

***Final Plan Vivo Validation Report:  
Limay Community Carbon Project  
Taking Root***



Final Validation Report  
Ezra C. Neale  
February 23, 2011



**Plan Vivo**  
Carbon management and rural livelihoods

## Final Plan Vivo Validation Report: Limay Community Carbon Project

### Contents

Project Description .....	2
Scope of Validation .....	2
Final Validation Opinion .....	2
List of Documents Reviewed.....	3
Description of Field Visit.....	4
Report Findings .....	4
1. Effective and Transparent Project Governance .....	4
2. Carbon Benefits .....	8
3. Ecosystem Benefits .....	15
4. Livelihood Benefits.....	16
References .....	19
Appendix I □ Validation response provided by Taking Root.....	20

## **Final Plan Vivo Validation Report: Limay Community Carbon Project**

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**Name of Reviewer:** Ezra C. Neale

**Date of Review:** August 16, 2010 □ August 27, 2010

**Project Name:** Limay Community Carbon Project

**Location:** Municipality of San Juan de Limay, Nicaragua

### **Project Description**

The Limay Community Carbon Project (project) supports small-scale farmers in the mitigation of greenhouse gas (GHG) emissions through afforestation/reforestation (A/R) activities in the municipality of San Juan de Limay, Nicaragua. The project is coordinated by Taking Root, a Canadian NGO, and the *Asociacion Profesionales para el Desarrollo Integral de Nicaragua* (APRODEIN), a Nicaraguan NGO. Taking Root provides overall program management support while APRODEIN coordinates day-to-day on the ground activities. Together APRODEIN and Taking Root (project developers) provide farmers with training and capacity building to facilitate tree planting activities that contribute to increased carbon sequestration in biomass as well as economic and social co-benefits for local producers. Taking Root will sell Plan Vivo certificates to buyers interested in mitigating their carbon dioxide (CO<sub>2</sub>) production and provide payments to producers for this service. One Plan Vivo Certificate is equal to the long-term sequestration of one tonne of CO<sub>2</sub>. Taking Root is currently in the pilot phase of the project and is now working with 19 local small-holder producers using a mixed species forest plantation land-use system.

### **Scope of Validation**

Taking Root seeks to register this project with the Plan Vivo Foundation in order to begin selling Plan Vivo Certificates and accessing carbon finance. The aim of the validation effort is to verify that the project documents accurately represent field conditions and ensure that the project is adequately addressing the requirements outlined in the Plan Vivo Standards. An independent expert, Ezra C. Neale (validator), completed a Plan Vivo validation of the Limay Community Carbon Project. The validation consisted of a desk review of relevant documents and a field visit to the municipality of San Juan de Limay, Nicaragua where projects activities are being implemented. The desk review took place between August 16, 2008 and August 20, 2010 and the field visit took place between August 23, 2010 and August 27, 2010.

### **Final Validation Opinion**

The evidence presented in project documents and during the field visit indicates that Taking Root and APRODEIN have the capacity to plan, develop, and manage the Limay Community Carbon Project in accordance with the Plan Vivo Standards. Based on the responses provided by Taking Root on February, 2011 (Appendix I) the three (3) minor corrective actions identified in the Draft Validation Report have been addressed. Based on these responses and the efforts taken to address the comments raised by the Technical Advisory Committee (TAC), it is the opinion of this validator that Taking Root has met all of the requirements of the Plan Vivo Standards and the Limay Community Carbon Project is qualified for registration with the Plan Vivo Foundation. If there are any further questions, please contact Ezra Neale at [ezra.neale@gmail.com](mailto:ezra.neale@gmail.com).

## Final Plan Vivo Validation Report: Limay Community Carbon Project

**Table 1. Summary of major and minor Corrective Actions**

Theme	Major CARs	Minor CARs	Observations
<b>Governance</b>	0	0	See recommendations
<b>Carbon</b>	0	0	See recommendations
<b>Ecosystem</b>	0	0	See recommendations
<b>Livelihoods</b>	0	0	See recommendations

### List of Documents Reviewed

#### Technical Specifications:

1. Limay Community Carbon Project Technical Specification  
Includes carbon stock assessment, baseline assessment, and monitoring components  
Author: Taking Root

#### Producer Agreement Template:

1. Limay Community Carbon Project Producer Agreement (*Acuerdo de Venta*)  
Author: Taking Root

#### Project Design Document:

1. Plan Vivo Project Design Document, Limay Community Carbon Project  
Author: Taking Root
2. Project Idea Note, Limay Community Carbon Project  
Author: Taking Root

#### Articles of Association:

1. Ministry of Industry Taking Root Articles of Association. Dated August 8, 2007
2. Quebec Business Registrar, Statement of Registration (*Registraire des entreprises, Québec, Déclaration d'immatriculation*). Officially recognized: November 21, 2007
3. Official decree issued by the government of Nicaragua recognizing APRODIEN (*La Gaceta Diario, Decreto Oficial*). Dated: September 9, 2010.
4. Official APRODEIN constitution (*Constitucion de Asociacion Civil sin Fines De Lucro y Estatutos*). Recognized: September 9, 2010.
5. Memorandum of Understanding (MOU). Working partnership between Taking Root Nicaragua and APRODEIN for the Limay Community Carbon Project.

#### Other:

1. Resolution of the Taking Root Board of Directors to open a Plan Vivo bank account. Adopted December 1, 2009.
2. Letter of Support by the Municipality of San Juan de Limay, Nicaragua.

#### Financial Reports:

1. DO&A Taking Root independent accountant report (*Rapport Financier*) 2009, Dated: July 15, 2010.

## Final Plan Vivo Validation Report: Limay Community Carbon Project

### Description of Field Visit

#### Meeting with Taking Root Project Team

On Tuesday, August 24, 2010 the validator met with the project team in Somoto, Nicaragua. This day was used to clear up questions that arose during the desk review, review the database, and collect additional information required for the validation work.

#### Producer Site Visits

The Limay Community Carbon Project is actively working with 19 farmers living in the hills surrounding the municipality of San Juan de Limay in the province of Esteli, Nicaragua. During the validation exercise the validator visited six (6) individual producers representing 32% of the producer group. These site visits consisted of meeting the producer at the Plan Vivo site and asking a series of semi-structure questions. The questions helped the validator gauge the producer's understanding of the Plan Vivo project, the technical specifications, and his/her management and monitoring responsibilities. The producer site visits completed during the validation exercise are outlined in Table 2 below.

**Table 2. List of producer site visits completed during the Limay Community Carbon Project Plan Vivo validation exercise**

Site Visit	Site Visit Date	Region	Landowner	Land Use System	Plan Vivo Area (ha)
1	2010/08/25	San Juan de Limay	Ronald Martinez	Mixed Forest Plant.	2.8
2	2010/08/25	San Juan de Limay	Harnaldo Torres	Mixed Forest Plant.	1.4
3	2010/08/26	San Juan de Limay	Lestor Peres	Mixed Forest Plant.	1.1
4	2010/08/26	San Juan de Limay	Juan Caldadron	Mixed Forest Plant.	1.8
5	2010/08/26	San Juan de Limay	Bellorin Lenin	Mixed Forest Plant.	2.8
6	2010/08/26	San Juan de Limay	Juan Martinez	Mixed Forest Plant.	5.6

#### Producer Group Meeting

A group meeting with all producers was held on August 25, 2010 in San Juan de Limay. During the meeting the consultant asked a series of semi-structured interview questions to better understand how Taking Root identifies producers and facilitates participation, the type of training they receive, and the roles and responsibilities of producers.

#### Close-out meeting with Taking Root staff

On August 27, 2010 a wrap-up meeting was held with the project team to discuss the findings from the validation exercise, define information gaps and field questions from the project team. The validator gave a PowerPoint presentation and then the group discussed the validation findings in more detail.

### Report Findings

Theme	1. Effective and Transparent Project Governance
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## Final Plan Vivo Validation Report: Limay Community Carbon Project

<p><b>Requirement</b></p>	<p>1.1 Administrative capabilities</p> <p>The project has set up a legal and organisational framework with the ability and capacity to aggregate carbon from multiple land-owners and transact to purchasers, and monitor progress across all project operations, including:</p> <p>1.1.1 A legal entity (project coordinator) able to enter into sale agreements with multiple producers or producer groups for carbon services;</p> <p>1.1.2 Standard sale agreement templates for the provision of carbon services;</p> <p>1.1.3 Transparent and audited financial accounts able to the secure receipt, holding and disbursement of payments to producers;</p> <p>1.1.4 All necessary legal permissions to carry out the intended activities;</p> <p>1.1.5 Mechanisms for participants to discuss issues associated with the design and running of the project.</p>
<p><b>Findings</b></p>	<p>The review indicates that institutional arrangements and legal agreements are in place and Taking Root and APRODEIN has the capacity to manage the fiscal and programmatic elements of a Plan Vivo program.</p> <p>A review of the official decree issued by the government of Nicaragua recognizing APRODEIN and the official APRODEIN constitution provide sufficient evidence that APRODEIN is a legal registered entity in Nicaragua and has the legal right to carry out the technical assistance and tree planting activities that are part of the project. According to the Quebec Business Registrar, Statement of Registration, Taking Root was officially registered as a business in Montreal, Canada on November 21, 2007. The partnership between Taking Root and APRODEIN was formalized with a Memorandum of Understanding (MOU) between the two entities.</p> <p>The sales agreement template clearly lays out management, monitoring, and reporting responsibilities for the producer. The template provides a matrix for linking carbon payments to monitoring indicators articulating the amount of carbon finance that will be available to a producer. The agreement also includes a 15% risk buffer requirement for each producer.</p> <p>Taking Root underwent its first and only third party financial review in 2009. A review of the 2009 independent accountant report indicates that the financial statements present fairly in all material respects the financial position of Taking Root and its financial statements conform to accounting principles generally accepted in Canada. APRODEIN completed its formal registration procedure with the government of Nicaragua on September 9, 2010 and at the time the validation exercise no financial reports were available.</p> <p>APRODEIN has the legal authority to raise funds and carry out programs with local producers in Nicaragua. The staff members of both APRODEIN and Taking Root are well known in the community of San Juan de Limay and the local government is formally providing its direct and indirect support for the project. Proof of this support is outlined in a letter of support sent by the Municipality of San Juan de Limay.</p>

## Final Plan Vivo Validation Report: Limay Community Carbon Project

	Project planning activities including the selection of trees for the land-use system have been conducted in direct consultation with the producers enrolled in the project. Additionally the community technician is based in the town of San Juan de Limay and provides opportunities for the producers to meet as a group and regularly consults with all 19 producers enrolled in the project. These close producer affiliations create ample opportunity to discuss issues related to the design and management of the project.		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	None		
<b>Requirement</b>	<p><b>1.2 Technical capabilities</b></p> <p>The project, through its participants, is able to provide assistance to producers in planning and implementing productive, sustainable and economically viable forestry and agroforestry systems, and provide support for silvicultural and other management operations.</p>		
<b>Findings</b>	<p>Based on the information provided it is evident that Taking Root and APRODEIN are able to deliver the training and capacity building assistance necessary to establish and manage successful forestry systems on the long-term.</p> <p>The Taking Root team consists of Kahlil Baker, Executive Director and Dave Baumann, Technical and Policy Assistant. The Nicaraguan team is managed by Elvin de Jesús Castellón Alvarado, Technical and Operations Service Provider. On-site support to producers is provided by Rononald Ignacio Martinez Centeno, a Community Technician who is based in San Juan de Limay. For a full description of the project staff see the project PDD.</p> <p>The administrative team demonstrated knowledge of agroforestry and land management techniques as well as competency administering technical assistance activities. The Technical and Operations Service Provider and Community Technician had substantial technical knowledge in the areas of agriculture and forestry and the capability to work with local producers. Local producers exhibit a strong understanding of their tree planting, management, and monitoring responsibilities as well as a commitment to overseeing their land-use systems for the long-term.</p>		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	None		

## Final Plan Vivo Validation Report: Limay Community Carbon Project

<b>Requirement</b>	<b>1.3 Social capabilities</b>  1.3.1. Able to select appropriate target groups, inform groups about the Plan Vivo System and the nature of carbon and ecosystem services and establish effective participatory relationships with producers 1.3.2. Able to establish land-tenure rights through engaging with producers and other relevant organisations 1.3.3. Able to consult producers effectively on a sustained basis		
<b>Findings</b>	<p>The project developers have successfully carried out a community engagement process and identified and developed strong relationships with 19 producers. Based on the evidence from the producer site visits, Taking Root has an aptitude for site selection and technical training.</p> <p>All of the target groups are small holder farmers that will benefit from A/R activities. Producers are voluntary project participants that are supportive of the project. They are also knowledgeable about the purpose and goals of the program and are able to discuss the technical specifications, land use systems, and management and monitoring requirements with an acceptable level of competency.</p> <p>Each of the six (6) producers visited during the validation exercise were able to provide documentation regarding land ownership as defined by the legal system in Nicaragua. The land tenure system in Nicaragua is largely informal but In the community of San Juan de Limay the government has been engaged in mapping land titles as part of PRODEP, a programme designed to legalize land ownership. Over the last seven years a large parcel mapping exercise has been underway in San Juan De Limay helping to formalize land-tenure in the region.</p> <p>For smallholders to enter into long-term carbon contracts with the project, and to avoid land tenure disputes, project participants must demonstrate their land tenure right in one of the following three ways:</p> <ol style="list-style-type: none"> <li>1) Have a legal deed to their land</li> <li>2) Their parents have a legal deed to the land and they have a legal contract with their parents demonstrating their legal right to a specified fraction of the property.</li> <li>3) If the first two options are unavailable, an official letter from the local government testifying that they are the true owners of the land.</li> </ol> <p>The locally based field technician provides regular and sustained trainings and personalized consultations to producers. All of the field staff demonstrated technical competencies in agriculture and forestry techniques and the capability to engage local producers.</p>		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>

## Final Plan Vivo Validation Report: Limay Community Carbon Project

<b>CAR/REC</b>	None		
<b>Requirement</b>	<p><b>1.4 Reporting</b></p> <p>Projects must on an annual basis, according to the reporting schedule agreed with the Plan Vivo Foundation:</p> <p>1.4.1 Accurately report progress, achievements and problems experienced;</p> <p>1.4.2 Transparently report sales figures and demonstrate resource allocation in the interest of target groups.</p>		
<b>Findings</b>	<p>Taking Root demonstrated that is has the infrastructure (sales agreement, database, and Plan Vivo bank account) and the capacity to store, track, and delivery producer payments. They also demonstrated that they are capable of maintaining accurate and transparent reporting procedures and producing and submitting annual reports to the Plan Vivo Foundation based on an agreed upon schedule.</p>		
<b>CAR/REC</b>	None		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>

<b>Theme</b>	<b>2. Carbon Benefits</b>		
<b>Requirement</b>	<p><b>2.1. Accounting methodology</b></p> <p>Carbon benefits are calculated using <b>recognised carbon accounting methodologies</b> and conservative estimates of carbon uptake/storage that take into account risks of leakage and reversibility.</p>		
<b>Findings</b>	<p>The carbon accounting methodology used to model the potential carbon sequestration benefits for the land use system is recognized as a credible in the industry and has been used by other registered Plan Vivo project developers (UNFCC 2006 and Berry, 2008).</p> <p>The carbon stock assessment methods were clearly described using recognized carbon accounting methodologies however there is one issue that needs to be resolved, see section 2.2. Baseline below for more details.</p>		

## Final Plan Vivo Validation Report: Limay Community Carbon Project

	Taking Root assumes that the leakage potential for these projects is very low and does not adjust the carbon benefits for leakage. Under CDM protocols it is credible to assume no leakage for small scale A/R activities. Taking Root does outline a number of management measures that will be implemented to minimize leakage, see section 2.5 Leakage for more details.		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	None		
<b>Requirement</b>	<b>2.2. Baseline</b> Carbon benefits are measured against a clear and credible <b>carbon baseline</b> .		
<b>Findings</b>	<p>The carbon stock assessment methods were clearly described and accurately calculated using recognized carbon accounting methodologies. However the weighted average of pasture with trees (19 plots, average 60 tCO<sub>2</sub>/ha), pasture without trees (13 plots, 0 tCO<sub>2</sub>/ha, and woody vegetation (9 plots, 35 tCO<sub>2</sub>/ha) will underestimate the carbon baseline for Plan Vivos developed on pasture with trees and woody vegetation. Taking Root should devise a solution to this issue. The simplest solution is to avoid developing projects on the pasture with trees and woody vegetation land-use types. Another potential method is to apply a conservative baseline estimate to Plan Vivos developed within these land cover types (e.g. the weighted average of on pasture with trees and woody vegetation approx. 45 tCO<sub>2</sub>/ha).</p> <p>A number of sources of information were used to calculate carbon sequestration rates of each of the seven tree species selected for the technical specification. For species that were well known (<i>Gliricidia sepium</i>, <i>Leucaena leucocephala</i>, and <i>Bombacopsis quinata</i>) Taking Root used data from existing studies to calculate tree growth rates. For lesser known species (<i>Enterolobium cyclocarpum</i>, <i>Caesalpinia velutina</i>, <i>Albizia saman</i>, and <i>Swietenia humilis</i>) site-specific allometric equations were derived for height and diameter at breast height (dbh) based on measurements taken within the community of San Juan de Limay. The data collection and growth rate modeling methods are standardized practices recognized by reputable sources (e.g. IPCC, 2009), see the project technical specifications for more details on these calculations.</p>		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	Corrective Action: 1. The weighted average of pasture with trees (19 plots, average 60 tCO <sub>2</sub> /ha), pasture without trees (13 plots, 0 tCO <sub>2</sub> /ha, and woody vegetation (9 plots, 35 tCO <sub>2</sub> /ha) will underestimate the carbon baseline for Plan Vivos developed on pasture with trees and woody vegetation. Please devise a solution to account for this overestimate. This CAR has been addressed, see response below.		

## Final Plan Vivo Validation Report: Limay Community Carbon Project

<p><b>Taking Root's Response</b></p>	<p>A number of similar comments related to the weighted average baseline were identified and discussed in great detail with the Plan Vivo Technical Advisory Committee (TAC) and major changes were made regarding how it was calculated. These changes adequately address the CAR identified under section 2.2 in the Draft Validation Report. Please see the summary of the changes made to the baseline calculation below. A more detailed description is provided in the Taking Root Mixed Species Forest Plantation Technical Specification.</p> <p>Land-use within the project area is not static and is consistently shifting. Land with bushy vegetation is commonly cleared for agriculture for a few years. When the fertility of the soil declines, cattle take the place of agriculture. Eventually the ratio of edible versus non-edible forage on that land decreases until it is difficult to support cattle. At this stage, the land is left fallow for an undetermined amount of time and bushy vegetation takes over again.</p> <p>LANDSAT satellite imagery was used to classify, calculate the surface area, and determine the proportion of each land cover type in the project area at a given point in time. Although the exact location of each land cover type will change over time, it is assumed that the proportions of each type will stay constant.</p> <p>Within the stratified design, a systematic sampling approach was used. A more extensive biomass inventory was carried out to accurately estimate the quantity of carbon in each land cover type and ensure that the initial carbon stock estimate was within 10% of the mean with a 95 % confidence level. The sampling distribution is shown in the table below.</p> <table border="1" data-bbox="422 1182 1010 1355"> <thead> <tr> <th>Land Cover Type</th> <th>Inventory Plots</th> </tr> </thead> <tbody> <tr> <td>Agriculture</td> <td>16</td> </tr> <tr> <td>Pasture without trees</td> <td>31</td> </tr> <tr> <td>Pasture with trees</td> <td>42</td> </tr> <tr> <td>Bushy Vegetation:</td> <td>44</td> </tr> </tbody> </table> <p>A weighted average carbon baseline was used, see table below. Since the majority of producers chose to establish land use systems on land that was almost entirely clear of woody vegetation the weighted average is a more conservative approach than using the carbon baseline for agriculture and pasture without trees what would typically be used in this type of project. In addition it accommodates for the shifting nature of the land cover in the project area.</p> <table border="1" data-bbox="414 1612 1353 1928"> <thead> <tr> <th></th> <th>Area (ha)</th> <th>Above ground woody biomass (tC/ha)</th> <th>Below ground woody biomass (tC/ha)</th> <th>Deadwood (tC/ha)</th> <th>Total (tC/ha)</th> </tr> </thead> <tbody> <tr> <td>Agriculture</td> <td>784</td> <td>0</td> <td>0</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>Pasture with trees</td> <td>837</td> <td>12.83</td> <td>3.73</td> <td>0.00</td> <td>16.56</td> </tr> <tr> <td>Pasture without trees</td> <td>795</td> <td>0</td> <td>0</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>Bushy vegetation</td> <td>1805</td> <td>12.16</td> <td>3.65</td> <td>0.80</td> <td>16.61</td> </tr> <tr> <td><b>Total</b></td> <td><b>4221</b></td> <td></td> <td><b>Weighted average:</b></td> <td></td> <td><b>10.39</b></td> </tr> </tbody> </table>	Land Cover Type	Inventory Plots	Agriculture	16	Pasture without trees	31	Pasture with trees	42	Bushy Vegetation:	44		Area (ha)	Above ground woody biomass (tC/ha)	Below ground woody biomass (tC/ha)	Deadwood (tC/ha)	Total (tC/ha)	Agriculture	784	0	0	0.00	0.00	Pasture with trees	837	12.83	3.73	0.00	16.56	Pasture without trees	795	0	0	0.00	0.00	Bushy vegetation	1805	12.16	3.65	0.80	16.61	<b>Total</b>	<b>4221</b>		<b>Weighted average:</b>		<b>10.39</b>
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## Final Plan Vivo Validation Report: Limay Community Carbon Project

<b>Requirement</b>	<p><b>2.3. Additionality</b></p> <p>Carbon benefits are <b>additional</b>, i.e. the project and activities supported by the project could not have happened were it not for the availability of carbon finance. Specifically this means demonstrating, as a minimum:</p> <ul style="list-style-type: none"> <li>2.3.1. The project does not owe its existence to legislative decrees or to commercial land-use initiatives likely to have been economically viable in their own right without payments for ecosystem services; and</li> <li>2.3.2. In the absence of project development funding and carbon finance, financial, social, cultural, technical, ecological or institutional barriers would have prevented the project activity.</li> </ul>		
<b>Findings</b>	<p>The Plan Vivo activities are additional and meet all of the requirements listed above. No legislative decrees or economically viable land initiatives are involved in this program. The project developers used a barriers analysis<sup>1</sup> to ascertain what barriers underpin current land-use activities and how these barriers can be effectively addressed.</p> <p>The result indicate that without technical training, capacity building efforts, and direct payments, producers in the project area lack the knowledge and financial capacity to implement the agroforestry and tree planting activities. Carbon finance will help Taking Root expand its efforts to include additional landowners, systematize implementation methodologies, and achieve social, economic, and climate change benefits that would not be possible in the absence of carbon finance.</p>		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	None		
<b>Requirement</b>	<p><b>2.4. Permanence</b></p> <ul style="list-style-type: none"> <li>2.4.1. Potential risks to permanence of carbon stocks are identified in project technical specifications and effective mitigation measures implemented into project design, management and reporting procedures.</li> <li>2.4.2. Producers enter into sale agreements with the project coordinator agreeing to maintain activities, comply with the monitoring, implement management requirements and re-plant</li> </ul>		

<sup>1</sup> Food For the Hungry (2004). Barrier Analysis. <http://barrieranalysis.fhi.net/>

## Final Plan Vivo Validation Report: Limay Community Carbon Project

	<p>trees felled or lost.</p> <p>2.4.3. As a minimum, a 10% risk buffer is deducted from the saleable carbon of each producer, where the level of buffer is recommended in the technical specifications according to the level of risk identified, and subsequently reviewed annually following annual reporting.</p>
<b>Findings</b>	<p>The PDD clearly identifies permanence issues that may arise from natural or man induced disasters such as forest fires, pests and diseases, and livestock damage. Management measures for these risks are summarized the Project Technical Specification.</p> <p>The landowner agreement clearly outlines management and monitoring procedures and provides monitoring targets that producers must meet to be eligible for carbon payments. Monitoring targets include the survivorship of individual trees as well as the growth rates measured in dbh. When monitoring targets are not met, farmers will be directed to implement corrective measures (e.g. tree planting) until monitoring targets are achieved. Payments will be withheld until monitoring targets are met. Based on the discussions and field visits with producers they are knowledgeable about these requirements and their tree planting activities are in accordance with the project technical specifications.</p> <p>Taking Root is using a risk buffer to provide insurance to carbon buyers in the case that a natural or man induced disasters such as forest fires, pests and diseases results in the loss of carbon. A carbon buffer is essentially a percentage of unsold and non-saleable carbon that is set aside for each Plan Vivo. In this case Taking Root will use a risk buffer of 15%, significantly higher than the 10% requirement.</p>
<b>Conformance</b>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/></p>
<b>CAR/REC</b>	None
<b>Requirement</b>	<p><b>2.5 Leakage</b></p> <p>Potential sources of <b>leakage</b> have been identified and effective mitigation measures implemented.</p>
<b>Findings</b>	<p>The project developer has sufficiently identified potential sources of leakage and mitigation measures. The overall risk to leakage is low since most land in the project area has been allocated to individuals with clear land-title, most land-use choices will be constrained by the boundaries of the parcel, and before registration each producer is required to demonstrate that he has sufficient land for agriculture, cattle grazing, and reforestation activities. The potential source of leakage and leakage mitigation measures identified by the project developer</p>

## Final Plan Vivo Validation Report: Limay Community Carbon Project

	<p>in the project technical specification are listed below:</p> <p>A. Displacement of agricultural activity Mitigation measures:</p> <ol style="list-style-type: none"> <li>1. Technical support in the development of farm plan to ensure that the farmers have sufficient land for agriculture productivity over and above tree planting.</li> <li>2. Regular assessments to monitor land use changes within the project area.</li> </ol> <p>B. Displacement of pastureland Mitigation measures:</p> <ol style="list-style-type: none"> <li>1. Technical support in the development of farm plan to ensure that the farmers have sufficient land for pastureland over and above tree planting.</li> <li>2. Regular assessments to monitor land use changes within the project area.</li> </ol> <p>C. Increased harvesting to meet demand for timber &amp; poles Mitigation measure:</p> <ol style="list-style-type: none"> <li>1. Establishment of forest plantations on producer's land to provide a sustainable source of timber and posts.</li> </ol> <p>D. Increased fuel-wood collection Mitigation measure:</p> <ol style="list-style-type: none"> <li>1. Establishment of forest plantations on producer's land to provide a sustainable source of fuel-wood + distribution of fuel-efficient cook stoves.</li> </ol>		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	None		
<b>Requirement</b>	<p><b>2.6. Traceability and double-counting</b></p> <p>Carbon sales are <b>traceable</b> and recorded in a database.</p>		
<b>Findings</b>	<p>The project developer has a database modeled after a Plan Vivo database to track, store, and manage carbon sales. Based on the review of the database it has the functions and capabilities necessary to track monitoring data, carbon sales, and the amount paid to producers so that all carbon sales are traceable and tied to monitoring indicators.</p>		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>

**Final Plan Vivo Validation Report: Limay Community Carbon Project**

<b>CAR/REC</b>	None	
<b>Requirement</b>	<p><b>2.7. Monitoring</b></p> <p>Project has an effective process for <b>monitoring</b> the continued delivery of the ecosystem services, where:</p> <ul style="list-style-type: none"> <li>2.7.1. Monitoring is carried out against targets specified in technical specifications;</li> <li>2.7.2. Monitoring is carried out accurately using indicators specified in technical specifications;</li> <li>2.7.3. Monitoring is accurately documented and reported to the entity responsible for disbursing payments to producers;</li> <li>2.7.4. Corrective actions are prescribed and recorded where targets are not met, and followed up in subsequent monitoring.</li> </ul>	
<b>Findings</b>	<p>The technical specifications outline a clear and comprehensible approach to monitoring with specific targets/thresholds and corrective measures.</p> <p>The project developer identifies monitoring targets as well as a monitoring threshold; see the project PDD. Monitoring targets include the percentage survival of individual trees as well as the growth rates measured in dbh whereas thresholds are indicators only slightly below these targets. When producers do not meet the targets outlined in the technical specification they will be directed to implement corrective measures (e.g. replanting trees) until monitoring targets are met. Full payments will be provided to the producer when monitoring targets are met, 50% of the payment will be released when monitoring thresholds are met, and payments will be withheld if neither thresholds nor targets are met.</p> <p>The project developer has a monitoring system that is sufficient for tracking survival and growth of trees planted as part of the program. Each year a community technician will randomly monitor &gt;10% of each Plan Vivo to assess tree survival and growth. Circular plots with a six meter radius will be placed 30 meters apart systematically over the planted area with a randomly defined starting point. In each plot the technician will measure tree survival and dbh to determine if the producers have met their monitoring targets. All monitoring information will be stored in the project database. When monitoring targets are not met the community technician will provide the producer with technical advice, new planting materials etc. as needed to ensure that they meet monitoring targets. Additionally a project technical will check 10% of the monitoring data collected by community technicians to internally verify the accuracy of the monitoring data.</p>	
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/> N/A <input type="checkbox"/>
<b>CAR/REC</b>	None	

## Final Plan Vivo Validation Report: Limay Community Carbon Project

<b>Requirement</b>	<p><b>2.8. Plan Vivos</b></p> <p>Producers <b>draw up Plan Vivos</b> as part of a participatory process that ensures proposed land-use activities:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Are clear, appropriate and consistent with approved technical specifications for the project;</li> <li><input type="checkbox"/> Will not cause producers' overall agricultural production or revenue potential to become unsustainable or unviable.</li> </ul>		
<b>Findings</b>	<p>Plan Vivos were drawn up as part of a participatory process and on site consultations with field technicians. Sample Plan Vivos are clear, easy to understand, and consistent with project technical specifications. The project developer also distributes a small booklet to each producer which outlines the basic principles of the technical specification (e.g. tree spacing and management measures) that helps complement each Plan Vivo.</p> <p>The project developer had taken the steps necessary to ensure that project activities will not impact the producer's agricultural productivity or revenue production. Before registration each producer is required to demonstrate that he has sufficient land for agriculture, cattle grazing, and reforestation activities. Additionally the project developer provides technical support to develop farm plans that ensure that producers have sufficient space for other land uses.</p> <p>At each of the six producer sites included in the validation exercise, tree planting activities are situated on land set aside from primary food and cash crop, and cattle production. Additionally all of the producers indicated that they are able to manage the responsibilities of both systems and that the land-use systems are not having negative impacts on their livelihoods.</p>		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	None		

<b>Theme</b>	<b>3. Ecosystem Benefits</b>		
<b>Requirement</b>	<p><b>3.1. Planting native and naturalised species</b></p> <p><b>3.1.1.</b> Planting activities are restricted to <b>native and naturalised species</b>.</p> <p><b>3.1.2.</b> Naturalised (i.e. non-invasive) species are eligible only where they can be shown to have compelling livelihood benefits and:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Producers have clearly expressed a wish to use this species;</li> <li><input type="checkbox"/> The areas involve are not in immediate proximity to conservation areas or likely to have any significant negative effect on biodiversity;</li> <li><input type="checkbox"/> The activity is still additional i.e. the producers in the area are not doing this activity or able to do this activity without the intervention and support of the project;</li> <li><input type="checkbox"/> The activity will have no harmful effects on the water-table.</li> </ul>		

## Final Plan Vivo Validation Report: Limay Community Carbon Project

<b>Findings</b>	All seven (7) trees species included in the mixed forest plantation technical specification are native species. The project developer is in conformance with all of the requirements listed above.		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	None		
<b>Requirement</b>	<b>3.2. Ecological impacts</b>		
	Wider <b>ecological impacts</b> have been identified and considered expressly including impacts on local and regional biodiversity and impacts on watersheds.		
<b>Findings</b>	The project area has been subject to intense environmental degradation and deforestation which contributes to increased erosion, flooding, water shortages, and a decline in biodiversity. By improving forest cover in the degraded watersheds the project will help ameliorate the environmental problems noted above and have will have an overall positive impact on the environment. A complete list of project benefits can be found in the Project PDD.		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	None		

<b>Theme</b>	<b>4. Livelihood Benefits</b>		
<b>Requirement</b>	<b>3.3. Community-led planning</b>		
	Project has undergone a <b>producer/community-led planning process</b> aimed at identifying and defining sustainable land-use activities that serve the community's needs and priorities.		
<b>Findings</b>	Taking Root actively engaged producers as well as local experts in project planning and identifying land-use activities that serve the community's needs. When the project began the producer group as well and local experts were consulted to identify trees species that are valued by the local community, adapted to local climatic conditions, and native to the region.		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>

## Final Plan Vivo Validation Report: Limay Community Carbon Project

<b>CAR/REC</b>	None		
<b>Requirement</b>	<p><b>3.4. Continued participation and training</b></p> <p>Mechanisms are in place for <b>continued training</b> of producers and participation by producers in project development.</p>		
<b>Findings</b>	<p>Taking Root provides continued training and ensures participation by producers in project development. The community technician regularly engages producers in one-on-one consultations to assist them in the establishment and management of the land-use system. The project team provides on-going technical training activities to ensure that producers are gaining knowledge of silvicultural and land management techniques.</p>		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	None		
<b>Requirement</b>	<p><b>3.5. Sale agreements</b></p> <p>Project has procedures for entering into <b>sale agreements</b> with producers based on saleable carbon from Plan Vivos, where:</p> <ul style="list-style-type: none"> <li>3.5.1. Producers have recognised carbon ownership via tenure or land-use rights;</li> <li>3.5.2. Agreements specify quantity, price, buyer, payment conditions, risk buffer, and monitoring milestones;</li> <li>3.5.3. An equitable system is in place to determine the share of the total price which is allocated to the producer;</li> <li>3.5.4. Producers enter into sale agreements voluntarily.</li> </ul>		
<b>Findings</b>	<p>The producers visited during the validation exercise were able to provide documentation regarding land ownership as defined by the legal system in Nicaragua.</p> <p>Taking Roots has a land-owner agreement template that will be used once the program has been registered with the Plan Vivo Foundation. The land-owner agreement clearly outlines management and monitoring procedures and provides monitoring targets that producers must meet to be eligible for carbon payments. Monitoring targets include the survivorship of individual trees as well as growth rates measured in dbh. When monitoring targets are not met, farmers will be directed to implement corrective measures (e.g. tree planting) until monitoring targets are achieved. Payments will be withheld until monitoring targets are met.</p> <p>Based on the discussions and field visits with producers they are knowledgeable about these requirements and their tree planting activities mirror the planting prescriptions outlined in the technical specification. All landowner</p>		

## Final Plan Vivo Validation Report: Limay Community Carbon Project

	<p>agreements will be put in place on a voluntary basis.</p> <p>The PDD indicates that 40% of carbon finance will be used for program operations and administration and 60% will be placed in a Plan Vivo trust fund. Of the total funds from the trust fund 58% will be paid directly to producers and 2% will be put towards financing fuel-efficient cooking stoves for community members living in the project boundary.</p> <p>Taking Root has not yet entered into landowner agreements with producers and has not discussed with them how carbon finance will be shared between the project developers and the producers. An adequate participatory process must be carried out with all producers to reach a decision on the payment scheme. Taking Root should seek guidance from the Plan Vivo Foundation on the steps necessary to complete this participatory process.</p>		
<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	<p>Minor Corrective Actions:</p> <ol style="list-style-type: none"> <li>1. Carry out a participatory process with producers to reach a decision on the carbon finance payment scheme. This CAR has been addressed, see the response below.</li> </ol>		
<b>Taking Root's Response</b>	<p>A new series of public consultations were held with project participants and community members in the various communities where Taking Root operates. The payment structure was discussed and the community was reminded that that distribution could be modified and used towards projects should the community desire it. As a result of these consultations and in consultation with Alexa Morrison, Plan Vivo's governance and policy manager, the current distribution of the payments will remain the same.</p>		
<b>Requirement</b>	<p><b>3.6. Payments to producers</b></p> <p>Project has an effective and transparent process for the timely administration and recording of <b>payments to producers</b>, where:</p> <ol style="list-style-type: none"> <li>3.6.1. Payments are delivered in full when monitoring is successfully completed against targets in sale agreements;</li> <li>3.6.2. Payments are recorded in the project database to ensure traceability of sales.</li> </ol>		
<b>Findings</b>	<p>Taking Root was able to demonstrate their capacity to develop and manage the fiscal and programmatic reporting requirements as well as the infrastructure (sales agreements, database, and Plan Vivo account) required to track Plan Vivo activities and deliver producer payments. Based on this evidence, it is conclusive that they are capable of collecting and storing monitoring information and delivering payments based on this information.</p> <p>However, before the validation exercise is complete a final review of the database populated with producer information is required.</p>		

## Final Plan Vivo Validation Report: Limay Community Carbon Project

<b>Conformance</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
<b>CAR/REC</b>	Corrective Action: 1. Final review of the database populated with producer information. This CAR has been addressed, see response below.		
<b>Taking Root's Response</b>	The database has been populated with all of the producer information and various processes such as monitoring calculations have been automated. The completed and updated database has been reviewed by the external Validator, Ezra C. Neale with the help of David Baumann, Taking Root's Policy and Technical Analyst.		

### References

Berry, N (2008). Carbon modelling for reforestation and afforestation projects. Unpublished but available at ECCM (part of the Camco Group), UK.

## **Final Plan Vivo Validation Report: Limay Community Carbon Project**

Berry, N (2008). Estimating growth characteristics of agroforestry trees. Unpublished but available at ECCM (part of the Camco Group), UK.

Berry, N (2008). Protocol baseline survey for agroforestry projects. Unpublished but available at ECCM (part of the Camco Group), UK.

UNFCCC, (2006). Approved afforestation and reforestation baseline and monitoring methodology AR-AM0008. CDM executive board. [http://cdm.unfccc.int/EB/033/eb33\\_repan11.pdf](http://cdm.unfccc.int/EB/033/eb33_repan11.pdf)

## **Appendix I – Validation response provided by Taking Root**

### **Background:**

## **Final Plan Vivo Validation Report: Limay Community Carbon Project**

The Limay Community Carbon Project is an ecosystem service payment project in the process of being registered with the Plan Vivo Foundation. Following a desk review and a field visit to the Limay Community Carbon Project in August 2010, the independent validator, Ezra C. Neale, submitted a draft Validation Report on October 4<sup>th</sup>, 2010. This report outlined a few minor corrective actions that needed to be addressed. This document reports how these actions have been addressed.

### **Corrective action 1: Baseline - Requirement 2.2**

#### **Taking Root's response:**

The topic of the weighted average baseline has been discussed in great detail with the Plan Vivo Technical Advisory board and major changes have been made regarding how it was calculated.

Due to environmental and socio-economic conditions in the municipality of San Juan de Limay, land-use commonly cycles from agricultural fields, to cattle pasture land, to fallow fields where bushy vegetation regenerates. This cycle of land-use occurs relatively rapidly and begins as land is cleared to grow food for a few years. As the soil erodes and loses fertility, agriculture is abandoned and cattle are moved in for grazing. During the dry season, cattle overgraze the area until the only vegetation left are thorny inedible brushes. At this point, the land is abandoned for an undetermined period of time until it is cleared again for agriculture.

Satellite imagery was used to determine the proportions of the project boundary (see section below) that was under the different types of vegetation cover at a given point of time. Although the exact location of each vegetation type will change over time, what is relevant is the ratio the different vegetation covers occupy throughout time. Through this project intervention, the relative proportion of agricultural land is likely to remain constant whereas the relative proportion of pastureland and woody vegetation is likely to diminish in relative terms due to gains in efficiency brought about by the reforestation projects.

At the time of this baseline study, the predominant vegetation cover was bushy vegetation. However, the majority of the producers we work with chose to establish this technical specification in open fields, where the baseline would be close to zero. However, since woody vegetation will likely be cleared elsewhere as a part of the normal land use cycle, the project chose to take a more conservative approach and integrate the carbon stock present in the other vegetation covers. Due to the land-use and the rapid cycle of land-use change, the four eligible categories of vegetation cover have been considered as one land-use stratum for the baseline. The carbon stock baseline is an area-weighted average of the following four land-use types: agricultural, pasture with trees, pasture without trees, and bushy vegetation. These four areas were included in the average scenario because each will be directly or indirectly affected by the project intervention.

#### **Satellite imagery and stratification of vegetation cover:**

## Final Plan Vivo Validation Report: Limay Community Carbon Project

Two Landsat 7ETM+ images (2010-06-06, 2008-11-07) of the scene 17-51 were acquired from the United State Geological Survey (USGS) web site (glovis.usgs.gov). These 30m spatial resolution images were selected by considering seasonality of the imagery to minimize variation in reflectance related to dry or wet season vegetation characteristics, and atmospheric contamination. Atmospheric correction was computed on the two images, which yielded reflectance values corrected from the contamination effect of atmospheric particles that absorb and scatter the radiation from the earth's surface. Clouds and cloud-shadow presence are also a significant problem when using remote sensing images over the humid and tropical latitudes. Therefore, in addition to the reflectance computation, when necessary, cloud-shadow was masked when encountered.

In May 2003, the Landsat 7 scan-line corrector (SLC), a mechanism designed to correct the under-sampling of the primary scan mirror, failed. Since then, scan gaps were created throughout the images that, similar to clouds and cloud-shadow, need to be masked and be filled up with previously acquired images. To do so, we identified, on each image, missing values from the SLC scan gaps and clouds using a decision tree based on the brightness values of the band 1(blue) and the band 6(thermal)<sup>2</sup>, and cloud-shadow using a threshold of the band 4 (near infra-red). We computed a 90m buffer on areas masked from clouds and cloud-shadow to ensure that all remaining areas were cloud-free and combined this mask to the SLC gap free mask to account for all contaminated or missing values.

A supervised classification was performed on individual images using the maximum likelihood classification algorithm. This algorithm calculates the probability that a given pixel belongs to a specific class based on the similarity of the statistics with the training classes. Training classes are groups of pixels that should be mapped in the same strata (i.e., class). We defined the pixels that belong to training classes based on visual interpretation of the false-colour infrared composite of bands 5-4-1 and from the biomass surveys conducted in late 2009 and 2010. Training sites within training classes were designed over the image of 2010 and adapted for the image of 2008 to account for potential changes in land cover in between the two dates of acquisition. The training classes stratified the project area into five classes: agriculture, pasture without trees, pasture with trees, bushy vegetation and forest.

The classification approach employed a combination of three products derived from the Landsat ETM+ spectral bands to compute a thorough classification. A Normalized Difference Vegetation Index (NDVI) was calculated from the red and near infrared bands and represents an indicator of density of healthy vegetation. This vegetation index was valuable for this project as it normalise the illumination effects which are substantial in mountainous regions and can yield significant differences in the reflectance values. A Principal Component Analysis (PCA) was calculated from all the Landsat 7 ETM+ bands, except the band six (thermal band). PCA is a variable reduction technique that, when used over multispectral bands, excludes the noise and summarizes most of the variance found into the bands selection. Therefore, by selecting the first and second component of the PCA, most of the information captured by the sensor was encompassed. The maximum likelihood classifications have been trained using 70% of the training sites, where the

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<sup>2</sup> Martinuzzi, S., Gould, W.A., Gonzalez, O.M.R. (2007). Creating cloud-free Landsat ETM data sets in tropical landscapes: cloud and cloud-shadow removal. United States Forest Service. Report IITF-GTR-32.

## Final Plan Vivo Validation Report: Limay Community Carbon Project

remaining 30% have been used to test classification accuracy. The land cover map of 2010 yielded an overall accuracy of 91% whereas the 2008 land cover map showed a 77% overall accuracy. After performing the classification on each individual image, we combined the two classifications by giving the priority to the newest image (2010-06-06). We acknowledge that discrepancies can occur due to the temporal difference between the two acquisitions. However, this image mosaic allowed retrieving an almost complete coverage of the project area (>99%). In order to remove noise from the classification (i.e., isolated pixels) two majority filters were executed. The first filter was a 25 pixel window to remove isolated pixels by capturing the major land cover for each 5x5 window. The second filter, a 9 pixel window, smoothed and eliminated any area generated from the first pass of the filter.

### Baseline results:

	Area (ha)	Above ground woody biomass (tC/ha)	Below ground woody biomass (tC/ha)	Deadwood (tC/ha)	Total (tC/ha)
Agriculture	784	0	0	0.00	0.00
Pasture with trees	837	12.83	3.73	0.00	16.56
Pasture without trees	795	0	0	0.00	0.00
Bushy vegetation	1805	12.16	3.65	0.80	16.61
Total	<b>4221</b>		<b>Weighted average:</b>		<b>10.39</b>

### Corrective action 2: Sale agreements - Requirement 3.5

#### Taking Root's response:

A new series of public consultations were held with project participants and community members in the various communities Taking Root operates. The payment structure was discussed and the community was reminded that that distribution could be modified and used towards projects should the community desire it. As a result of these consultations and in consultation with Alexa Morrison, Plan Vivo's governance and policy manager, the current distribution of the payments will remain the same.

### Corrective action 3: Payment to producers - Requirement 3.6

#### Taking Root's response:

The database has been populated with all of the producer information and various processes such as monitoring calculations have been automated. The completed and updated database has been reviewed by the external Validator, Ezra C. Neale and by David Baumann, Taking Root's Policy and Technical Analyst.