

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/260419972>

Voluntary carbon market and its contributions to sustainable development: Analysis of the Monte Pascoal–Pau Brazil...

Article in *International Journal of Innovation and Sustainable Development* · January 2014

DOI: 10.1504/IJISD.2014.059219

CITATIONS

2

READS

103

4 authors, including:



Guineverre Alvarez

Universidade Federal da Bahia

1 PUBLICATION 2 CITATIONS

SEE PROFILE



José Célio Silveira Andrade

Universidade Federal da Bahia

78 PUBLICATIONS 149 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Safety Cultura Maturity - a review [View project](#)

Voluntary carbon market and its contributions to sustainable development: analysis of the Monte Pascoal–Pau Brazil Ecological Corridor

Danielle Soares Paiva* and
Guinevere Alvarez Machado de Melo Gomes

School of Management,
Federal University of Bahia (UFBA),
Salvador, Bahia 40110-100, Brazil
E-mail: paivadani@hotmail.com
E-mail: guineverre2@hotmail.com
*Corresponding author

Luz Fernández

Department of Chemical & Environmental Engineering,
Technical University of Madrid (UPM),
Madrid 28006, Spain
E-mail: lfernandezg@etsii.upm.es

José Célio Silveira Andrade

School of Management,
Federal University of Bahia (UFBA),
Salvador, Bahia 40110-100, Brazil
E-mail: celio.andrade@superig.com.br

Abstract: This paper aims to analyse the co-benefits of reforestation projects developed in the voluntary carbon market based on the analysis of a single case study: the Ecological Corridor Project Monte Pascoal–Pau Brazil, the first forest restoration project in Latin America to receive the seal climate community and biodiversity (CCB). To achieve this purpose, the research combined: i) primary sources, obtained from visits and interviews with key actors and script for semi-structured, with; ii) secondary sources, including reports of institutions on this theme and references. The results presented showed that forestry projects have positive co-benefits beyond those achieved in reducing deforestation and carbon sequestration, whether in environmental and social benefits. The case study had interesting picture of forest governance, growing in transparent structures of popular participation, but has exposed deficiencies in the sector, as the absence of a strong institutional framework – which leads to legal uncertainty and policy.

Keywords: voluntary carbon market; co-benefits; sustainable development; forestry projects; Brazil.

Reference to this paper should be made as follows: Paiva, D.S., Alvarez, G., Fernández, L. and Andrade, J.C.S. (2014) 'Voluntary carbon market and its contributions to sustainable development: analysis of the Monte Pascoal–Pau Brazil Ecological Corridor', *Int. J. Innovation and Sustainable Development*, Vol. 8, No. 1, pp.1–16.

Biographical notes: Danielle Soares Paiva is an Economist and Master and Doctorate in Business Administration from the Federal University of Bahia (UFBA). She is researcher at CAPES and Professor of Management Graduate. Her main fields of interest in research are: carbon market, co-benefits, clean development mechanism and sustainable development.

Guinevere Alvarez Machado de Melo Gomes is graduated in Law and Master of Regional Development and Environment and Doctoral student in Business Administration at the Federal University of Bahia (UFBA). Researcher of the "Global Environmental Governance and World Carbon Market".

Luz Fernández is a PhD student in Environmental Engineering at the Technical University of Madrid (UPM). Fields of research: environmental management, carbon projects, social technologies, pro-poor co-benefits and human development.

José Célio Silveira Andrade is PhD in Administration. He is a Professor at Federal University of Bahia (UFBA). His fields of research are international environmental regimes; environmental management and international relations; clean development mechanism, cleaner technologies and sustainable development.

1 Introduction

It can be noted that there is almost a consensus within the international scientific community as to the existence of climate change at a global level, due mainly to human activities. To reduce some of its potential causers – the greenhouse gases (GHG), resulting mainly from the post-industrial productive model, which is based on the expressive use of fossil, non-renewable fuel and on carbon technologies – there is an attempt to develop 'cleaner' technological alternatives that would lead to pollution prevention.

Among the efforts to fight global climate change are actions to reduce deforestation and forest degradation, as well as the conservation and recovering of existing forest areas. According to data from the intergovernmental panel for climate change (IPCC), the emission caused by deforestation during the 1990s reached 5.8 billion tons of carbon a year, which represents 20% of the total global emission. This outnumbers the emission caused by transportation (IPCC, 2007). This is due to a lot of initiatives to make other types of use of the forests, such as cattle-raising and agriculture. In Brazil, the deforestation of the Amazon Region itself is responsible for 55% of the total emission, according to the 1994 inventory (Planeta Sustentavel, 2010).

Hence, this change in the use of the land is currently the number-2 contributor to global warming, but, as far as Brazil is concerned, this sector will be the number 1 by 2030 (Mickinsey & Company, 2009).

The carbon market has been regarded as one of the most innovative instruments in the attempt to stimulate cleaner technologies and sustainable development, establishing a price for pollution and deforestation (Ecosystem Marketplace, 2009). The carbon credit market, be it regulated or voluntary, works as a catalyst of projects to reduce the GHG.

A type of project in the voluntary carbon market (VM) that has been calling special attention concerns reforestation, owing to the interest of actors, such as non-governmental organisations (NGOs) and governments, in the purchase of its credits and the fact that some research indicate that the price of carbon in these initiatives can be higher than in the others (Ecosystem Marketplace, 2011a). This sort of project fits the aims of the Brazilian National Policy for Climate Change, since it encompasses actions to fight deforestation to reduce GHG emission.

This paper aims analyse the contributions towards sustainable development performed by reforestation projects developed within the voluntary carbon market, based on a case study: the Monte Pascoal–Pau Brazil Ecological Corridor Project, first reforestation project in Latin America to be granted the climate, community and biodiversity standard (CCBS) Certificate. Throughout this paper, there will be a presentation of the carbon market and its contributions to sustainable development as well as the Brazilian voluntary carbon market with a display of the already implemented projects; analysis of forest projects; research methodology; the case study of the Monte Pascoal–Pau Brazil Ecological Corridor Project and its benefits towards sustainable development; and the conclusion and recommendations for future work.

2 Voluntary carbon market

The voluntary carbon market (VM), developed parallel to the regulated one, can be seen as an instrument in which the rules for the elaboration and approval of projects emerge from the relations among the actors of this market, whose mitigation and/or GHG reduction projects are subordinated to international standards (ISs), which establish their own rules for conceiving the projects (Souza et al., 2011).

The negotiation of the carbon credit certificate within the VM, called verified emission reduction (VER), are performed by different actors, such as governments, companies, NGOs, individuals, etc. (Simoni, 2009), having different interests, since they are not under the Kyoto protocol (KP) demands.

In general, what concerns the VM investors and buyers is the management of their impact on climate change, their image, reputation, interests in technological innovations to reduce GHG, legitimacy, the need to prepare themselves for future regulations and/or plans to resell carbon credit, profiting with the trade (IBRI, 2009). Companies seek to have a good position within their market, through the implementation of socio-environmental responsibility actions and, as a result, increasing their competitiveness. The participation and/or migration of new companies to this market is also due to a greater celerity in the project validation procedures when compared with the regulated one, which increases the gain of the investment (Simoni, 2009).

Thus, among the projects developed in the VM are:

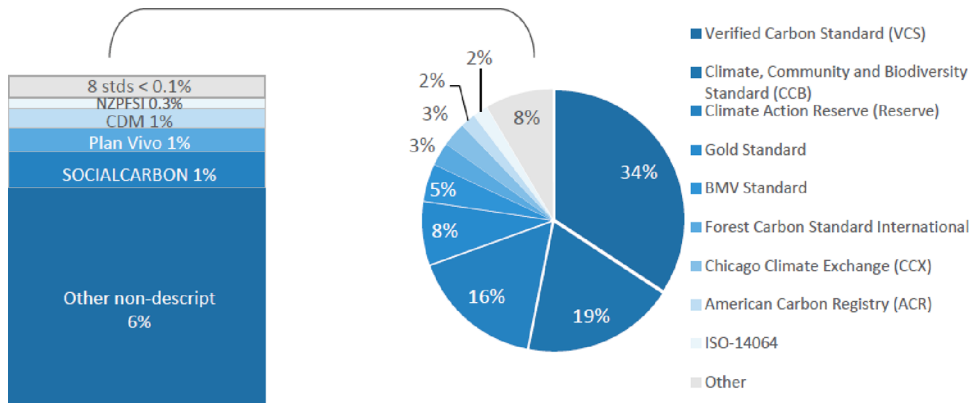
- small-scale methodology projects, which would not be economically viable in the regulated market

- projects that do not fit the criteria established by the clean development mechanism (CDM)
- projects that have already computed active credit, that is, credit computed even before the project registration (Simoni, 2009).

Taking into account the possibility of fails (owing to measurement, inspection, account of the emission reduction, among other aspects that are essential to the offset market), which might cause an impact on the credibility of the negotiated VERs, ISs were created, through the mobilisation of the actors involved (Simoni, 2009). That way, rules were set to provide the necessary credibility for the market to work effectively.

The ISs establish guidelines for the development of projects according to specific criteria, previously known by the market, strengthening the projects and making it possible to obtain carbon credit with a higher price. Besides, the ISs also have the role of establishing guidelines for the application of their methodology by the companies/counselling agencies (Carbon Positive, 2009). Among the global initiatives to trade carbon credit are the ISs shown in Figure 1, which have their own certification and validation rules.

Figure 1 Participation of the ISs in GHG reduction and/or mitigation projects worldwide, within the voluntary carbon market in 2010 (see online version for colours)



Source: Ecosystem Marketplace (2011a)

As it can be observed, the predominant ISs in the voluntary carbon market are: verified carbon standard (VCS), responding for 34% of the negotiated projects, the CCBS, with 19%, and the climate action registry (CAR), with 16%. It is worth noticing that the decreasing of the participation of the chicago climate exchange (CCX) in the voluntary carbon market: from 12% of the transactions in 2009 to only 3% in 2011. So, it is possible to verify that 69% of the transactions done by October 2010 are limited to 3 (three) ISs.

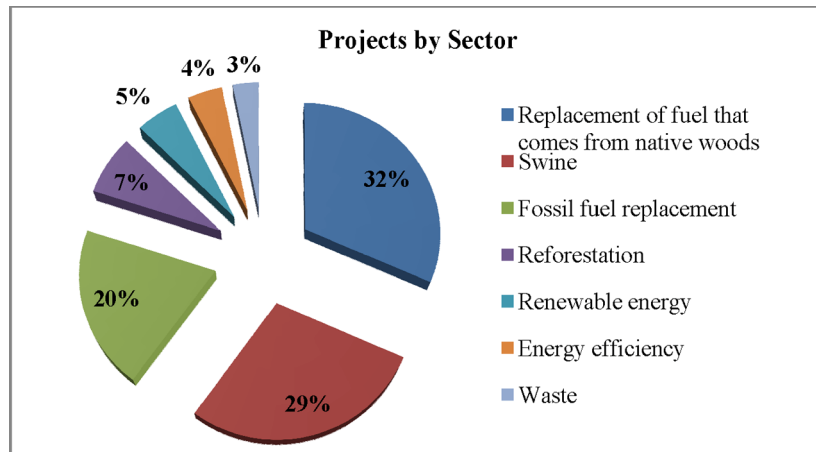
Such Patterns establish the accepted methodologies to the projects and it is the proponents' role to verify their compatibility and/or adequacy. Methodology can be defined as the type of 'technology' used in the project to mitigate and/or reduce GHG. Such methodologies are meant to ensure that the compulsory requirements are met to provide credibility and validity to the initiative and, consequently, to the credit.

Even though the ISs exist mainly to provide credibility and transparency to the VM, some of them also require that the projects generate environmental and social co-benefits, going beyond the basic demand for generation of carbon credit. For instance, Brazil Mata Viva Standard, CarbonFix Standard, CCBS, Gold Standard, Panda Standard, Plan Vivo Standards and Social Carbon (Ecosystem Marketplace, 2011a). It is required from the proponents that they follow some rules during the development of the project so that they can be proactive as far as environmental and social aspects are concerned. In some cases, such as Social Carbon, CCBS and Gold Standard, some specific indicators are established to measure these benefits. According to the Ecosystem Marketplace (2011a), there is evidence that such projects tend to be more valued in the market and their prices are higher.

It was verified that, currently, the global voluntary carbon market holds 95 registered Brazilian projects (up to February 2012), 14 other projects under validation process for future registration and two validated projects, waiting for approval and registration. For Simoni (2009), all the Brazilian projects developed within the VM are small-scale ones, since they constitute renewable energy projects (with an up to 15 megawatts capacity) or they are projects that result in emission reduction ≤ 60 kilos tCO₂e a year (MCT, 2011).

In general, the projects can be divided into seven sectors: energy efficiency, reforestation, waste, fossil fuel replacement, replacement of fuel that comes from native woods, swine and renewable energy. Figure 2 shows the division of the 95 registered projects according to their sector in Brazil up to February 2012.

Figure 2 Number of projects by sector (see online version for colours)



Source: Own elaboration (2012)

The most representative sectors in the VM are replacement of fuel that comes from native woods, swine and fossil fuel replacement, with 30%, 27% and 19%, respectively. In smaller proportions come reforestation (7%), renewable energy (5%), energy efficiency (4%) and waste (3%). It is important to point out that waste and replacement of fuel that comes from native woods are sectors only found in the VM, there is no registration in the regulated market.

Table 1 displays the sectors of the Brazilian projects registered in the VM, the ISs used, the methodology applied and the activities developed.

Among the VM projects, the ones on reforestation have been raising special interest, even though they represent only 7% of the negotiated projects, because their results involve social and environmental co-benefits.

Table 1 Sector, ISs, methodologies and activities developed

<i>Sector</i>	<i>IS</i>	<i>Methodology</i>	<i>Activities</i>
Replacement of fuel that comes from native woods	VCS and social carbon	AMS-I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User	Ceramics industry
Swine	VCS	AMS-III.D. – Methane Recovery-CDM	Swine
Fossil Fuel replacement	VCS (mostly), together or not with social carbon and CCX	AMS-I.C: Thermal energy for the user with or without electricity; AMS-I.E: Switch from Non-Renewable Biomass for Thermal; ACM0006: Consolidated baseline methodology for grid-connected electricity generation from biomass residues; CCX Rulebook Chapter 09 Offsets and Early Action Credits 1-24-05	Ceramics, cellulose, food and fabric industries
Reforestation	CCBS (mostly), CCX and VCS	CCX Rulebook Chapter 09 Offsets and Early Action Credits 3-2006; AR-AMS0006 Version 1 – methodologies for the monitoring of silvipastoris at small scale and AR-AMS0001 – simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grassland and cropland	Reforestation
Renewable energy	VCS	Category I.D – Renewable electricity generation for a Small grid; ACM0002 – Consolidated baseline methodology for grid-connected electricity generation from renewable sources	Small hydroelectric plants and hydroelectric plants
Energy efficiency	CCX	CDM Small-scale Methodology: III.E Avoidance of methane production from decay of biomass through controlled combustion gasification or mechanical/thermal treatment	Energy industry
Waste	CCX	CDM Small-scale Methodology: III.E. Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment e CDM ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources	Wood and cellulose industry and trade

Source: Own elaboration (2012)

3 Methodology

To carry out the analysis, a database for registered reforestation voluntary carbon mitigation projects in Brazil was first created encompassing the key project details extracted from the respective publically available documents.

Information regarding voluntary carbon markets has been traditionally opaque. Over the past several years, these markets have not only become an opportunity for citizen consumer action, but also an alternative source of carbon finance and an incubator for carbon market innovation. As the voluntary carbon markets have rapidly gained attraction, some independent reports have aimed to response to a ‘black hole’ of information. To detect the voluntary carbon projects in Brazil, the websites of the voluntary standards defined in the Peters-Stanley et al. (2011) report were visited to research the location of their registered projects. The time range used for mapping the VM projects was January 2011 until June 2012. All the project design documents (PDDs) were analysed and the information organised in an Excel worksheet. Besides the PDDs, other types of documents that support the conception of the project were taken into account. An exploratory bibliographic and documental research was performed, using books, company reports, national and international newspapers, national and international scientific articles, technical reports, national and international database and institutional websites.

To reach the objective of this paper, among the 11 reforestation projects found during the exploratory research, the Monte Pascoal–Pau Brazil Ecological Corridor Project was selected, for being a pioneering initiative, the first reforestation project in Brazil and Latin America acquire registration and validation though CCBS.

The primary research methodology carried out a desktop analysis of the documents, looking for the co-benefits of the Monte Pascoal–Pau Brazil Ecological Corridor Project.

To obtain an insight into the existing methods available for analysis of co-benefits under carbon mitigation projects, research has been undertaken of existing methodologies available to assess sustainable development impacts of carbon mitigation projects. The existing methodologies that were assessed included:

- The Gold Standard; sustainability assessment model (Begg et al., 2003).
- The Social Carbon; sustainability assessment model (Rezende and Merlin, 2003).
- The methodology Multi-Attributive Assessment of CDM (Sutter, 2003; Sutter and Parreño, 2007).
- The sustainable development benefits of CDM projects as detailed by Olsen and Fenhann (2008), Subbarao and Lloyd (2011) and UNFCCC (2011).

It was found that the UNFCCC (2011) encompasses most of the criteria used by other studies. They cover the economic development, environmental protection and social development dimensions of sustainable development. Thus, the co-benefits claims in the documents were tabulated using the indicators in Table 2.

In addition to the desktop analysis, the MPPBECF was visited and project developers and involved local communities were interviewed to verify the documents information. The indicators in Table 2 were also used to guide the assessment of the co-benefits from the case study. The case study analysis will be used to compare and verify the

findings from the documents analysis for the selected to the actual developmental benefits delivered on the ground. This has already been done for other research papers (e.g., Subbarao and Lloyd, 2011).

Table 2 Research analysis model

<i>CONCEPT</i>	<i>DIMENSION</i>	<i>COMPONENT</i>	<i>INDICATORS</i>
Voluntary carbon market co-benefits	Sustainable development	Economic development	Direct/indirect financial benefit for the local and/or regional economy
			Local/regional jobs generated directly/indirectly
			Development/diffusion of local/imported technology
	Environment protection	Environment protection	Investment in the local/regional infrastructure
			Efficient utilisation of natural resources
			Reduction in noise, odours, dust or pollutants
			Improvement and/or protection of natural resources
	Social development	Social development	Available utilities
			Promotion of renewable energy
			Labour conditions and/or human rights
			Promotion of education
			Health and safety
			Poverty alleviation
		Engagement of local population	
		Empowerment of women, care of children and frail	

Source: Adapted from UNFCCC (2011)

4 Characterisation of the afforestation and reforestation projects in Brazilian VM

Forests are fundamental for the maintenance of life on Earth – for they keep the global climate system stable, regulate water cycles, provide a habitat for the biodiversity and people, besides hosting genetic resources with endless possibilities. Moreover, they can perfectly contribute to a green economy, especially when all their potential economic and social benefits (UNEP, 2011). It is within such scenario that afforestation and reforestation projects are found, trying to reach these co-benefits through carbon credit negotiation mechanisms.

Forest carbon kidnapping consists on an activity of sustainable use of forests or forest compensation, or even restoration of land hectares that were deteriorated and/or deforested, for instance, grassland where intensive pasturing or prolonged cultivation of monoculture were applied (Ecosystem Marketplace, 2011b). It also involves deforestation prevented by the so-called REDD+ (Reducing Emissions from Deforestation and Forest Degradation). In 2010, the global markets for forest carbon projects received the greatest amount of negotiated credit in history, having Peru and Brazil as hotspots, as far as the offer is concerned, holding almost half of the globally negotiated projects, according to Ecosystem Marketplace (2011b).

It can be observed that a great number of afforestation and reforestation (A/R) initiatives are being developed in Brazil, even though research shows that only 11 (eleven) projects are actually linked to the ISs of the voluntary market so far. Among these, 8 (eight) are registered and the others are in the validation phase, waiting for future approval and registration. Table 3 briefly shows such scenario.

Mato Grosso is the state that hosts more A/R projects connected to ISs, with four current projects, whereas the other projects are hosted in different states each. The reason why this happens should be investigated further, but it can be inferred that geographic location plays an important role. Different from the global scenario in which VCS is the predominant pattern in the market (Ecosystem Marketplace, 2011b), in Brazil, the most frequently employed International Standards is CCBS, owing to the fact that it is frequently employed in projects that focus on the use of land, for instance, agro-forestry projects to protect and restore forests. Another characteristic of CCBS is to act specifically in the beginning phases of the projects, such as structuring and development, not having the competence to certify projects (final phase). Then, another IS, such as VCS, is applied for carbon accounting.

In general, reforestation projects encompass actions that go beyond the demands of the IS and the implementation methodology. This is due to the peculiar nature of the projects, which require full commitment from the stakeholders to be developed. Besides carbon kidnapping, these projects bring social co-benefits, preserving the biodiversity and improving the control of the water systems. These initiatives carry values that are pursued by the credit buyers in the voluntary markets (FBDS, 2008).

Table 3 Deforestation projects developed within the Brazilian VM

<i>No. Project</i>	<i>Brazilian state</i>	<i>IS</i>	<i>Project description</i>	<i>Status</i>
1 Emas-Taquari Biodiversity Corridor Carbon Project	GO/MS	CCBS and VCS	Voluntary partnership among farmers, NGOs and local Conservation Units, to reforest 558.9 ha with native species of the Cerrado. A 214,245 tCO ₂ eq storage is estimated within 30 years	CCBS – validated in 2010 VCS – validated in 2011
2 Surui Forest Carbon Project (REDD)	RO/MT	CCBS	Stop deforestation in 13,575.3 ha in the Amazon Region. It aims at avoiding the emission of 7,258,352.3 tCO ₂ eq by 2038, preserving the way of living and traditions of the Paiter Suruí indigenous people, strongly involved in the project	Validated in 2012
3 Multi-Species Reforestation in Mato Grosso (Peugeot)	MT	VCS and CCBS	Sponsored by a private company, it is meant to restore a 1096.25-ha grassland where intensive pasturing was applied	VCS – validated in 2011 CCBS – under validation

Table 3 Deforestation projects developed within the Brazilian VM (continued)

<i>No.</i>	<i>Project</i>	<i>Brazilian state</i>	<i>IS</i>	<i>Project description</i>	<i>Status</i>
4	Watershed Restoration in the Cantareira Water System: Carbon, Community & Biodiversity Initiative	SP	CCBS	Partnership among governmental and non-governmental institutions and one foundation, meant to restore 185.56 ha of native vegetation in the Cantareira Water System (Atlantic Rainforest)	Under validation
5	The Purus Project: A Tropical Forest Conservation Project in Acre, Brazil (REDD)	AC	CCBS	Tropical forest conservation project through payment of environmental services in a private 35,169-ha property. It should last 30 years	Under validation
6	The Monte Pascoal – Pau Brazil Ecological Corridor: Carbon, Community & Biodiversity Initiative	BA	CCBS	First phase of a reforestation process that aims at creating a corridor to connect two important protected remaining areas of the Atlantic Rainforest, covering 17.4 ha. This initiative involves local farmers and residents, NGOs, co-ops and community associations	Validated in 2009
7	The Juma Sustainable Development Reserve Project: Reducing Greenhouse Gas Emissions from Deforestation in the State of Amazonas, Brazil	AM	CCBS	Avoided deforestation of 329,483 ha in an area where there is great pressure to use the land, which was converted into a Conservation Unit for Sustainable Use. It is part of a strategy of the state government to reduce deforestation and promote regional sustainable development	Validated in 2008
8	Floresteca Sustainably Managed Forest	MT	CCX	Sustainable forest managing – forest compensation	Validated in 2006
9	Tectona Agroflorestal Ltda. Sustainably Managed Forestry Project	MT	CCX	Sustainable forest managing – 1593-ha plantation in degraded grassland, subject to erosion and silting	Validated in 2008
10	Cikel Brazilian Amazon REDD APD Project – Avoiding Planned Deforestation	PA	VCS	Avoided deforestation of 27,434.09 ha, which would be turned into pasture by a private company	Validated in 2012
11	Boa Vista Afforestation/Reforestation Project	RR	ACR	Protection and rehabilitation of natural forest resources in 23,507 ha, with an estimated removal of 4,186,323 tCO ₂ eq within 40 years	Under validation

Source: Own elaboration (2012)

5 The Monte Pascoal–Pau Brazil Ecological Corridor Project

The Monte Pascoal–Pau Brazil Ecological Corridor is located in the Central Corridor of the Atlantic Rainforest, in the area of the Caraíva River Basin, in the south of Bahia, covering an area of ~94,000 ha. This area is surrounded by important conservation units,

such as Monte Pascoal, Pau Brazil and Descobrimento National Parks, the Caraíva-Trancoso Environmental Preservation Area, the Corumbau Extractive Sea Reserve, the Veracel Private Environmental Reserve (RPPN Veracel) and the Pau Brazil Ecological Station (SENA, 2011).

The most important urban areas within the corridor are the districts of Monte Pascoal (~6000 inhabitants), Montinho (1200), Caraíva and Nova Caraíva (1400 altogether) and the indigenous villages of Barra Velha (2500) and Boca da Mata (1100) (Mesquita et al., 2010).

The perception of the decrease of water quality and the loss of fishing resources in the past decades raised local people's awareness as to the need to find sustainable solutions, which was achieved through the establishment of partnership and projects to restore remaining forest areas and recover riparian woods. Started in 2004, the Monte Pascoal–Pau Brazil Ecological Corridor is currently supported by a network of institutions formed by The Nature Conservancy (TNC), International Conservancy (IC), Instituto Bioatlântica (IBIO), Instituto Cidade, Grupo Ambiental Naturezabela, Associação dos Povos Nativos de Caraíva (ANAC – Caraíva Native Peoples Association), Associação Comunitária Beneficente de Nova Caraíva (ASCBENC – Nova Caraíva Community Charitable Association) and Cooperativa de Reflorestadores de Mata Atlântica do Extremo Sul da Bahia (CooPlantar – Atlantic Rainforest Reforestation Workers Co-op of Southern Bahia) (Mesquita et al., 2010).

With the aim of restoring 4000 ha of forest and protecting other 20,000 ha, the Monte Pascoal–Pau Brazil Ecological Corridor Project (MPPBECF) has different financial sources. One of them should be the trading of carbon from a 1000-ha area. This process started in 2008, with the restoration of 17 ha through a contract with Kraft Foods. In 2009, two other carbon credit contracts for voluntary emission compensation were signed with Natura Cosmetics (250 ha) and COELBA (Power Company of the State of Bahia) (50 ha).

Through the restoration of remaining areas of the Atlantic Rainforest, the aims are to build corridors connecting the two National Parks, generate jobs and income to the local community, protect and recover environmental services, mainly related to water and carbon, regulate the environmental adequacy of the properties (a strategy to attract rural producers), raise environmental awareness, mobilise the society and increase human capital (SENA, 2011).

The project should last 30 years and it is estimated that it will reduce 316 thousand tons of CO₂eq, what makes it a small-scale project. To achieve its aim, the degraded areas were restored through the planting of native species, with seeds and saplings collected and cultivated by local agents trained in reforestation techniques (the result of a partnership between the project and the Ecology and Forest Restoration Laboratory of the Luiz de Queiroz Agriculture School – ESALQ/USP).

5.1 Co-benefits of the Monte Pascoal–Pau Brazil Ecological Corridor Project

The MPPBECF has peculiar characteristics which allow the illustration of the co-benefits on the social, economic and environmental dimensions of the Brazilian reforestation projects developed within the VM, also tracing the paths that need to be followed.

The need to choose an IS that recognised and valued the strong social aspect of the MPPBECF led to the application of CCBS, making this reforestation project the first one in Latin America to be granted such certification. It was also verified/certified by the

Rainforest Alliance. Given the inexistence of national parameters to guide the different steps in the validation process, as well as its pioneer occurrence in Brazil, some effort was required as to adapt some of the characteristics of the carbon credit project to the demands of the IS.

It is worth to note that CCBS require to the project developers a sustainability monitoring plan in addition to the sustainable development assessment in the design document. The monitoring plan is used to verify if the project has indeed contributed to sustainable development as anticipated in the PDD. Case study first insights highlight that, behind the definition of the MPPBEC Project, there is a sophisticated networking of local stakeholders. Since 2004, the Caraíva Native Peoples Association, the Nova Caraíva Community Association, Instituto Cidade (a regional planning and sociodevelopment NGO based in Belo Horizonte, Brazil), and Grupo Ambiental Natureza Bela (a local environmental organisation) are working with the objective of the restoration of the Atlantic Rainforest and the protection of water resources in the Caraíva River Basin. Local communities have participated actively on the choice of areas to be reforested, seeking to protect riparian zones in the basin and also taking the first steps towards the establishment of an ecological corridor connecting Pau Brazil and Monte Pascoal National Parks. Community members (especially those connected to the Caraíva Native Association) played key roles. Actually, one of the main results of the process is the foundation of the Cooperative of Atlantic Rainforest Reforestation Workers of Southern Bahia – COOPLANTAR.

CCBS serve to give well-meaning project developers frameworks with which to ensure that a wide range of pro-poor criteria are considered in planning and implementing projects. The results from the analysis indicate that the project developers have been successful in taking due account of the CCBS frameworks, being highly successful in terms of delivering the envisaged development benefits to the local community as indicated in the PDD.

As it can be seen in Table 4, of the 15 co-benefits seen as indicators in the research, the project displays eight, demonstrating that the project succeeded in the promotion of sustainable development. The economic and social dimensions were the ones that showed greater contribution.

Through the interviews it was highlighted that the MPPBECP is a successful effort that combines forest restoration with job and income generation. The lack of regular job opportunities and medium-high level education for young people were affecting the prospects of local families, threatening the future of the local culture. In the past, isolation and abundance of natural resources in the forests, rivers and the ocean, guaranteed the existence of local inhabitants and the survival of the traditional extractivist culture. Today, ocean and forest devastation, together with the real estate pressure brought about by tourism in a coastal region of great beauty, puts the area under a great pressure. The 'with the project' scenario can contribute to the mitigation of these impacts, to the extent that the project increases jobs in forest restoration activities on rural properties. Even the issue of raising the education level can have a significant impact on cooperative activities. Aware of the legal obligation to include illiterate workers in a work co-op (by virtue of jurisprudence of labour justice) and interested in attracting workers with extensive experience in rural services, the founders of COOPLANTAR, directed a large part of the cooperative funds to sustain literacy courses and basic education for adults.

Table 4 Co-benefits of the MPPBECP

<i>Dimension</i>	<i>Indicator</i>	<i>MPPBECP</i>
Economic	Direct/indirect financial benefit for the local and/or regional economy	X
	Local/regional jobs generated directly/indirectly	X
	Development/diffusion of local/imported technology	X
	Investment in the local/regional infrastructure	
Environment	Efficient utilisation of natural resources	X
	Reduction in noise, odour, dust or pollutants	
	Improvement and/or protection of natural resources	X
	Available utilities	
Social	Promotion of renewable energy	
	Labour conditions and/or human rights	
	Promotion of education	X
	Health and safety	
	Poverty alleviation	X
	Engagement of local population	X
	Empowerment of women, care of children and frail	

Source: Own elaboration (2012)

Some of the main expected co-benefits for the region are the environmental ones, concerning the contribution to climate change mitigation, reforestation of degraded areas and decrease of the threat to endemic species. Throughout the implementation of the project, some environmental changes were perceived by participant rural producers, such as decrease in land erosion, improvement of the natural water resources and lower occurrence of plagues in the plantations, due to more balanced surrounding ecosystem. Such scenario favours the reduction of the use of artificial plague control and the quality of the soil, consequently reducing the cost of maintenance. A more constant presence of small birds and other animals was reported as well.

All these changes caused by the project imply in improvement, protection and more efficient use of the natural resources.

As to the social co-benefits, another great contribution of the project is the community involvement in the establishment of participatory forest governance. Forest governance can be understood as the way governmental and institutional (formal or informal) representatives “acquire and perform authority regarding the management of the resources to maintain and improve the well-fare and quality of living of those whose subsistence depends on the sector” (The Forest Dialogue, 2008, p.36).

Observation indicates the existence of a democratic discussion arena – with a certain level of representativeness and legitimacy –, the formation of a network of operators – with clearly distinctive attributions and goals – and transparency in decision making concerning collective interest. No involvement on the part of public power and/or its representatives was reported in the MPPBECP implementation and management process.

A certain difficulty was reported as to the assignment and use of the land, since the properties involved in the project belong to private owners and some legal demands, such as formal contracts, must be followed, as well as the commitment on the part of the land

owners not to deforest and/or degrade the area for 30 years (estimated project time). New land owners and stakeholders were somewhat reluctant as to adhering to the proposal due to issues like: the long attachment period to the project; very little knowledge about its environmental co-benefits; the uncertainties caused by the uneasy process of legal discussion of the new Brazilian Forest Code; the end of the first commitment phase of the KP (and its consequences on carbon market in general); and the legal and political uncertainties inherent to these processes. Moreover, the lack of clear specific legal norms concerning forest carbon initiatives in the country to define a uniform guideline for all the actors involved and to establish an institutional framework that benefits forest preservation actions and the combat to irregular deforestation.

Cost and funding issues are recurrent and essential within this context. Short-term initiatives that merely aim at the planting of species, without any monitoring of their evolution, might fail, due to the possibility of leaking. This also implies on wasting the opportunity to plan and subsidise medium and long-term activities – essential to reforestation sustainability. Besides, the monitoring of the activities for a reasonable period of time would promote financial tranquillity to the proponents and community agents involved, due to the lasting engagement. Even though this item might hinder the negotiation process with the rural owners, its importance was highlighted as to the choice of a carbon project as an economic instrument to implement conservation actions.

6 Conclusion and final recommendations

This paper aimed at analysing, based on a case study, the co-benefits of a Brazilian reforestation project developed in the voluntary carbon market, using the methodology of the UNFCCC (2011). To do so, the research methodology used combined

- primary sources, obtained through interviews (face-to-face and via telephone) with the key actors, using a semi-structured interview guideline
- secondary sources, including the PDDs, institutional reports on the subject matter and bibliographic reference.

In general, the literature indicates that reforestation projects present positive impacts, which go beyond deforestation reduction and carbon kidnapping, showing economic, environmental and social benefits. The observation led to the conclusion that projects, such as the Monte Pascoal–Pau Brazil Ecological Corridor, bring about important lessons from a technical–methodological and political perspective, which might guide the replication of other experiments and contribute to the improvement of national systems. The MPPBEC case, specifically, displayed an interesting forest governance framework, which was developed using transparent structures of public participation. However, it pointed out to the fails in the sector, such as the lack of a strong institutional framework – leading to legal and political uncertainty.

Research results demonstrate that the MPPBEC was successful in promoting sustainable development. The economic and social dimensions presented the greatest contribution. The economic co-benefit that outstands among the others is job and income generation, through the increase of job positions related to forest restoration in rural properties. The reforestation of degraded areas and the decrease of the threat to endemic species are examples of environmental co-benefits. As to the social co-benefits, one of

the highlights of the project is the community involvement at establishing a participatory forest governance. Some of the actions applied were local empowerment and human capital – technical training of the residents to handle the forest resources in a sustainable way (using a co-op system). These actions turned out to be effective strategies towards the success and endurance of the project.

The establishment of an integrated network of citizens and organisations (private and third-sector ones) engaged in forest restoration processes is not only an environmental governance process, but it also causes a change in the way biodiversity issues and man-made interferences are understood, democratising the management of the land and the climate, creating better social and environmental synergy.

Finally, it is recommended that this research be expanded, encompassing different examples of Brazilian reforestation projects traded within the voluntary carbon market, to verify diverging and common aspects among projects of the same type. Moreover, it should be interesting to address reforestation projects under the Reducing Emissions from Deforestation and Forest Degradation (REDD+) mechanism, an issue that has been gaining importance in the national and international agendas for forest governance within the climate change context.

References

- Begg, K., Parkinson, S., Horst, D., Wilkinson, R., Theuri, D., Gitonga, S., Mathenga, M., Amisshah-Arthur, H., Atugba, S. and Ackon, S. (2003) *Encouraging CDM Energy Projects to Aid Poverty Alleviation*, Final Report of Project R8037 under the DFID KAR Programme. Centre for Environmental Strategy, University of Surrey, Surrey.
- Carbon Positive (2009) *Standards Now Integral to Voluntary Carbon Market*, <http://www.carbon.org.za/newsitem.php?itemid=144>
- Ecosystem Marketplace (2009) *Florestas: o setor florestal nos mercados voluntários de carbono*, 2nd ed., http://www.ecosystemmarketplace.com/pages/dynamic/resources.library.page.php?page_id=6958§ion=our_publications&eod=1
- Ecosystem Marketplace (2011) *Back to the Future: The State of the Voluntary Carbon Markets*, http://www.ecosystemmarketplace.com/pages/dynamic/resources.library.page.php?page_id=8351§ion=our_publications&eod=1
- Ecosystem Marketplace (2011b) *State of the Forest Carbon Markets 2011*, www.forestcarbonportal.com
- FBDS (2008) *Mercados de carbono: situação dos projetos florestais*, www.fbds.org.br
- IBRI (2009) *O Mercado de Carbono. Cadernos IBRI. Série Sustentabilidade*, 1st ed., http://www.ibri.com.br/download/publicacoes/IBRI_Caderno_1.pdf
- IPCC (2007) *Working Group II Report: Impacts, Adaptation, and Vulnerability*, Intergovernmental Panel on Climate Change.
- MCT (2011) *Status atual das atividades de projeto no âmbito do Mecanismo de Desenvolvimento Limpo (MDL) no Brasil e no Mundo*, http://www.mct.gov.br/upd_blob/0215/215908.pdf
- Mesquita, C.A.B., Holvorcem, C.G.D., Lyrio, C.H., Menezes, P.D.de, Dias, J.D.da.S. and Azevedo Jr., J.F. (2010) 'COOPLANTAR: a Brazilian initiative to integrate forest restoration with job and income generation in rural areas', *Ecological Restoration*, Vol. 28, No. 2, June, pp.199–207.
- Mickinsey & Company (2009) *Pathways to a Low-Carbon Economy for Brazil*, Version 2.0 of the Global Greenhouse Gas Abatement Cost Curve, London.

- Olsen, K. and Fenhann, J. (2008) 'Sustainable development benefits of clean development mechanism projects: a new methodology for sustainability assessment based on text analysis of the project design documents submitted for validation', *Energy Policy*, Vol. 36, No. 8, pp.2819–2830.
- Peters-Stanley, M., Hamilton, K., Marcelo and Sjardin, M. (2011) *Back to the Future: State of the Voluntary Carbon Markets 2011*, Ecosystem Marketplace & Bloomberg New Energy Finance, http://www.forest-trends.org/publication_details.php?publicationID=2828
- Planeta Sustentavel (2010) *REDD: entenda este mecanismo de preservação florestal*, Fev., <http://planetasustentavel.abril.com.br/noticia/ambiente/redd-desmatamento-degradacao-preservacao-floresta-531760.shtml?func=1&pag=0&fnt=9pt>
- Rezende, D. and Merlin, S. (2003) *Social Carbon: Adding Value to Sustainable Development*, Instituto Ecológica, Editora Fundação Petrópolis Ltda.
- Sena, D. (2011) *Corredor Monte Pascoal Pau Brasil: clima-comunidade-diversidade*, Instituto BioAtlântica.
- Simoni, W.F. (2009) 'Mercado de Carbono', in Fujihara, M.C. and Lopes, F.G. (Eds.): *Sustentabilidade e Mudanças Climáticas: guia para o amanhã*, Editora Senac, São Paulo.
- Souza, A., Paiva, D. and Andrade, J. (2011) *Perfil do Mercado Voluntário. XIII Encontro Nacional de Gestão Empresarial e Meio Ambiente (ENGEMA)*, Anais do ENGEMA, São Paulo.
- Subbarao, S. and Lloyd, B. (2011) 'Can the clean development mechanism (CDM) deliver?', *Energy Policy*, Vol. 39, No. 3, pp.1600–1611.
- Sutter, C. (2003) *Sustainability Check-Up for CDM Projects*, Wissenschaftlicher Verlag, Berlin.
- Sutter, C. and Parreño, J.C. (2007) 'Does the current clean development mechanism (CDM) deliver its sustainable development claim? An analysis of officially registered CDM projects', *Climatic Change*, Vol. 84, No. 1, pp.75–90.
- The Forest Dialogue (2008) *Além do REDD: o papel das florestas nas mudanças climática*, Número 3, <http://www.theforestdialogue.org>
- UNEP (2011) *REDDy Set Grow*, A briefing for financial institutions, Part 1. Opportunities and roles for financial institutions in forest carbon markets, Geneva, Switzerland. <http://www.unepfi.org/fileadmin/documents/reddysetgrow.pdf>
- United Nations Framework Conventions on Climate Change (UNFCCC) (2011) *Benefits of the Clean Development Mechanism 2011*, http://cdm.unfccc.int/about/dev_ben/pg1.pdf