. (2009), 'Lessons for REDD+ from protected areas and integrated conservation and development projects', *Realising REDD+: National strategy and policy options*, 225--236.
[23] Jagger, P.; Lawlor, K.; Brockhaus, M.; Gebara, M. F.; Sonwa, D. J. & Resosudarmo, I. A. P. (2012), 'REDD+ safeguards in national policy discourse and pilot projects', *Analysing REDD*, 301.
[24] http://www.un-redd.org/AboutREDD/tabid/102614/Default.aspx
[25] http://theredddesk.org/markets-standards/design-features/scale
[26] http://www.v-c-s.org/JNR

Appendix 2: Detail of the themes used for the typology of REDD+ projects

Category:	Characteristics:	Specification (list or unit):
1-Location.	1-1-Continent.	Africa; Asia; Latin America.
	1-2-Country's baseline.	In 1000 tons of CO_2 equivalent.
	1-3- Country's deforestation rate.	In %.
	1-4-Country's corruption control.	[-2.5 ; 2.5].
	1-5-Country's Human Development Index.	[0; 1].
	1-6- Country's governance's effectiveness.	[-2.5 ; 2.5].
	1-7-Countr'y R-PP submitted.	Yes; No.
2-Type.	2-1-Activities.	REDD; ARR; IFM; other.
	2-2-Pilot.	Yes; No.
3-Size.	3-1-Scale.	Site-level; Landscape-level.
	3-2-Area.	In ha.
4-Time.	4-1-Date of start.	In years.
	4-2-Duration.	In years.
5-Project developer	10-1-Status	For-profit organization; NGO; Research institute; Public; Partnership public-private; Partnership private-private; Partnership public-public; Other;
	5-2-Domestic	Yes; No.
	5-3-Partners	Yes; No.
6-Cobenefits: conservation	6-1- Conservation Objective.	Main; Secondary; Not mentioned.
	6-2-Protected Area.	Yes; No.
7-Cobenefits: local communities	7-1- Development Objective.	Main; Secondary; Not mentioned.
	7-2-Participation type.	No; Informed; Consulted; Involved in decision-making; Involved in management.
	7-3-Social certification status.	No; Intended; On-going; Certified.
	7-4-Social standard.	CCB; Plan Vivo; BMV; CarbonFix; Social Carbon.
	7-5-Payments.	No ; Direct ; Linked to practices (PES-like) ; Guaranteed purchase

		system.
	7-6- Jobs.	No; Yes no data; 0-50; 50-100; More than 100.
	7-7-Economic activities.	No; Agriculture (activities linked to agricultural changes); Agroforestry; Tree planting; Microenterprise; Sustainable mining activities; Ecotourism; Economic interest groups; Sport hunt; Processing and commercialization; Micro-credits;
	7-8-Development activities.	Education (Training and school building); Water; Health; Roads/building; Supplies; Other infrastructure.
8-Forests.	8-1-Deforestation driver type.	local livelihoods; industrial agriculture or cattle ranching; slash and burn agriculture; mining; illegal logging; industrial wood exploitation; energy wood; charcoal production; fire; infrastructure; oil extraction; ND.
	8-2-Forest type.	Dry; Humid; Dry and humid; wetlands; Other.
9-Financing.	9-1-Carbon Financing.	No; Carbon future scheduled; Carbon future transacted; Carbon Prepayment; Carbon Fund investment.
	9-2-Domestic public fund.	Yes; No.
	9-3- Non domestic public fund.	Yes; No.
	9-4-Internal private investment linked to project developer: Personal/private equity investment or private loan or NGO/Foundation funding.	Yes; No.
	9-4-External private investment: firm sponsorship and other commodity.	Yes; No.
	9-5-Sale of timber or agricultural products or non-timber forest products.	
10-Carbon chapter.	10-1-Climate objective.	Main; Secondary; Not mentioned.
	10-2-Yearly emission reductions.	In tons of CO_2 equivalent.
	10-3-Total emissions reductions.	In tons of CO_2 equivalent.

	10-4-Carbon certification status.	No; Intended; Ongoing; Certified.
	10-5-Carbon standard.	VCS; ACR; CDM; Plan vivo ; ISO-14064 ; Carbon Fix (Gold Standard) ; CAR; Natural Forest Standard; Internal;
	10-6-Sale of carbon offsets status.	Completed; not completed
	10-7-Carbon main source of financing.	Yes; No.

Appendix 3: Repartition of standards within ARR projects.

Standard	Projects certified under the standard	Percentage, out of the 156 'ARR' and 'ARR+IFM' projects
CDM	**48**	**30.8%**
VCS	45	28.8%
Plan Vivo	12	7.7%
Carbon Fix	10	6.4%
CCX	5	3.2%
CAR	1	0.6%
Internal	3	1.9%
Total voluntary standards	**76**	**48.7%**
Not certified	**32**	**20.5%**

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