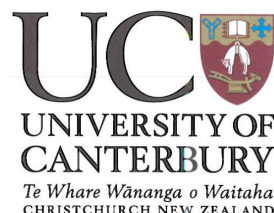


Comparison of Carbon Offset Standards for Climate Forestation Projects participating in the Voluntary Carbon Market

**A comparison of
Climate, Community & Biodiversity Standard (CCBS),
CarbonFix Standard (CFS),
Plan Vivo Systems and Standard, and
AFOLU Voluntary Carbon Standard (VCS)**



**Eduard Merger & Alwyn Williams
University of Canterbury, Christchurch, New Zealand
May 2008**

Acknowledgements

Special thanks to all people who contributed to this work with their comments, advice, and expert knowledge.

Thank you to the University of Canterbury for the support and provision of their facilities.

We also would like to thank Climate, Community, & Biodiversity Alliance, CarbonFix, the Plan Vivo Foundation, and the Voluntary Carbon Standard for the use of their documents and their feedback.

Executive Summary

This report compares different standards of Climate Forestation Projects. These are projects that convert non-forest land into forest land in order to mitigate climate change and contribute to sustainable development. The report concentrates on parameters of the standard which are of special interest for carbon buyers in the Voluntary Carbon Market.

The need for such a report has arisen due to the variety of standards that have recently been developed. The report concentrates on the comparison and evaluation of the four standards currently regarded as the main international standards in the field of Climate Forestation Projects.

The following table summarises essential outcomes of this report. The table is shaped according to the composition of the chapters in the paper.

Summary of the comparison (CCBS, CFS, Plan Vivo, ARR VCS)

	Type of credits	Transparency	Permanence	Co-benefits	Additionality	Verification frequency
CCBS	N/A	★ ★	N/A	★ ★ ★	A/R CDM	5 yearly
CFS	Ex-ante ¹	★ ★ ★	Buffer 30 %	★ ★	A/R CDM or Financial 3 rd party approval	2-5 yearly
Plan Vivo	Ex-ante & ex-post ²	★ ★	Buffer minimum 10 %	★ ★ ★	Barrier analysis	annually
VCS	Ex-post	★	Buffer 5-60 %	★	Project test	once

★ The stars are set in relation to the requirements of each standard. The more stars, the better the transparency level, or co-benefits of a standard.

¹ Ex-ante credits are determined by the future CO₂-fixation of a forest.

² Ex-post credits are calculated by the current CO₂-stock of a forest.

Foreword

Together with the discussion on REDD, Climate Forestation Projects have gained new momentum. However, many environmental NGOs remain in favour of REDD projects rather than those involving afforestation or reforestation. In contrast to this, an analysis by the Clinton Foundation (2008) demonstrates that the potential to mitigate climate change through Climate Forestation Projects is equal to that of REDD.

In March 2008 WWF published a general evaluation of eight standards participating in the Voluntary Carbon Market (Kollmus *et al.* 2008). The document provides a comprehensive overview of the different standards participating in the market.

As a follow-on report, this paper concentrates on the comparison of standards for Climate Forestation Projects³.

There are four main Carbon Offset Standards that can be applied globally and that are currently active within the Voluntary Carbon Market; these are: Community, Climate, and Biodiversity Standard (CCBS), the CarbonFix Standard (CFS), the Plan Vivo Systems and Standard, and the AFOLU Voluntary Carbon Standard (VCS). The Gold Standard is not part of this document as it excludes Climate Forestation Projects. The standards put forward by California Climate Act Registry (CCAR) and Chicago Climate Exchange (CCX) are not included in this report due to their geographical limitation.

The main objective of this report is to provide clear information about each standard in order to assist CO₂-buyers in the decision-making process of selecting the appropriate standard for their forestry based offsetting efforts.

Since this paper elaborates on the standards solely from a carbon buyers' perspective, there remains a need to compare these standards according to the needs of a project developer. This will be realised with the next publication, due in July 2008. This subsequent document will compare in detail the different methodologies used for the calculation of CO₂-fixation (including the Baseline, Leakage and Project emissions) as well as the practicability of its use, the value of its credits and the costs.

The motivation for this work is to shed light on the numerous standards currently operating in order to contribute to a better understanding of the options available and improve collaboration between organisations.

³ Climate Forestation Projects are projects where non-forest land is converted to forest land in order mitigate climate change and contribute to sustainable development.

Abbreviations

AFOLU	Agriculture, Forestry and Other Land Use Projects
A/R CDM	Afforestation and Reforestation Clean Development Mechanism
CDM EB	Clean Development Mechanism Executive Board
CCBS	Community, Climate and Biodiversity Standard
CFS	CarbonFix Standard
DOE	Designated Operational Entity
DNA	Designated National Authority
FAO	Forestry and Agriculture Organisation
FSC	Forest Stewardship Council
IPCC	Intergovernmental Panel on Climate Change
IPCC GPG	Intergovernmental Panel on Climate Change Good Practice Guidance
LULUCF	Land Use, Land Use Change and Forestry
OTC Market	Over-the-Counter Market
REDD	Reduced Emissions from Deforestation and Degradation
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
WWF	World Wide Fund for Nature

Tables

Summary of the comparison (CCBS, CFS, Plan Vivo, ARR VCS)	- 3 -
Table 1: Transparency of the standards.....	- 12 -
Table 2: Permanence insurance approaches of the standards.....	- 15 -
Table 3: Co-benefit of the standards.....	- 17 -
Table 4: Opportunities to prove additionality	- 19 -
Table 5: Carbon pools of the CFS	- 20 -
Table 6: Carbon pools of VCS	- 21 -
Table 7: Carbon fixation issues.....	- 21 -
Table 8: Certification issues	- 24 -
Table 9: Summary of the comparison (CCBS, CFS, Plan Vivo, ARR VCS)	- 25 -

Contents

<i>Acknowledgements</i>	- 2 -
<i>Executive Summary</i>	- 3 -
<i>Foreword</i>	- 4 -
<i>Abbreviations</i>	- 5 -
<i>Tables</i>	- 5 -
<i>Contents</i>	- 6 -
<i>Introduction</i>	- 7 -
<i>1. Background to the Standards</i>	- 8 -
<i>2. Transparency</i>	- 9 -
<i>3. Permanence</i>	- 12 -
<i>4. Co-benefits</i>	- 15 -
<i>5. Additionality</i>	- 17 -
<i>6. Estimation of net CO₂-sequestration</i>	- 19 -
<i>7. Certification Process</i>	- 22 -
<i>Summary</i>	- 25 -
<i>References</i>	- 27 -

Introduction

The forestry sector accounts for approximately 20% of global greenhouse gas emissions. Since the inception of the Kyoto Protocol, forests have gained importance as being part of an overall strategy for mitigating climate change. Globally, forests play a vital role in stabilising atmospheric concentrations of greenhouse gases while simultaneously contributing to sustainable development (Article 2; Kyoto Protocol).

In order to incorporate forestry activities for climate change mitigation purposes and sustainable development, the UNFCCC has developed the instrument of A/R CDM⁴. In combination with the compliance market it was expected that forestry will play an essential role, as considered by the Kyoto Protocol. However, since the ratification of the Protocol, only minor forestry activities have taken place. Up to the publication of this report only one of 1000 CDM projects has been registered under A/R. There are several reasons for this: The procedures and methodologies of project registration are overly complex, the ex-post credits issued by A/R CDM are of limited time span, and the biggest market platform of the compliance market – the EU ETS⁵ – has not included credits generated through forestry.

As Climate Forestation Projects are still being developed, they have moved to the Voluntary Carbon Market. Here, stringent project management rules are absent. This has resulted in a lack of market acceptance and severe criticisms. The latest survey on the Voluntary Carbon Market by Hamilton et al. (2008) mirrors this situation. It shows a 240% market value increase from 2006 to 2007 of the Voluntary Carbon Market, and at the same time a decline of the share of Climate Forestation Projects from 33% (2006) to 10% (2007) (Hamilton et al. 2008: 33)⁶.

Recently, several new certification standards have been developed for the Voluntary Carbon Market. These aim to tackle the challenges of establishing practical certification schemes that will generate permanent quality forestry carbon offsets.

With a number of certification standards available, it is important to investigate the differences of these standards and their ability to provide transparent information to project developers and carbon buyers.

The following comparison covers four standards, which currently can be regarded as the main players generating CO₂-certificates from Climate Forestation Projects in the Voluntary Carbon Market. These are the Climate, Community, and Biodiversity Standard⁷ (CCBS) (Version 1.0.), the CarbonFix Standard⁸ (CFS) (Version 2.0.), the Plan Vivo Systems and Standard⁹ (Version February 2008 Draft), and the Voluntary Carbon Standard¹⁰ (VCS) (Version 2.0).

The main objective of this paper is to evaluate the main parameters of each of the standards that influence a carbon buyer's decision in purchasing carbon offsets. These parameters are:

⁴ Afforestation and Reforestation Clean Development Mechanism

⁵ European Union Emission Trading Scheme

⁶ OTC Market: Afforestation/Reforestation plantation 2% (2006), 2% (2007); Afforestation/Reforestation mixed native 31% (2006), 8% (2007).

⁷ <http://www.climate-standards.org/index.html>

⁸ <http://www.carbonfix.info>

⁹ <http://www.planvivo.org>

¹⁰ <http://www.v-c-s.org/index.html>

Transparency, assurance of permanence, environmental and socio-economic co-benefits, additionality, CO₂-calculation, and the certification process.

1. Background to the Standards

This chapter provides a brief description of the history of each of the standards, the organisations involved, and the latest release of the standard, including their goals.

1.1. Climate, Community and Biodiversity Standard (CCBS)

Background: The Climate, Community and Biodiversity Standard was launched by the Climate, Community, and Biodiversity Alliance (CCBA) in cooperation with independent experts and non-governmental organisations. CCBA is an organisation run by non-governmental organisations, corporations, and research bodies. The first version of the standard was released in May 2005. The standard is currently being reviewed and the second version is expected to be released by October 2008.

Goals: CCBA's main goal is to provide regulations and guidance to develop land-use projects that mitigate climate change and deliver multiple benefits in an integrated sustainable manner. Hence, CCBA mainly concentrates on the generation of positive co-benefits and restricts its carbon assessment to the acceptance of methodologies from other standards.

1.2. CarbonFix Standard (CFS)

Background: The CFS was developed by scientists in the fields of forestry, environment and climate change, together with experts in the field of development aid. The standard was specifically developed for Climate Forestation Projects and does not verify or register carbon offsets of other land use types. The latest version (Version 2.0) was released in May 2008.

Goals: The standard's main objective is to provide project developers with a quality standard that utilises practical applicable methodologies and delivers credible CO₂-credits to carbon buyers. This is combined with insurance on permanence, positive co-benefits and a transparent track-and-trace system¹¹.

1.3. Plan Vivo System and Standards

Background: Plan Vivo is an organisation that originates from a research project in southern Mexico in 1994. The organisation is supported by a carbon management consultancy, research institutions, and several non-profit organisations. Currently the standard is run by the Bio Climate Research and Development (BR&D) organisation, which will soon become the Plan Vivo Foundation. The latest version was released in February 2008 for public review. This is still ongoing and the final version is expected to be released by June 2008.

¹¹ With a track-and-trace system a customer can track back the origin of a product.

Goals: The core of the Plan Vivo System is to enhance climate change mitigation from rural small-scale farming community projects promoting sustainable livelihoods. The standard's aims are to sustainably and economically sequester carbon in a socially and environmentally responsible way. Additional objectives are to assist farmers, maintain projects, and promote sustainable small-scale management systems in developing countries.

1.4. Voluntary Carbon Standard (VCS)

Background: The VCS is a standard for all greenhouse gas offset types and was developed by non-governmental organisations, industry associations, certification companies, project developers, and offset buyers. Since the purpose of this paper is to compare forestry related standards, only the Afforestation, Reforestation and Revegetation (ARR) of the VCS Agriculture, Forestry and other Land Use (AFOLU) Program is considered. The first AFOLU version was released on 19th November 2007 and is part of VCS' second version.

Goals: The standard was designed to validate and verify rigorous and trustworthy voluntary greenhouse gas offsets. In addition, the standard aims to generate permanent carbon credits, keep validation and verification costs low, and ensure basic environmental and social benefits.

2. Transparency

As carbon dioxide is a product that is neither tangible nor visible, it is of utmost importance to communicate how and where the carbon has been fixed in a transparent and easily understood manner.

In contrast to non-forest climate projects, Climate Forestation Projects have an advantage in that the fixation of CO₂ is clearly visible and easy to understand.

Certified projects have hitherto only been communicated in the form of occasional online texts, small pictures, or long technical papers. As CO₂-buyers base their prices on many different project parameters, they must be able to judge these for themselves. Therefore transparency as well as simplicity of the project information is essential for the attractiveness of Climate Forestation Projects.

Another aspect of transparency is the prevention of double selling. For Climate Forestation Projects this would be possible by the certification of a project with two different standards. Another possibility arises when the host-country of a project has accepted Article 3.4¹² of the Kyoto-Protocol. Such projects would need to be excluded from the national carbon registry of LULUCF to avoid future double counting.

As projects are often situated in rural areas of developing countries, where complications of land tenure and social conflicts can easily arise, the publication of stakeholder opinions is essential. Such transparency reduces the risk of potential conflicts between the different stakeholders involved.

The following chapter elaborate on the level of transparency provided by each standard.

2.1. Climate, Community and Biodiversity Standard (CCBS)

Project information: On the website¹³ of CCBA the following information is given about projects: Project name and location, PDDs¹⁴, public comments, name of CCB certifier, final verification reports, and CCB status.

Double selling/counting: Since CCBS does not verify carbon offsets, the issue of double selling is not relevant.

Public involvement: During the validation process by a third party, PDDs are made publicly available and can be commented on for a 21 day period. These comments are considered in the further validation process.

2.2. CarbonFix Standard (CFS)

Project information: On the CarbonFix website each project is assigned its own webpage. Information relating to the project such as pictures, comments of project visitors or neighbours, news from the project developer, all project documents, validation and

¹² Prior to the first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol, each Party included in Annex I shall provide, for consideration by the Subsidiary Body for Scientific and Technological Advice, data to establish its level of carbon stocks in 1990 and to enable an estimate to be made of its changes in carbon stocks in subsequent years. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session or as soon as practicable thereafter, decide upon modalities, rules and guidelines as to how, and which, additional human-induced activities related to changes in greenhouse gas emissions by sources and removals by sinks in the agricultural soils and the land-use change and forestry categories shall be added to, or subtracted from, the assigned amounts for Parties included in Annex I, taking into account uncertainties, transparency in reporting, verifiability, the methodological work of the Intergovernmental Panel on Climate Change, the advice provided by the Subsidiary Body for Scientific and Technological Advice in accordance with Article 5 and the decisions of the Conference of the Parties. Such a decision shall apply in the second and subsequent commitment periods. A Party may choose to apply such a decision on these additional human-induced activities for its first commitment period, provided that these activities have taken place since 1990. <http://unfccc.int/resource/docs/convkp/kpeng.pdf> (23.05.2008)

¹³ <http://www.climate-standards.org/projects/index.html> (24.05.2008)

¹⁴ Project Design Document – A technical paper which describes all project information. PDDs vary in forestry from approximately 50 to 150 pages.

verification reports, as well as project maps including a Google Map function is made publicly available¹⁵.

As projects developers can use this website as a platform for selling their CO₂, carbon buyers will also have access on price information as well as on the quantity of CO₂ available for sale.

Additionally, CarbonFix offers carbon buyers the possibility to make use of a track-and-trace system. The system allows CO₂-buyers to split their bulk purchases into smaller CO₂-certificates with a unique CO₂-code. This code can then be printed on a product. This allows end-customers to track their trees online and trace them back to the offsetting project.

Double selling/counting: To avoid double selling the CFS uses a registry. If projects are implemented in countries that have accepted Article 3.4 of the Kyoto Protocol, CarbonFix reports the respective project area to the DNA¹⁶ of the projects' host country. According to CFS¹⁷, the standard will join a supra-voluntary registry¹⁸ as soon as one evolves.

Public involvement: Subject to validation, each project gets its own webpage. Here, comments can be submitted at any time and will be considered in the next certification process. The comments are made publicly available on the project webpage.

2.3. Plan Vivo System and Standards

Project information: Plan Vivo provides information about the name, location, coordinator, and status of its projects as well as each project's technical and publicity documents. In addition, pictures and information of the project's current main activities, annual project reports and other relevant literature are publicly available.

Double selling/counting: Each Plan Vivo Certificate has a unique serial number preventing double selling. They can be traced back to the individual project and the date of issuance. All sales are published on the webpage of Plan Vivo¹⁹.

Public involvement: Currently unknown. The verification and validation webpage of Plan Vivo is currently under construction²⁰.

2.4. Voluntary Carbon Standard (VCS)

Project information: VCS is currently constructing a project database²¹ where verified projects will be publicly displayed. The database will at a minimum include the VCS Project Description, validation and verification reports. The date of publication of this database was not available up to the date of publication.

¹⁵ Up to the end of this report, only previews of the projects webpage were available to the authors.

¹⁶ Designated National Authority, <http://cdm.unfccc.int/DNA/index.html>

¹⁷ Moriz Vohrer (Chairman of the CarbonFix technical board)

¹⁸ A supra-voluntary registry would unit the registries of all standards.

¹⁹ <http://www.planvivo.org/fx.planvivo/scheme/buyerregister.aspx> (23.05.2008)

²⁰ <http://www.planvivo.org/fx.planvivo/scheme/verification.aspx> (24.05.2008)

²¹ <http://www.v-c-s.org/projects.html> (20.05.2008)

Double selling/counting: VCS prevents double counting by a registry that assigns a unique serial number to each VCU²².

Public involvement: Public consultation is not explicitly required for the verification process of a project.

Synopsis

Table 1: Transparency of the standards

	Double selling Voluntary Market	Double counting Compliance Market	Provision of Project information	Public involvement
CCBS	N/A	N/A	★ ★	Possible Limited in time
CFS	Registry	Reported to DNA	★ ★ ★	Possible
Plan Vivo	Registry	Not addressed	★ ★	Foreseen
VCS	Registry	Not addressed	★	Not required

★ The stars are set in relation to the standards. The more stars, the higher the information content on standards’ websites.

3. Permanence

One distinctive property of forestry projects is the issue of permanence. Forests may function either as carbon sinks or carbon source. Although there will never be a forest that lives forever, forests that are sustainably managed can be regarded as long-term sinks; and if in case of removal the carbon credits are insured.

To provide robust quality offsets for the Voluntary Carbon Market the permanence of projects and their credits is essential. The risks associated with Climate Forestation Projects are very diverse, which makes their mitigation difficult and sometimes even impossible. Risk can arise from many sources including financial and land tenure issues, natural disasters such as fires, pest outbreaks, floods or storms, as well as from political sources. Sufficient management capacities and clear land-tenure relations can reduce the risk to a certain extent. By contrast, natural hazards, and political changes are often not predictable.

Many risks can be mitigated through compliance with other criteria of a standard, for example, the risk of fire. This risk depends not only on the prevailing climatic conditions but also on the relationship to the surrounding neighbours and the capacity of management to respond to such an event. Therefore, the criteria of standards must be set in such a manner that they are able to mitigate risks effectively.

²² Voluntary Carbon Unit: Name of carbon credit generated and certified by the Voluntary Carbon Standard.

At present there is no scientific evidence that demonstrates how different parameters influence the risk of Climate Forestation Projects. In the following chapter each standards' approach to risk mitigation and compensation are explained and assessed.

3.1. Climate, Community and Biodiversity Standard (CCBS)

Mitigation: The CCBS requires the project proponent to provide sufficient information on the financial health of a project, evidence that laws are respected, and that people are not displaced or mistreated. Land tenure has to be clarified before the project start. Risks concerning the climate, surrounding communities, and biodiversity have to be described, measured, and mitigated.

Compensation: If a CCBS project becomes certified its CO₂-calculations must be based on an accepted A/R CDM methodology. Therefore, although the standard does not issue carbon credits itself, it still provides criteria for its usage.

CCBS recommends that projects shall withhold 10% of their CO₂-credits from selling in the compliance market. It is optional that this 10% is either retired or sold within the Voluntary Carbon Market.

3.2. CarbonFix Standard (CFS)

Mitigation: The CFS has set strict criteria that require the project developer to provide evidence on quality management and sufficient technical capacity, financial health, and secured land tenure. Indirect parameters such as good relations to the neighbours are addressed in other parts of the standard. As CFS concentrates only on forestry, specific risks such as fire and pests are addressed in detail. On the projects webpage, the risk of each project is rated.

Compensation: The project developer is committed to compensate for shortfalls of CO₂ as well as potential losses of forest areas by replacements²³. In case this is not possible the CO₂-credits are insured by the buffer fund, where 30% of all projects' credits are held back. Part of the portfolio buffer is used to generate a counter insurance.

3.3. Plan Vivo System and Standards

Mitigation: In Plan Vivo projects, risk mitigation is conducted by an integrated planning process. As such all participants have to develop future strategies creating alternative income opportunities. This long term planning also considers long term financial risks. Here project participants must develop alternative income sources. In addition, permanence impediments have to be assessed. Risks such as fire or pests must be identified in the description of technical specifications. These have to be mitigated through proper planning

²³ To replace a shortfall on credits, additional area can be planted or CFS certified credits from other projects must be purchased.

and management. Moreover, project participants must work in collaboration with authorities and governmental bodies in order to alleviate risk.

Compensation: With these descriptions the Plan Vivo Foundation conducts an annual assessment of the risks. Three risk levels are determined depending on the type of carbon credits. For ex-ante²⁴ credits the risk is assessed as low (10-20%), medium (20-40%), and high (40-60%). Similarly, the risk of ex-post²⁵ credits is assessed as low (5-10%), medium (10-20%), and high (20-40%). The percentage determines the amount of credits that should not be sold. Plan Vivo encourages the project developer to hold back this amount of credits to cover unexpected shortfalls.

3.4. Voluntary Carbon Standard (VCS)

Mitigation: The buffer system of VCS encourages project developers to mitigate potential risks but does not explicitly state that risk abatement has to be undertaken.

Compensation: The standard has established a risk assessment system that delineates the risk into three classes: low - with a buffer range of 5-20%, medium - with a range of 20-40%, and high - with a range of 40-60%. The risk assessment is then conducted by two independent verifiers. It considers criteria such as management capacity, technical capacity, financial capacity, project lifetime, land-tenure, future income, and endorsement of the project. Subsequently, the *risk likelihood* is multiplied by the *significance* rating. According to the percentage of the risk assessment a certain amount of credits will not be permitted for selling and is managed in a VCS buffer account. It is the interest of the project developer to keep risks as low as possible and adopt risk mitigation strategies that will result in increased amounts of tradable carbon credits.

Buffer credits are joined in a buffer portfolio. This buffer is used to compensate carbon shortfalls or project failure. If a project fails to submit a self-validation²⁶ report within five years, 50 % of its buffer is cancelled. If a self-validation report has not been submitted after a further five years, the remaining 50% project buffer is cancelled. Finally, after 15 years without self-validation reports the project is removed from the portfolio buffer.

²⁴ Ex-ante credits are determined by the future CO₂-fixation of a forest.

²⁵ Ex-post credits are calculated by the current CO₂-stock of a forest.

²⁶ The project developer is responsible for the submission of a validation report within five years conducted by an independent validator.

Synopsis

Table 2: Permanence insurance approaches of the standards

	Fund	Use of fund	Credits not being sold
CCBS	N/A	N/A	0%
CFS	Yes	In case of project failure (In case of shortfalls projects have to compensate by replacements)	30%
Plan Vivo	No	N/A	Minimum 10%
VCS	Yes	In case of project shortfalls and project failure	5-60%

4. Co-benefits

Social and environmental responsibility has become an increasingly important part of the marketing strategies of large companies. “More and more companies are adopting policies of environmental sustainability” (Kotler, 2006: 634). Co-benefits in the Voluntary Carbon Markets progressively capture a great value. Hence a high level of co-benefits can attract investment in Climate Forestation Projects. Well-managed and sustainable projects are closely associated with a variety of co-benefits, such as increased employment and income generation, biodiversity and watershed conservation, and the provision of wood products and recreational services. These are likely to be greatly appreciated by carbon buyers and compose a significant value proposition to carbon offsets. This chapter evaluates the minimum requirements of co-benefits that each standard demands for the certification of its projects.

4.1. Climate, Community and Biodiversity Standard (CCBS)

The CCBS has developed a set of basic compulsory regulations that must be met prior to a project achieving certification²⁷. Furthermore, the standard provides additional requirements associated with co-benefits that empower a project to reach a silver²⁸ or gold²⁹ level.

Environmental & social demands: The compulsory basic requirements includes net positive community impacts, mitigation of negative offsite community impacts, net positive biodiversity impacts, and mitigation of negative offsite biodiversity impacts.

²⁷ Projects that satisfy 15 of the 23 criteria.

²⁸ Projects that satisfy all requirements and receive one point from four different sections (General, Climate, Community, Biodiversity).

²⁹ Projects that satisfy 15 requirements, have a minimum of 6 additional points, with at least one point from each of the four sections.

Additional criteria for achieving silver or gold level are the installation of an adaptive management system, knowledge dissemination, capacity building, community participation, use of native species, and water and soil improvements.

Monitoring: In order to assess the net benefits rigorous scientific monitoring systems, for both biodiversity and socio-economic impacts must be implemented. These are verified in the verification process that is undertaken every 5 years.

4.2. CarbonFix Standard (CFS)

CFS primarily concentrates on good practices in sustainable forest management, a concept that ensures the long-term enhancement of socio-economic and ecological co-benefits and therefore also contributes to the sustainable development of a country.

Environmental & social demands: Net positive environmental impacts concerning soil, water, and biodiversity, as well as socio-economic impacts concerning employment, neighbourhood, and capacity building have to be enhanced. Negative impacts must be mitigated.

On the website, each project is rated according to its ecological and social co-benefits. These ratings are then published on the CFS website. The highest rating can only be achieved by projects that are also CCBS certified.

Monitoring: The monitoring of co-benefits is executed during regular field visits every 2 to 5 years, as well as by visitors to the project who are encouraged to verify the publicly available project information.

4.3. Plan Vivo System and Standards

Apart from carbon sequestration, Plan Vivo concentrates particularly on the generation of co-benefits. In addition to the income from carbon credits, projects must contribute to poverty reduction, rural development, and ecosystem protection.

Environmental & social demands: To achieve a Plan Vivo certification various co-benefits have to be met. Specifically, these are high community participation, capacity building and knowledge transfer, soil stability improvement, watershed protection, and restoration of degraded or degrading ecosystems. The assessment of these criteria is not linked to a specific methodology.

Monitoring: A biodiversity and socio-economic impact assessment are conducted before a project is registered. Periodic measurements are also conducted relating to the management necessities. Since no fixed timeframe of undertaking measurements is provided, it is assumed that these have to be conducted and reported to the Plan Vivo Foundation on an annual basis as part of the compulsory annual report.

4.4. Voluntary Carbon Standard (VCS)

The VCS does not specifically focus on co-benefits. It regards co-benefits as a positive secondary effect that may lower the risk profile of a project. However VCS does encourage project developers to use other standards to demonstrate the monitoring of co-benefits. For forestry projects the standard refers to use toolkits provided by EnCoFor³⁰ for CDM, FSC³¹, or CCBS.

Environmental & social demands: According to AFOLU VCS (2007), projects have the potential to improve socio-economic and environmental impacts, but may also have negative impacts. Hence, prior to certification, the VCS requires projects to identify negative environmental and socio-economic impacts and undertake steps to mitigate these.

Monitoring: The monitoring of co-benefits is not specifically required.

Synopsis

Table 3: Co-benefit of the standards

	Environmental	Socio-economical	Monitoring
CCBS	★ ★ ★	★ ★ ★	Scientific rigorous methodology
CFS	★ ★	★ ★	Criteria of the standard
Plan Vivo	★ ★ ★	★ ★ ★	Periodic measurements
VCS	★	★	Self-validation reports

★ The stars are set in relation to the standards. The more stars, the higher the standards' co-benefit requirements.

5. Additionality

One of the most important and often controversial issues of carbon offset projects is proof of additionality. For carbon buyers it is essential to know that their money is decisive for project implementation and does not just generate additional financial benefits to project developers.

As project cash flow calculations and the setting of benchmarks are based on very flexible parameters, it is often very difficult to evaluate additionality. In general, standards generating ex-ante credits can prove their additionality more easily.

The following chapter gives an overview of the methodologies required of each standard.

³⁰ <http://www.joanneum.at/encofor/> (20.05.2008)

³¹ <http://www.fsc.org/en/> (20.05.2008)

5.1. Climate, Community and Biodiversity Standard (CCBS)

The standard accepts the methodologies of the IPCC GPG³² and approved methodologies of the CDM Executive Board.

5.2. CarbonFix Standard (CFS)

CFS uses two options to prove additionality. In the first option a project developer confirms its financial additionality by gaining the approval of an internationally recognised bank³³. The bank approval must prove that the project is not feasible without additional carbon income. The second option uses the official CDM methodology.

Furthermore, evidence must be given that a forest cannot establish itself naturally and that the forestation activities are not enforced by any law. With the CFS, only ex-ante credits are generated.

5.3. Plan Vivo System and Standards

Plan Vivo does not provide detailed information about the proof of additionality. However, a barrier analysis can be used to show additionality due to the lack of technical expertise, institutional capacity, finances, or prohibitive political or cultural environments. With the Plan Vivo System and Standards ex-post as well as ex-ante credits are generated.

5.4. Voluntary Carbon Standard (VCS)

VCS has developed its own additionality regulations which can be verified through a Project Test, Performance Test, or Technology Test.

The Project Test requires the execution of an investment barrier analysis, a technological barrier analysis, or an institutional barrier analysis. In the investment analysis the project proponent has to prove that he/she has or can overcome financial constraints; in the technology barrier analysis the project must demonstrate it has overcome technological barriers to acquire its increased carbon income; and in the institutional analysis the project must prove it has overcome organisational, cultural or social barriers. Finally, the project proponent must give evidence that his/her activities are not common practice.

The Performance Test requires an approved methodology by the VCS. Up to the publication of this document no methodologies³⁴ have as yet been approved.

The third opportunity to test additionality is the Technology Test. The VCS Program is currently developing a list³⁵ which approves project types and areas as being additional. With the VCS, only ex-post credits are generated.

³² Intergovernmental Panel on Climate Change Good Practice Guidance

³³ The bank must be one of the 50 biggest banks worldwide: http://www.gfmag.com/c_aw/0510_03.php (22.05.2008)

³⁴ <http://www.v-c-s.org/methodologies.html> (20.05.2008)

³⁵ <http://www.v-c-s.org/methodologies.html> (20.05.2008)

Synopsis

Table 4: Opportunities to prove additionality

	Financial	Barrier	Comparison
CCBS	✓	✓	✓
CFS	✓	✓	✓
Plan Vivo		✓	
VCS	✓	✓	✓

6. Estimation of net CO₂-sequestration

The quantification of net positive greenhouse gas benefits is conducted by subtracting the baseline, leakage and project emissions from the carbon sequestered by trees. In doing that, different carbon pools have to be considered, which vary among the standards. Moreover, to ensure that long-term carbon sequestration is achieved, monitoring systems have to be established. This chapter elaborates on the CO₂-quantification methodologies, carbon pools and monitoring systems used by each standard.

6.1. Climate, Community and Biodiversity Standard (CCBS)

Methodology: As mentioned above, CCBS does not verify carbon offsets itself. It refers to methodologies of other standards. Currently, it accepts only approved A/R CDM methodologies³⁶.

Carbon pools: Depending on the A/R CDM methodology all carbon pools can be considered.

6.2. CarbonFix Standard (CFS)

Methodology: The CFS requires scientifically reliable calculations of future CO₂-fixation and provides a methodology that is based on formulas of the IPCC³⁷. Here, the future CO₂-fixation of a forest is calculated based on scientifically rigorous growth-models from which the baseline, leakage, and project emissions are deducted. All calculations must also follow the conservative approach of the IPCC.

Carbon pools: As shown in table 5, the CarbonFix Standard considers different carbon pools for the calculation of future CO₂-fixation, baseline and leakage.

³⁶ Currently 11 methodologies are approved by the UNFCCC
http://cdm.unfccc.int/methodologies/ARmethodologies/approved_ar.html (23.05.2008)

³⁷ Intergovernmental Panel on Climate Change

Table 5: Carbon pools of the CFS

Carbon Pools		Examples	Future CO ₂ fixation	Baseline	Leakage	
Aboveground	Woody	Living Biomass	<i>Stem, bark, foliage and branches</i>	Selected	Selected	Selected
		Dead Biomass	<i>Dead trees or branches</i>			
	Non-woody	Living Biomass	<i>Grass</i>		Selected	
		Dead Biomass	<i>Dead grass, litter and seeds</i>			
Belowground	Woody	Living Biomass	<i>Roots</i>	Selected	Selected	
		Dead Biomass	<i>Died off roots</i>			
	Non-woody	Living Biomass	<i>Grassroots</i>		Selected	
		Dead Biomass	<i>Died off grassroots and organic soil</i>			
Wood products		<i>Construction timber or furniture</i>				
Wood as renewable energy		<i>Replacement of oil or coal</i>				

According to CFS the “selected” carbon pools are compulsory for the determination of net positive CO₂-fixation.
Source: CarbonFix Standard, 2008 (Chapter: Calculation of VER_{futures})

Monitoring: Prior to every certification process (every 2-5 years) the net future CO₂-fixation must be reassessed by the project developer and confirmed during the certification process. For the reassessment and adaptation of growth models, regular forest inventories are required that measure the real rate of carbon sequestration. Therefore, CFS provides a comprehensive guideline.

6.3. Plan Vivo System and Standards

Methodology: The methodology of carbon modelling must be stated in the technical specifications of the project. It requires transparent assumptions with justifications that consider different ecosystem variables. Carbon pools always have to be estimated conservatively and consider the quality of the measured parameters. Consequently, the lower the quality of the measured parameters the more conservative the estimates have to be. External resources such as consultants, educational or research institutes may also be supportive in carbon modelling.

Plan Vivo does not provide its own or specific methodologies to measure CO₂-fixation.

Carbon pools: In the Plan Vivo regulations there is no information about the carbon pools that have to be considered in the calculations. Hence the assumption is made that all carbon pools are allowed to be used in the calculations if they lead to conservative estimates.

Monitoring: Plan Vivo projects are monitored by annual reports. These are assessed by the Plan Vivo Foundation.

6.4. Voluntary Carbon Standard (VCS)

Methodology: VCS quantifies the emission reductions by either approved A/R CDM methodologies or by its own methodology; these must be approved by the ARR³⁸ working group of the standard. Up to the publication of this paper no own methodologies were approved by ARR VCS³⁹ working group.

Carbon pools: For its own methodologies, VCS considers carbon pools as shown in the table below:

Table 6: Carbon pools of VCS

ARR Carbon Pools						
Living Biomass			Dead Organic Matter		Soil	Wood products
Aboveground woody	Aboveground non-woody	Below-ground	Litter	Dead wood		
Y	O/S	Y	O/S	O/S	O/S	O

Y = compulsory carbon pools; O = optional carbon pools; S = to be included if their reduction due to project is significant

Source: AFOLU VCS (2007)

Monitoring: For ARR VCS projects only an initial field verification is required. After this projects have to submit a self-validation report once every five years. In the case where a project intends to re-assess the projects buffer, in order to generate additional carbon credits, a supplementary field visit is required.

Synopsis

Table 7: Carbon fixation issues

	Type of credits	Carbon pools	Monitoring	Certificate name
CCBS	N/A	N/A	N/A	N/A
CFS	Ex-ante	Depending on the parameters CO ₂ -fixation, Baseline, Leakage	Every 2-5 years	VER _{futures}
Plan Vivo	Ex-ante & ex-post	All possible	Annually	Plan Vivo Certificate
VCS	Ex-post	All possible	Every 5 years	VCU

³⁸ Afforestation, Reforestation and Revegetation

³⁹ <http://www.v-c-s.org/methodologies.html> (23.05.2008)

7. Certification Process

Standards participating in the Voluntary Carbon Market usually have different certification procedures, which considerably influence the level of transparency and the credibility of carbon credits. To enhance the quality of certification it is good practice to involve third parties that independently assess each project's documents and approve tradable CO₂-certificates.

It is important to note that whether or not a project adheres to generally described regulations is often subject to the judgement of the individual certifier. In other words, generally described guidelines shift the responsibility to project developers and the interpretation capability of certifiers. This can result in differences in quality between projects. Furthermore, the frequency of verification⁴⁰ is another important factor influencing project quality. In this next chapter, the certification procedure, accredited⁴¹ certifier, and the frequency of verification are described.

7.1. Climate, Community and Biodiversity Standard (CCBS)

Registration process: To become CCBS certified, the project proponent has to submit a PDD directly to an independent 3rd party, normally a validation body. This body assesses the design against each of the 15 mandatory and 8 optional criteria of CCBS. The assessment is complemented by an auditor field visit.

After the initial assessment the certification body prepares a *Draft CCB Validation Report*. If the validation⁴² is unsuccessful the project proponent has six months to satisfy the shortcomings identified in the report. With a successful validation, a *Final CCB Validation Report* is produced that verifies the project.

Verification bodies: To validate according to CCBS, verification bodies have to be accredited as DOE⁴³ in the field of forestry, or by the FSC. CCBA does consider accrediting other entities as validators or verifiers if they can demonstrate competence and credibility.

Frequency: Projects have to be verified every 5 years in the described manner. The verification does not necessarily need to be conducted by the same body every five years.

7.2. CarbonFix Standard (CFS)

Registration process: To become registered under CFS, the project developer has to create a user account. Here, all necessary project templates can be downloaded. These templates iteratively guide the project developer through the criteria of the standard. They have to be completed and uploaded.

⁴⁰ Verification is a procedure by which a third party gives written assurance that a product, process, or service conforms to specified requirements (ISO 19011:2002).

⁴¹ Third-party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tests (ISO/IEC 17000:2004).

⁴² Confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled (ISO 9000:2000).

⁴³ Designated Operational Entity, <http://cdm.unfccc.int/DOE/index.html>, (21.05.2008)

For the generation of CO₂-certificates, and for the display of further project information on the website, the project coordinator has to submit the calculated amount of CO₂-equivalents, GPS coordinates, maps, additional pictures, and select his/her options for CO₂-sale.

When all the information is uploaded, the project developer is able to request for the validation online. This is conducted by the technical board of CarbonFix. With a successful validation the project coordinator can apply for the verification process, which is carried out by an accredited third party.

Verification bodies: Certification to the CFS is conducted by DOEs in the field of forestry as well as by 10 accredited international forestry verifiers. For projects smaller than 1 km², forest experts can also be accredited as verifiers.

Frequency: The frequency of the field verification process depends on the age of the project. When a project is young, it will be assessed every two years. For older projects this frequency rises to a five year period. Usually additionality, eligibility, as well as baseline and leakage calculations, are only assessed during the first certification process.

7.3. Plan Vivo System and Standards

Registration process: To become verified according to the Plan Vivo system the project developer has to submit to the Plan Vivo Foundation documents describing the project design. These must include technical specifications and an operational manual of the project. If the Plan Vivo Foundation approves these documents then an expert reviewer is instructed by the Plan Vivo Foundation to conduct a field visit. This expert prepares a validation report. With the validation report a project is registered by the Plan Vivo Foundation and published on the Plan Vivo website. Afterwards the project is permitted to sell carbon certificates. Henceforth the project has to work towards its verification, which is conducted by a third independent body approved by the Plan Vivo Foundation.

This system was established as it is considered that young projects will not have the financial capacity to pay for the verification process at the inception of the project. It allows projects to constantly scale up through carbon finance and work towards verification.

Verification bodies: Independent third parties that verify Plan Vivo projects need to be accredited by an international certification authority such as the UN, ISO, California Climate Action Registry⁴⁴, FSC, and other certification programmes.

Frequency: The acceptance of annual project reports by the Plan Vivo Foundation is a prerequisite to the issuance of carbon certificates. Plan Vivo does not set exact timeframes for the first verification.

⁴⁴ <http://www.climateregistry.org/404.html> (23.05.2008)

7.4. Voluntary Carbon Standard (VCS)

Registration process: To become registered as a VCS project, the project developer initially has to submit his/her project documents to a verifier. Thereafter, the verifier produces a validation report that includes the assessment of additionality, the determination of carbon credits, and certification. Subsequently, these documents and the VCS Project Description (PD), which is produced by the project developer, are submitted to the VCS registry operator⁴⁵. When a registry operator accepts the documentation, VCU serial numbers are requested from the VCS Association.

Verification bodies: VCS projects can be verified by DOEs approved under the CDM, and AIEs⁴⁶ approved under JI⁴⁷. Additionally, VCS considers accrediting other verification bodies that are approved by the Californian Climate Action Registry.

Frequency: Field verification has to be executed only once.

Synopsis

Table 8: Certification issues

	3 rd party	Validation / Verification separated	Frequency	Format of project's documents
CCBS	Yes	No	5 years	All
CFS	Yes	Yes	2-5 years	Templates
Plan Vivo	Yes, after certificate issuance	No	annually	All
VCS	Yes	Yes	once	Templates

⁴⁵ Registry operators are those bodies that operate approved VCS registries. Registry operators are responsible for verifying that all required VCS documents have been submitted to the registry, issuing and maintaining accounts of VCUs for account holders and maintaining custody and records of VCU original legal ownership. (VCS Program, 2007: 6)

⁴⁶ Accredited Independent Entities

⁴⁷ Joint Implementation

Summary

In this final chapter a summary of the comparison is outlined. The table below shows the core of each standard with regard to the relevance for CO₂-buyers.

Table 9: Summary of the comparison (CCBS, CFS, Plan Vivo, ARR VCS)

	Type of credits	Transparency	Permanence	Co-benefits	Additionality	Verification frequency
CCBS	N/A	★ ★	N/A	★ ★ ★	A/R CDM	5 yearly
CFS	VER _{futures}	★ ★ ★	Buffer 30%	★ ★	A/R CDM or Financial 3 rd party approval	2-5 yearly
Plan Vivo	Plan Vivo Certificate	★ ★	Buffer minimum 10%	★ ★ ★	Barrier analysis	annually
VCS	VCU	★	Buffer 5-60%	★	Project test	once

★ The stars are set in relation to the requirements of each standard. The more stars, the better the transparency level, or co-benefits of a standard.

In contrast to the other standards, the **CCBS** concentrates exclusively on the generation of environmental and socio-economical co-benefits. This enables the standard to cooperate with various partner standards resulting in the generation of carbon credits with a high level of co-benefits. The standard is set-up in a very general and easy to understand way. However there is a risk of flexible interpretation. The project developers as well as the verifier must interpret the criteria themselves, which can eventually lead to differences in project quality.

The **CFS** is a standard that can provide quality credits to carbon buyers from sustainably managed Climate Forestation Projects. With the purchase of carbon credits the CO₂-buyer receives additional values such as comprehensive information on the background and the co-benefits of the project. The track-and-trace system provides an opportunity to connect end-customers with the story behind the credits. As CFS concentrates on Climate Forestation Projects only, it is able to efficiently ensure the quality of its projects.

With credits from the **Plan Vivo System and Standards** the carbon buyer primarily promotes small-scale rural projects with a high community participation level. Although the standard has been active for many years, the conceptual structure of its work can be unclear for the reader. As Plan Vivo works primarily with small-scale grass-root projects, and often sells its first credits before the assessment of an independent third party, it is recommended that buyers build up a close relationship to projects before purchasing its credits. Hence, the carbon buyer would be able to judge potential risks and co-benefits of the project in a more cooperative way.

Carbon buyers purchasing credits from a **VCS (ARR)** certified project will receive offsets with basic co-benefits. For CO₂-buyers of the Voluntary Carbon Market, credits from this standard would be more attractive if they are additionally certified by a scheme that ensures the co-benefits of a project. In contrast to other standards, VCS only issues ex-post credits. This brings the uncertainty that only limited amount of credits can be generated during the first years of a project. Although the buffer system of the VCS investigates precisely the amount of safeguard, it is hard to understand why credits of this fund would only be cancelled 15 years after a projects fails to submit a self-validation report.

References

- CCBA. (2005). *Climate, Community and Biodiversity Project Design Standards*. Vol. 1: Washington DC. May 2005. Retrieved 18.05.2008, from www.climate-standards.org
- CarbonFix. (2008). *The CarbonFix Standard*. Version 2.0. CarbonFix. Stuttgart, Germany.
- Hamilton, K., Sjardin, M., Marcello, T., & Xu, G. (2008). *Forging a Frontier: State of the Voluntary Carbon Markets 2008: Ecosystem Marketplace & New Carbon Finance*. Retrieved 12.05.2008, from: http://ecosystemmarketplace.com/documents/cms_documents/2008_StateofVoluntaryCarbonMarket.4.pdf
- Nabuurs, G. J., Masera, O., Andrasko, K., Benitez-Ponce, P., Boer, R., Dutschke, M., et al. (2007). *Forestry*. In *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.
- Kollmuss, A., Zink, H., & Clifford, P. (2008). *Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards* Stockholm Environment Institute: WWF Germany.
- Kotler, P., & Armstrong, G. (2006). *Principles of Marketing* (Vol. 11). Upper Saddle River, New Jersey: Prentice Hall. 611 p.
- Plan Vivo Systems and Standards. *Plan Vivo Project Concept Application Template*. Edinburgh, Scotland: Plan Vivo Foundation. Retrieved 16.05.2008. from <http://www.planvivo.org/content/fx.planvivo/resources/Plan%20Vivo%20Project%20Concept%20Application%20Template.pdf>
- Plan Vivo. (2008). *Plan Vivo - Carbon management and rural livelihoods: BioClimate Research and Development*. Retrieved 10.05.2008, from <http://www.planvivo.org/content/fx.planvivo/resources/Plan%20Vivo%20System%20and%20Standards%20-%20Consultation2.pdf>
- Voluntary Carbon Standard. (2007). *Guidance for Agriculture Forestry and Other Land Use Projects* Vol. 2: Voluntary Carbon Standard. Retrieved 10.05.2008, from <http://www.v-c-s.org/documents.html>
- Voluntary Carbon Standard. (2007). *Voluntary Carbon Standard Program Guidelines* Vol. 2: VCS Secretariat. Retrieved 10.05.2008, from <http://www.v-c-s.org/documents.html>
- Voluntary Carbon Standard. (2007). *Voluntary Carbon Standard* Vol. 2: VCS association. Retrieved 10.05.2008, from <http://www.v-c-s.org/documents.html>
- William, J. (2008). *Unlocking climate change mitigation potential of sustainable commercial plantations*: Clinton Foundation.