



USFS International Programs Forest Carbon Measurement Training Workshops Evaluation

Evaluation Report prepared by

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Abbreviations and Acronyms

| | |
|----------------|---|
| AIDER | Asociación para la Investigación y el Desarrollo Integral |
| CONABIO | Comisión Nacional para el Conocimiento y Uso de la Biodiversidad |
| CONAFOR | Comisión Nacional Forestal |
| CONANP | Comisión Nacional de Áreas Naturales Protegidas |
| GEF | Global Environment Facility |
| GIZ | Gesellschaft für Internationale Zusammenarbeit (Germany Development Aid) |
| ICF | Instituto de Conservación Forestal (Honduras) |
| MRV | Measurement, Reporting and Verification |
| NGO | Non-Governmental Organization |
| ONG | Organización No Gubernamental |
| PMP | Performance Management Plan |
| PSLM | Promoting Sustainable Landscapes in Mexico |
| REDD+ | Reducing Emissions from Deforestation and Forest Degradation plus Improving forest management |
| UAEM | Universidad Autónoma del Estado de México |
| USAID | U.S. Agency for International Development |
| USFS-IP | U.S. Forest Service International Programs |

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In telephone interviews, five key workshop developers, organizers, and instructors shared information and opinions early in the evaluation process: many thanks to Richard Birdsey, Kristofer Johnson, Lucas Nave, Alicia Peduzzi, and Craig Wayson. Seventy-eight people who participated in past workshops responded to the online survey, and were our main source of information about the effectiveness of the workshops. Post-survey interviews were conducted with ten selected workshop participants, and those interviews gave a deeper and richer understanding of how information from the workshops is being applied in a range of institutions and work roles: thanks to Alejandra Aguilar Ramírez Sartorius, Gregorio Ángeles-Pérez, Alejandro Durán Fernández, Roberto Escalante López, Carlos Antonio López Sánchez, Marlin Pérez Suárez, David Tejeda Sartorius, Berioska Quispe Estrada, Percy Recavarren Estares, and Efraín Duarte.

¡Muchísimas gracias!

Executive Summary

Evaluation Background and Objectives

The U.S. Forest Service International Programs (USFS-IP) Office has supported a program of technical training and capacity building workshops focused on forest carbon measurement since 2010. These workshops have been a main component of the Promoting Sustainable Landscapes in Mexico (PSLM) Program of USFS-IP, funded by USAID-Mexico. Some workshop participants from Central and South America were also supported by the SilvaCarbon Program. In most cases, the workshops were carried out in collaboration with the *Fondo Mexicano para la Conservación de la Naturaleza*.

This evaluation focused on nine workshops covering four themes: forest carbon measurement, soil carbon measurement, data interpretation and linear regression, and Landsat time-series analysis. It was participatory and relatively informal, and used mixed methods, including a review of relevant documents, review of post-workshop participant surveys, key informant interviews, and an online survey of workshop participants to evaluate the effectiveness and impact of the workshops. The target audience for the evaluation findings is USFS International Programs staff working on the PSLM and SilvaCarbon programs. Findings will be used to develop communications materials to promote future workshops and seek funding for them.

Methodology

The evaluation took place in stages over approximately eight months, beginning in December, 2014, and concluding in July, 2015. First, key documents related to the program were reviewed. The program had not previously developed an explicit Results Framework, so one was developed from the review of biannual reports, workplans, and Performance Management Plans, and it provided the framework for developing questions for the online survey of past workshop participants. Five key workshop developers and instructors were interviewed by telephone early in the evaluation process, and their inputs also shaped the online survey. The survey was tested on a sample of 20 workshop participants, and performed as expected. All past workshop participants (134 people) were then invited to take the survey, and 78 completed it. Survey results were summarized quantitatively and analyzed statistically. Ten individuals who reported significant and frequent use of information from the workshops in their current work, and who represented different types of institutions and work roles, were selected for follow-up interviews, conducted by Skype or telephone.

Results

Results Framework

The review of background documents and other sources uncovered an implicit vision, or understanding, of the Theory of Change and Results Framework for the PSLM Program, and the forest carbon measurement capacity-building workshops component thereof. The overall outcome-level objective of the program could be stated as “Mexican institutions with relevant forest management authority and/or roles have the technical knowledge and capacity to manage and restore forests to ensure that they sustainably provide the full range of ecological benefits they can provide.” As PSLM program activities and inputs, the workshops being evaluated here are meant to build the technical knowledge and capacity needed to reach the objective of sustainable forest management.

Online Survey

Survey respondents represented all types of institutions: 49% were from government agencies, 33% from universities or research institutions, and the rest worked for NGOs or other types of organizations. Seventy-four percent were men and 26% were women, and 67% came from Mexico while the rest were from ten other countries in Central or South America. Results of the online survey provided strong and clear evidence that the workshops improved the capacity of forest managers and scientists from various kinds of institutions to do their jobs. Approximately 80% of survey respondents said that the workshops improved their capacity to do their jobs “a lot” or “very much.” Survey respondents also said that they were directly applying information from the workshops in their work – 50% said they did so “a lot” or “all the time,” and another 44% said they did so some of the time. About 45% said they used some of the information from the workshops in their jobs at least once a week, and another 46% said they did so once a month. These strong positive results were associated with all of the four types of workshops, and were found for both men and women, and among participants from all types of institutions.

The online survey showed that some work roles were associated with certain institutions. Not surprisingly, for example, staff of government agencies are significantly more likely to report that their job involves formulation of government policies than participants from other kinds of institutions. We also found that government agency staff are significantly more likely to be involved in public communication and raising public awareness regarding forests, deforestation, and climate change.

We asked workshop participants about their views on the purpose of forest carbon measurement, and a large majority (68%) said it was to “support sustainable forest management, irrespective of whether an international system for REDD+ is implemented.” Twenty-three percent said its main purpose was to “contribute to an international system of financial assistance for REDD+.” There were no significant differences among participants from different institutions in their response to this question. Survey responses suggest that the workshops facilitated some networking with other professionals within their own country; 66% said that they have maintained contacts made in the workshops to a moderate or strong degree. In contrast, only about one-third of participants said they maintained international contacts, either with the instructors or participants from other countries, to a moderate or strong degree. Survey respondents reported that textbooks, printed materials, and presentations on workshop websites were highly appreciated and used; 87% said that they were moderately to strongly useful.

Interviews with Selected Survey Participants

No single individual “success story” based on the interviews with selected survey participants stands out. The real “success story” here seems to be that the workshops served the needs, and build the capacity, of a wide range of participants from different institutions and with different work roles. All of the interviews provided case studies of successful capacity-building of various kinds. The interviews helped to explain why a large majority of respondents (68%) said that the purpose of forest carbon measurement was not only to support a REDD+ financial mechanism, but to support sustainable forest management. Forest carbon measurement in part depends on measuring and mapping forest cover and forest biomass, and both of these kinds of information are also important for managing forest ecosystems sustainably for all other benefits, including their role in hydrological ecosystem services, for the production of timber and wood products, and as habitats for other species.

Conclusions & Recommendations

Conclusions

General carbon measurement workshops serve a diverse group of participants. Workshop instructors were in general satisfied with the workshops, and most eventually came to view the diversity of participants as a positive factor in their success. For workshops offered more than once, workshop instructors adapted the content and curriculum from year to year in response to feedback from the participants, and to meet the needs of new target audiences.

High levels of satisfaction with workshops were reported by participants in end-of-workshop surveys in all workshops. On the online survey, they reported high levels of continuing use of information learned in the workshops in their jobs. All of the types of workshops offered were reported to have improved the capacity of participants to do their jobs, and information from all was generally being used directly and frequently in their work. This did not differ between male and female participants, nor participants from different kinds of institutions.

The high diversity of suggestions by survey respondents for additional workshop topics seems to suggest a need, or desire, for more individualized learning and problem solving related to the unique demands of their work. Some participants, depending on their work roles in their institutions, need more advanced and specialized knowledge and training to improve their capacity; others may need a broad overview of a certain theme to help them with their work.

Recommendations

A number of recommendations emerge from the results and conclusions of the evaluation, including the following:

- It will be useful to offer the basic forest carbon measurement workshop for at least a few more years, shifting to different sites within Mexico, or perhaps even offering it in another Latin American country. Eventually it may be desirable to institutionalize the basic forest carbon measurement course at a Mexican university or research institution, where it could be taught on a regular basis.
- Some of the workshops on more advanced topics should be offered again, and workshops on new topics should be developed as needed.
- USFS-IP should continue to try to attract a range of workshop participants with different institutional affiliations and work roles. Generalist participants, as well as technical specialists, can benefit from more general workshops (such as forest carbon measurement). For more technically-specialized workshops, recruiting participants who will actually apply the specialized knowledge in their jobs (soil carbon measurement; data analysis; Lidar) is important.
- An effort to improve the gender balance among workshop participants through moderate “affirmative action” criteria in the selection process would be worth trying, without unduly shifting the focus away from sustainable forest management issues toward a women’s empowerment or gender mainstreaming agenda.
- Broadening the thematic range of workshops offered to include other aspects of sustainable, ecosystem-based forest management, especially forest hydrology and watershed

management, would be in line with the overall objective of the PSLM program and other USFS-IP objectives.

- Participants in future workshops could benefit from an increased emphasis on sharing and comparing experience among regions within a country such as Mexico, and among countries, as well as an increased emphasis on creating an ongoing professional support network among workshop participants that will continue after the workshop.
- USFS-IP should consider developing a mechanism for individualized, site- or problem-specific technical advice (such as from individuals or small teams of technical advisors) to follow-up with selected workshop participants, visit selected participants at their field sites, and offer tailored advice and support. A coaching or mentoring system, or “on call” technical assistance, might address some of this need. A stronger professional network of carbon-measurement practitioners would probably also help to meet this need for specific, problem-oriented technical advice.
- The PSLM program could benefit from a review of its underlying Theory of Change and Results Framework to clarify the overall causal logic of the program, and situate the carbon-measurement aspects of training and capacity-building within the overall objectives of the program.

1.0 Evaluation Background and Objectives

1.1 Background

The U.S. Forest Service International Programs (USFS-IP) Office has been working with USAID on programs of technical training and capacity building related to mitigation of climate change. Training workshops on forest carbon measurement have been offered since 2010 as a main component of the Promoting Sustainable Landscapes in Mexico (PSLM) Program of USFS-IP, funded by USAID-Mexico. Some workshops had participants from Latin American countries other than Mexico who were supported by the SilvaCarbon Program. This evaluation focused on nine workshops covering four themes: forest carbon measurement (five workshops, 2010-2014); soil carbon measurement (two workshops, 2013-2014); data interpretation and linear regression (2014); and Landsat time-series analysis (2014). Depending on the workshop, topics covered included field and remote sensing methods and tools, and data analysis and statistical methods.

1.2 Objectives

This evaluation (see Annex A for Statement of Work):

- was primarily to assess the effectiveness, impact, and success of the program of training workshops to date (i.e., primarily a summative evaluation), but also with some interest in lessons learned and success stories to inform future directions of the program (in other words, with some aspects of a formative evaluation as well);
- was participatory, relatively informal, and “friendly”;
- used mixed methods (including review of documents; key informant interviews; qualitative analysis of interviews; an online survey; and quantitative, statistical analysis of survey results) to “triangulate” findings.



Fieldwork during a Forest Carbon Measurement workshop, Mexico (Photo credit: USFS-IP)

The target audience for the evaluation findings was USFS International Programs staff working on the PSLM and SilvaCarbon programs. Findings will be used to assess the success of the workshops, inform adaptive management of the workshop program, provide recommendations to improve the workshops, and develop communications materials to promote future workshops.

2.0 Methodology

The evaluation took place over approximately seven months, beginning in December, 2014, and concluding in July, 2015. Nine workshops offered between 2010 and 2014 were evaluated (Annex B). The sections below detail the methods employed in the evaluation.

2.1 Document Review

Information of several kinds provided the initial background for the evaluation (Annex C), including:

- Background documents and presentations on the PSLM Program, such as biannual reports, workplans, Performance Management Plans (PMPs);
- presentations by the Program Manager presented to various audiences during 2014;
- workshop agendas and descriptions, participants lists, and end-of-workshop questionnaires; and
- success story documents.

2.2 Retrospective Development of a Theory of Change and Results Framework

The PSLM program has not previously developed an explicit Theory of Change and Results Framework. Drawing from background documents and other sources – especially the biannual reports, workplans, and PMPs, and also several PowerPoint presentations about the program prepared by the Program Manager – a diagram of the implicit Results Framework for the PSLM Program was developed. This Results Framework diagram was discussed with the Program Manager and revised to ensure that it accurately represented the logical structure of the program.

2.3 Participant Surveys of Satisfaction with Workshops

Course instructors administered a short (10-15 question) end-of-workshop questionnaire to participants in most of the workshops, asking them about their satisfaction with various aspects of workshop organization, workshop facilitation, and group participation. Satisfaction measures were scored on a scale of 1-10. The results from participant satisfaction surveys available from five of the nine workshops were reviewed.

2.4 Interviews with Workshop Instructors

Five people who played key roles in developing, organizing, and conducting the workshops being evaluated were identified by the PSLM Program Manager, and they were interviewed by telephone about their roles in, and opinions of, the workshops. A list of general questions served as an interview guide or “script” to structure these interviews (see Annex D).

2.5 Online Survey of Workshop Participants

A total of 134 participants attended the workshops (Annex E). Questions for an online survey of these participants were designed to probe for a better understanding of the process of capacity building that is outlined in the Results Framework for the PSLM Program, within which the workshops were offered. We designed questions to go beyond previous output-level metrics (see Standard Indicators 4.8.2-6, 4.8.2-27, and 4.8.2-29, and Custom Indicator 4.8.2-8 in Fig. 1 below) to outcome-level results (Standard Indicators 4.8.2-14 and 4.8.2-28) at the highest level of the Results Framework. The web-based survey included questions of interest to the developers and instructors of the workshops, and they reviewed the draft survey questions and offered suggestions. USFS-IP staff agreed on the questions in the final survey (Annex F).

The web-based survey, using Survey Monkey® <https://www.surveymonkey.com/>, was tested on a pilot group of 20 participants, most from Mexico but some from elsewhere in Latin America, who had attended one or more of the workshops offered. The response rate to the pilot survey was 65% (13 responses/20 invited). The pilot survey worked as expected and without problems, so the same survey was sent to the full list of participants without modification; 114 additional participants were invited to complete survey. Among all 134 workshop participants contacted, 78 completed the survey, for an overall response rate of 58%.

Survey results were analyzed for statistically-significant differences among various kinds of groups (e.g., gender, institutional affiliation, work roles, workshop attended) using exact row by column contingency tests (i.e., tests of independence), which were done with a calculator available online ([Exact rxc Contingency Table](#)). Probability (p) values greater than 0.05 indicated that any differences were not statistically significant; p-values less than 0.05 indicated statistically-significant associations. Survey results were filtered to identify participants from various types of institutions and work roles whose online survey results were highly positive about the value of the workshops to their work.

2.6 Interviews with Selected Survey Participants

Ten individuals who reported significant and frequent use of information from the workshops in their current work in the online survey, and who represented different types of institutions and work roles, were selected for follow-up interviews. A semi-structured guide or “script” for the interviews was developed to probe for examples of, and details about, how the information learned in the workshop(s) had helped that person in their work (see Annex I). Interviews were conducted between April 29 and May 14, 2015, by Skype or telephone.



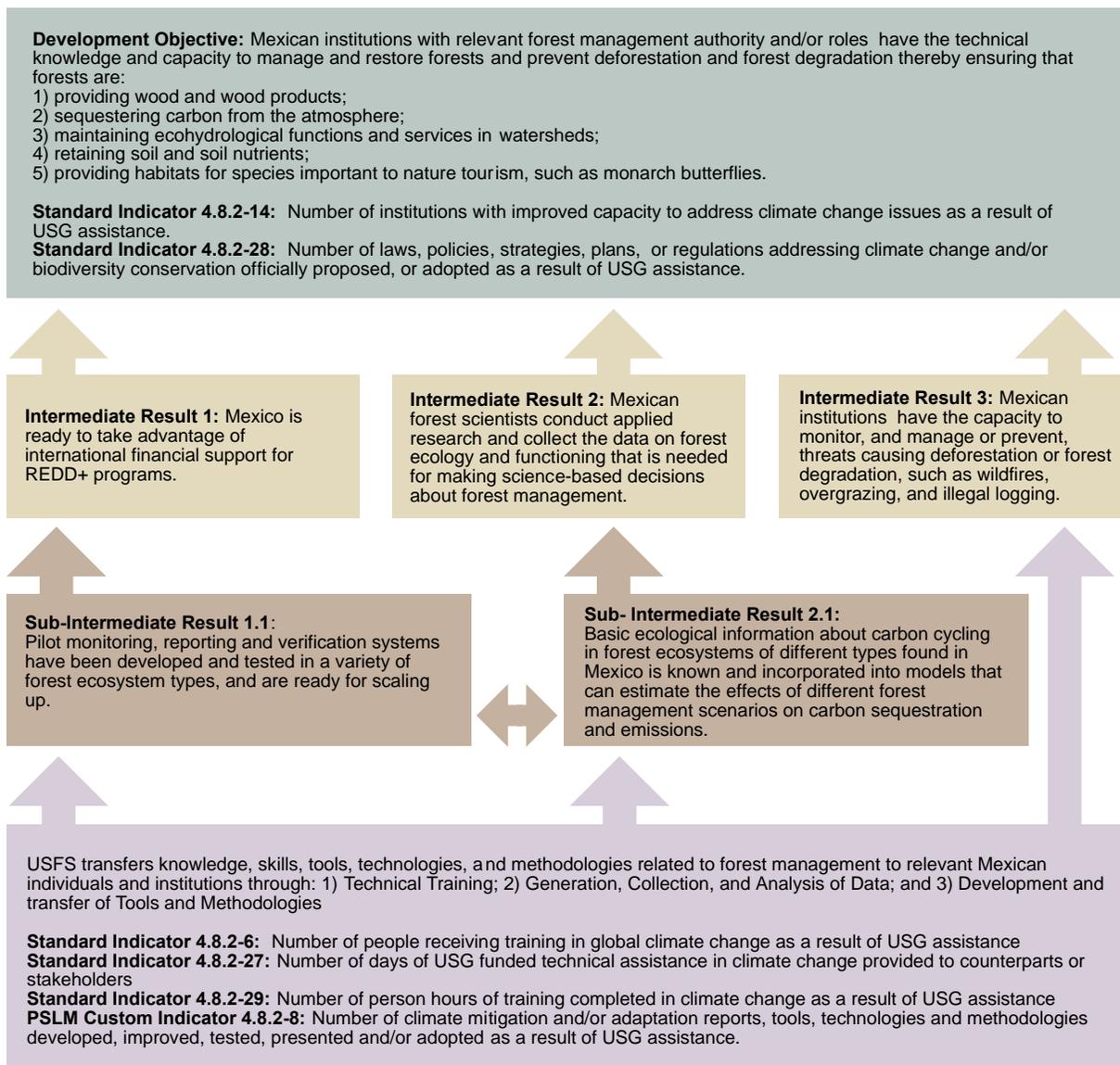
Fieldwork in 2010 Forest Carbon Measurement Workshop in New Jersey. (Photo credit: Sarah Hines, USFS)

3.0 Results

3.1 Review of Background Documents

The review of background documents and other sources uncovered an implicit vision, or understanding, of the Theory of Change and Results Framework for the PLSM Program, and the forest carbon measurement capacity-building workshops component thereof. An explicit Results Framework was not described in those documents, however, and to facilitate the development of evaluation questions that could probe the process of capacity building implicit in the program’s design, a Results Framework diagram was developed (Fig. 1).

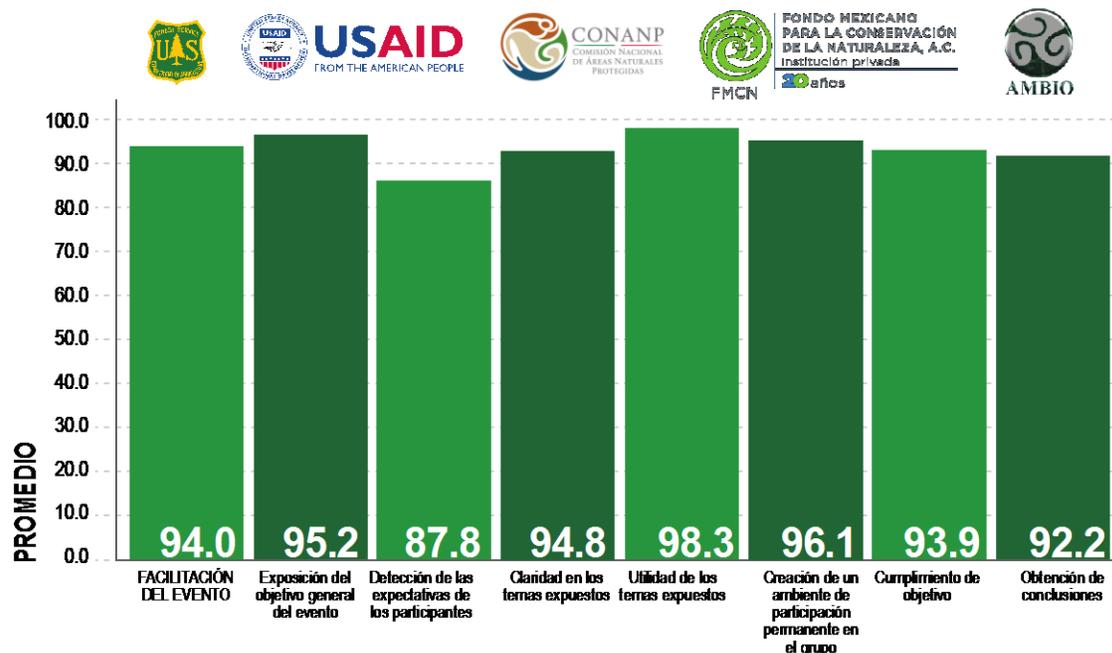
Figure 1. Results Framework Diagram for PSLM Program



3.2 Surveys of Participants' Satisfaction with Workshops

Average scores on all questions on the end-of-workshop surveys were above 9/10, indicating a very high level of participant satisfaction with course organization, facilitation, and group participation (Fig. 2). This highly-positive feedback from participants immediately following the workshops indicates that they were well planned and taught. These end-of-workshop questionnaires are essentially output-level measures – they do not indicate whether, or how, the participants later used the information they had gained in their jobs. For that reason, our methodology used an online survey to try to measure, long after workshop completion, whether participants were using what they had learned, and how.

Fig. 2 – Example of summary of results from participant questionnaire from Forest Carbon Measurement Course IV, Jan. 2014, Chiapas, México



3.3 Interviews with Workshop Instructors

Key workshop organizers and instructors generally felt that the workshops had successfully achieved most of their objectives. In interviews, they shared their opinions and insights about the workshops, and their observations and questions helped in developing the online survey. Most of the workshop instructors reviewed the draft survey questions and offered suggestions that helped to finalize the survey. Some important observations from the instructors are summarized below.

3.3.1 Satisfaction with organization and management

- The idea of establishing a network on carbon measurement in North America, even the Americas, has always been part of the agenda. Overall, one key workshop organizer thinks the experience has been very good, and that the workshops have been able to reach a diverse group of participants and teach them information and skills that can help them do their jobs.
- The training workshops that have been repeated (forest carbon measurement, 5 times; soil carbon measurement, 2 times) have been modified from year to year, including in the number of participants, the percentage of non-Mexico participants, and the curriculum. Workshops have been adjusted in response to reactions from past participants.
- Organizers/instructors described workshop development as “a learning process,” and they have tried to adapt and change and improve the curriculum to improve them from year to year.
- Workshops that have been repeated have been adapted for the demands of new target audiences – for example to focus on carbon measurement in protected areas, aimed mostly at staff from the Comisión Nacional de Áreas Naturales Protegidas (CONANP).
- Some of the workshops have been organized more like courses, such as Linear Regression and Data Analysis, or Landsat Time Series Interpretation.

3.3.2 Participant selection and appropriateness

An initial impetus for the first two general forest carbon measurement training workshops was that the USFS was helping to establish intensive forest-monitoring sites in Mexico, and those sites needed Mexican staff to run them. The staff had to be trained, just as they are trained for USFS intensive forest-monitoring sites in the US. So there was a ready application for the capacity built by the workshops for those participants who would be working at the intensive monitoring sites. The first forest carbon measurement workshops also had participants from higher levels in the institutions, such as the Comisión Nacional Forestal (CONAFOR), who were supervising people working at the intensive forest-monitoring sites.

Some instructors expressed the view that initially they wanted to train people who would be measuring carbon in forests and soils, some in intensive forest-monitoring sites like those in a USFS network in the US, and who were essentially forest carbon researchers in their jobs. In general, initially they wanted to train people just like them.

Selection of course participants was not completely under the control of USFS-IP, however. Invitations to select participants for the workshops were sent to administrators and managers of relevant agencies and other institutions, in most cases, and they sometimes selected participants without the applied research profile envisioned by the workshop organizers and instructors. In the forest carbon and soil carbon measurement workshops especially, participants sometimes had more diverse work roles in their institutions than the workshop organizers initially envisioned.

In the end, however, workshop leaders generally felt that the diversity of participants enriched the workshops by providing a spectrum of perspectives that enriched the experience of all participants, and favored having participants from a diversity of institutions (e.g., government agencies, academic and research institutions, and NGOs) and work roles (e.g., policy/managers, researcher, field technician). One instructor even said that at first he thought they should more directly target the science/field technician type of participant, but gradually changed his mind as he saw the benefit of participant diversity.

In general, workshop instructors felt that most of the participants were at the appropriate level and in an appropriate role to benefit from the training and capacity-building. All participants were seen by instructors as wanting and needing a general overview of how forest carbon stocks can be measured, even though their own job may use only a piece of that understanding. One instructor said he thought that “95% of the participants are going to be using something they have learned in the course in their work.”

Having a USFS-IP staff person in Mexico to shepherd the selection process has helped in getting appropriate participants for the courses, because of his contacts and connections he can communicate with institutions and guide their selection of participants based on the appropriate participant profile. Instructors of the soil carbon measurement course felt that their course needed a more carefully targeted kind of participant, who: 1) has an interest in, or background in, soils, and 2) is involved in the technical details of soil carbon measurement in their job.

3.3.3 Main or most important result or impact



Technician climbing air monitoring tower, Hidalgo, Mexico. (Photo credit: USFS-IP)

One instructor said that the most concrete result is that approximately half a dozen intensive forest monitoring sites in Mexico are now staffed by people who have been trained in their courses. Material from the courses is now being applied directly by those people. Another workshop leader said he has noticed more capacity in forest carbon measurement in Mexico just in the 3-1/2 years he has been involved with the workshops. Now Mexicans are able to identify Mexican experts to teach the

courses, whereas at the beginning it was the USFS doing so. Another said he thinks it has helped to build this pool of

in-country capacity for soil carbon measurement that he thinks is needed. In general, in Mexico and throughout LAC, “capacity building is a need for all of them.” Each country has a different need, but the general forest carbon measurement course helps them to have a better idea of what methodologies, tools, and technologies are out there.

3.3.4 Target institutions and/or agencies

One instructor pointed out that CONAFOR is mandated by the Mexican climate change law that passed a few years ago to develop a national carbon monitoring system by 2015. Because they are the lead agency for setting up the carbon emissions measurement, reporting and verification (MRV) system for Mexico, they need to be a target agency for carbon measurement capacity-building. More recently, CONANP, the protected areas agency, seem to be especially interested in forest carbon measurement. They asked the USFS-IP program to organize the 2014 Forest Carbon Measurement workshop in Baja California, associated with Parque Nacional Sierra de San Pedro Mártir, for example. The Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO) also seems interested.

As in the question about participant appropriateness and selection, instructors in general would seem to favor institutional diversity among workshop participants. One workshop organizer pointed out that academic and NGO participants may be able to implement new methodologies at the local or regional level, before they would or could be adopted nationally, and that could lead the way for the government to adopt them or scale them up to the national level at a later time.

An instructor pointed out that one of the challenges of building sustainable capacity in Mexico is that most high-level positions are political, and change when a new president and political party is elected, as happened three years ago. USFS-IP is trying to train technicians, hoping that they will remain in their jobs/roles even with those political changes, but they sometimes get laid off by political-appointee bosses. Another issue is that technicians who receive training through USFS-IP are often young, and new in their careers, and they may not have the clout or confidence to carry the new methodologies to their bosses and get them implemented.

3.3.5 Professional relationships maintained

One instructor said that in some cases he has continued to interact with people from the courses. That is particularly true with past participants, especially from academic/research institutions, with whom they now have joint research agreements at intensive forest monitoring sites funded by USAID-Mexico.

Most instructors described a relatively low level of post-workshop communication with a relatively small number of the participants, and generally only for a short time. In general, They did not, in general, describe much continuing professional communication with past participants.

3.3.6 Course topics and appropriateness

One instructor saw the general forest measurement course as particularly appropriate and still needed, in order to continue to assist Mexico in the process of deciding how to implement a national MRV system. One instructor said that the idea of offering a course such as the general forest carbon measurement course at a university had been discussed.



2012 Forest Carbon Measurement Workshop, Hidalgo, Mexico. (Photo credit: Kristen Schmitt, USFS)

3.4 Online Survey Results

Results and statistical analysis from the web-based survey are summarized below.

3.4.1 Gender

Approximately 74% (58/78) of the participants who responded to the survey were men, and 26% (20/78) were women (Annex G, Question 6). These survey respondents were a representative sample of the population of all workshop participants in terms of gender – among all workshop

participants 76% were male (102/134) and 24% were female (32/134). This gender imbalance among workshop participants undoubtedly reflects a general gender imbalance in forestry jobs in Mexico and Latin America.

3.4.2 Nationality

Two-thirds of the workshop participants were Mexican (90/134 = 67%), and one-third (44/134 = 33%) were from 10 other Latin American countries (Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Nicaragua, Panama, and Peru) (Annex G, Question 2). Non-Mexican participants were supported to attend the workshops by the SilvaCarbon Program. Although a lower percentage of non-Mexican workshop participants responded to the survey (19/78 = 25%) compared to Mexican participants (59/78 = 75%), this difference was not statistically significant (chi-square = 1.696, $p = 0.193$) ([chi-square calculator](#)), and we can conclude that survey respondents are a representative sample of the nationalities of workshop participants overall.

3.4.3 Institutional Affiliation

We asked survey participants about their institutional affiliation (Annex G; Question 3). Approximately one-half of the participants worked for government agencies, one-third for universities or other research institutions, and the remainder for NGOs or other types of organizations.

Table 1. Institutional affiliation of survey respondents.

| Institutional Affiliation | Percent | N |
|--|---------|----|
| 1 = government agency; agencia del gobierno | 48.7% | 38 |
| 2 = NGO; ONG | 10.2% | 8 |
| 3 = university or research institution; universidad o institución de investigación | 33.3% | 26 |
| 4 = donor-financed project; proyecto financiado por donantes | 2.6% | 2 |
| 5 = other type of institution; otra tipo de institución | 5.1% | 4 |
| | | 78 |

3.4.4 Gender and institutional affiliation

There are no significant gender differences among participants from different kinds of institutions (Annex G, Question 6 by Question 3, exact test of independence, $p = 0.888$)

Table 2. Gender and institutional affiliation of survey respondents.

| Institutional Affiliation Gender | Government agency | University or research institution | NGO or other type of institution | % (N) |
|----------------------------------|-------------------|------------------------------------|----------------------------------|-----------|
| Men | 29 | 19 | 10 | 74% (58) |
| Women | 9 | 7 | 4 | 26% (20) |
| | 49% (38) | 33% (26) | 18% (14) | 100% (78) |

$p = 0.888$

3.4.5 Application of Information Learned in Workshop in Job

Three questions on the online survey were designed to measure outcome-level performance of the capacity-building workshops through participants' self-reported opinions of their increased capacity to do their jobs, and their use of information from the workshops in their jobs. These three questions provide measures of "improved capacity" under Standard Indicator 4.8.2-14: Number of institutions with improved capacity to address climate change issues as a result of USG assistance (see Fig. 1: Results Framework). Survey results for these three questions are given below:

Table 3: Responses to Question 20: The workshop(s) improved my capacity to do my job; *El/los taller/es ha mejorado mi capacidad para desarrollar mi trabajo.*

| Answer Options | Percent | N |
|---------------------------|---------|----|
| 0 = no; no | 0.0% | 0 |
| 1 = very little; muy poco | 2.6% | 2 |
| 2 = some; un tanto | 17.1% | 13 |
| 3 = a lot; bastante | 52.6% | 40 |
| 4 = very much; mucho | 27.6% | 21 |
| | | 76 |

Table 4: Responses to Question 8: I am directly applying what I learned in the workshop(s) in my job; *Estoy aplicando directamente lo que aprendí en el/los taller/es en mi trabajo actual.*

| Answer Options | Percent | N |
|----------------------------------|---------|----|
| 0 = no; no | 2.7% | 2 |
| 1 = very little; muy poco | 4.0% | 3 |
| 2 = some; moderadamente | 44.0% | 33 |
| 3 = a lot; bastante | 38.7% | 29 |
| 4 = all the time; todo el tiempo | 10.7% | 8 |
| | | 75 |

Table 5: Question 21: I have used some of what I learned in the workshop(s); *He aplicado parte de lo aprendido del/de los taller/es:*

| Answer Options | Percent | N |
|-------------------------------------|---------|----|
| 0 = never; nunca | 0.0% | 0 |
| 1 = once a year; una vez al año | 9.2% | 7 |
| 2 = once a month; una vez al mes | 46.1% | 35 |
| 3 = once a week; una vez por semana | 22.4% | 17 |
| 4 = every day; cada día | 22.4% | 17 |
| | | 76 |

Note: total sample sizes for these questions are slightly less than the total number of participants who took the online survey (N = 78) because some respondents skipped these questions.

3.4.6 Work Roles

Many of the questions on the survey asked participants to define for us what their actual work entailed. We identified five general types of work roles, defined by strongly positive responses to one or more survey questions (Annex G):



2010 Forest Carbon Measurement Workshop, New Jersey (Photo credit: Sarah Hines, USFS)

1) Measuring carbon in forests and soils; this role was defined by strongly positive responses to Questions 9, 11, and 17:

Question 9: My current job involves measuring carbon in forests.

Question 11: My current job involves training or teaching others about how to measure carbon in forests.

Question 17: My job contributes to the development and testing of pilot monitoring, reporting and verification (MRV) systems in my country.

2) Forest ecology research (including carbon cycling); this role was defined by strongly positive responses to Questions

12, 18, and 19:

Question 12: I am currently conducting applied research on forest ecology and functioning.

Question 18: My job helps to provide basic ecological information about carbon cycling in forest ecosystems in my country.

Question 19: My job contributes to scientific knowledge about forest ecology and functioning in my country.

3) Government policy formulation on forest management; this role was defined by strongly positive responses to Question 15:

Question 15: My job involves the formulation of government policies regarding forest management.

4) Informing decision makers about sustainable forest management and climate change; this role was defined by strongly positive responses to Questions 13 and 14.

Question 13: My job involves educating and informing policy makers about sustainable forest management practices.

Question 14: My job involves educating and informing policy makers in the forest sector about deforestation and its effect on climate change.

5) Raising public awareness about the importance of forests in climate change; this role was defined by strongly positive responses to Question 16:

Question 16: My job involves raising public awareness about forests, deforestation, and climate change.

Most, but not all, of these work roles could be carried out by workshop participants from any type of institution.

3.4.7 Statistical Analyses of Factors Linked to Workshop Effectiveness

Independent variables of interest in this evaluation included gender, institutional affiliation, and workshop(s) attended; dependent variables included measures of the effectiveness of the workshops in building participants' capacities to do their jobs and providing useful information for their work. Statistical tests of independence were used to examine associations among the independent and dependent variables of interest from the online survey. Table 6 summarizes the significance of associations between gender, institutional affiliation, and workshop attended and responses to the three questions that measured use of workshop information in participant's jobs.

Table 6: Statistical significance of associations between survey independent variables and application of workshop learning in job.

| Question ↓ | Variable → | | |
|---|-----------------------|---------------------------|-----------------------|
| | Gender | Institutional Affiliation | Workshop Attended |
| Question 20: Workshop improved my capacity to do my job. | No ($p = 0.136$) | No ($p = 0.207$) | No ($p = 0.687$) |
| Question 21: How often use what was learned in workshop in job. | No ($p = 0.978$) | No ($p = 0.130$) | No ($p = 0.684$) |
| Question 8: Directly applying learning from workshop in job. | No ($p = 0.157$) | Yes ($p = 0.012$) | No ($p = 0.204$) |

3.4.7.1 Gender and capacity improvement due to workshop participation

There was no significant difference ($p = 0.136$) between men and women participants' views about whether the workshops improved their capacity to do their jobs (Annex G, Question 20). No significant differences between men and women were found in how often participants reported using information learned in a workshop (Annex G, Question 21), nor in whether participants say they are directly applying what they learned (Annex G, Question 8).

3.4.7.2 Institutional affiliation and capacity improvement due to workshop participation

- 1) There are no significant differences among participants from different kinds of institutions – government agency, university/research, and NGO/other – in whether they say that the workshops improved their capacity to do their work (Question 20) [$p = 0.207$].
- 2) There were no significant differences among participants from different kinds of institutions in how often they say they use what they have learned in the workshops in their work (Question 21) [$p = 0.130$].

3) University and research institution participants say they are “directly applying” what they learned in the workshops in their work (Question 8) to a significantly greater degree than government agency or NGO/other participants [$p = 0.002$]. Because participants from all institutional affiliations say the workshops improved their capacity, and they are equally applying what they learned, this significant difference about “directly applying” what was learned in the workshops is somewhat difficult to interpret.

3.4.7.3 Workshop type and capacity improvement due to workshop participation

There were no significant differences among the types of workshops – forest carbon measurement, soil carbon measurement, or Landsat time series and linear regression – in whether participants report that they improved their capacity to do their jobs because of the workshop (Question 20) ($p = 0.687$). There were no significant differences among the types of workshops in whether participants are applying some of what they learned (Question 21) ($p = 0.684$), and also no significant differences among the types of workshops in whether they are being directly applied in participants’ work (Question 8) ($p = 0.204$).



Fieldwork in Forest Carbon Measurement Workshop, Chiapas, Mexico. (Photo credit: USFS-IP)

Table 7: Responses by workshop to Question 20: The workshop(s) improved my capacity to do my job; El/los taller/es ha mejorado mi capacidad para desarrollar mi trabajo.

| Workshop→ Answer ↓ | Forest Carbon Measurement | Soil Carbon Measurement | Landsat Time- series or Linear Regression | % (N) |
|--------------------------|------------------------------|----------------------------|---|-----------|
| no or very little | 0 | 1 | 0 | 1% (1) |
| some | 8 | 2 | 2 | 16% (12) |
| quite a lot | 23 | 8 | 12 | 55% (43) |
| very much | 11 | 4 | 7 | 28% (22) |
| | 54% (42) | 19% (15) | 27% (21) | 100% (78) |

$p = 0.687$

Table 8: Responses by workshop to Question 21: I have used some of what I learned in the workshop(s); He aplicado parte de lo aprendido del/de los taller/es:

| | Forest Carbon Measurement | Soil Carbon Measurement | Landsat Time-series or Linear Regression | |
|----------------|---------------------------|-------------------------|--|----|
| no o muy poco | 2 | 2 | 2 | |
| moderadamente | 22 | 5 | 8 | |
| bastante | 10 | 3 | 5 | |
| todo el tiempo | 8 | 5 | 6 | |
| | 42 | 15 | 21 | 78 |

$p = 0.684$

Table 9: Responses by workshop to Question 8: I am directly applying what I learned in the workshop(s) in my job; Estoy aplicando directamente lo que aprendí en el/los taller/es en mi trabajo actual.

| | Forest Carbon Measurement | Soil Carbon Measurement | Landsat Time-series or Linear Regression | |
|----------------|---------------------------|-------------------------|--|----|
| no o muy poco | 2 | 2 | 0 | |
| moderadamente | 21 | 5 | 5 | |
| bastante | 15 | 6 | 13 | |
| todo el tiempo | 4 | 2 | 3 | |
| | 42 | 15 | 21 | 78 |

$p = 0.204$

3.4.8 Institutional affiliation and work roles

It seems logical that some certain work roles would be associated with certain institutional affiliations. We tested some of the obvious hypotheses about such associations. For example, as would be expected, there was a statistically significant association ($p = 0.001$) between institutional affiliation and the formulation of government policy (Annex G, Question 15). Staff of government agencies are significantly more likely to report that their job involves formulation of government policies than participants from other kinds of institutions .

Table 10: Responses by institution to Question 15: My job involves the formulation of government policies regarding forest management; Mi trabajo consiste en la formulación de las políticas del gobierno con respecto a la gestión forestal.

| | Government Agency | University or Research Institution | NGO or Other Type of Institution | |
|----------------|-------------------|------------------------------------|----------------------------------|----|
| no o muy poco | 10 | 19 | 5 | 34 |
| moderadamente | 7 | 5 | 3 | 15 |
| bastante | 13 | 1 | 6 | 20 |
| todo el tiempo | 7 | 1 | 0 | 8 |
| | | | | 77 |

$p = 0.001$

We also found that government agency staff are significantly more likely ($p = 0.018$) than university/research or NGO/other participants to be involved in public communication and raising public awareness regarding forests, deforestation, and climate change (Annex G, Question 16). CONANP and CONAFOR staff in Mexico are the main group saying they do this.

Table 11: Responses by institution to Question 16: My job involves raising public awareness about forests, deforestation, and climate change; *Mi trabajo consiste en sensibilizar al público acerca de la importancia de los bosques, la deforestación y el cambio climático.*

| | Government Agency | University or Research Institution | NGO or Other Type of Institution | |
|----------------|-------------------|------------------------------------|----------------------------------|----|
| no o muy poco | 6 | 8 | 0 | |
| moderadamente | 8 | 7 | 6 | |
| bastante | 8 | 9 | 6 | |
| todo el tiempo | 14 | 2 | 2 | |
| | | | | 76 |

$p = 0.018$

3.4.9 Institutional affiliation and views about the purpose of forest carbon measurement

There were no significant differences among participants from different institutions in their views on the purpose of forest carbon measurement (Annex G, Question 26). Sixty-eight percent (52/77) said it was to “support sustainable forest management, irrespective of whether an international system for REDD+ is implemented”; “apoyar la gestión forestal sostenible, independientemente de si se implementa un sistema internacional para REDD+”. Twenty-three percent (18/77) said the purpose of forest carbon measurement was to “contribute to an international system of financial assistance for REDD+”; “contribuir a un sistema internacional de apoyo financiero para REDD+,” and 9% said it had “another purpose”; “otro propósito.”

Table 12: Views about purpose of carbon measurement by institution.

| | Government Agency | University or Research Institution | NGO or Other Type of Institution | |
|---|-------------------|------------------------------------|----------------------------------|------------|
| Contribute to international financing system for REDD+ | 6 | 8 | 4 | 18 (23.4%) |
| Support sustainable forest management independent of whether REDD+ financing is available | 27 | 17 | 8 | 52 (67.5%) |
| Another purpose | 4 | 1 | 2 | 7 (9.1%) |
| | 37 | 26 | 14 | 77 (100%) |

$p = 0.458$

3.4.10 Development of Professional Networks

The USFS-IP PSLM Final 2014 Workplan (p. 10) states that: “A core part of USFS-IP’s work is providing capacity building in the form of training, technical assistance, mentoring, study tours and technical exchanges. One of the key outcomes of capacity building is the creation of informal technical networks that strengthen collaboration and exchange at national and international levels.” Questions 22, 23, and 24 in the online survey asked directly about whether participation in the workshops led to maintaining contacts and thereby helping to establish networks.

Table 13: Responses about professional networks.

| Answer Options | I have maintained the contacts with other professionals in my own country made in the course/workshop: | I have maintained the international contacts with other Latin American professionals made in the workshop: | I have maintained contacts with one or more of the instructors of the course: |
|-----------------------|---|---|--|
| 0 = no | 5.3% | 7.9% | 15.8% |
| 1 = very little | 28.9% | 52.6% | 43.4% |
| 2 = some | 38.2% | 30.1% | 32.9% |
| 3 = a lot | 23.7% | 7.9% | 5.3% |
| 4 = all the time | 3.9% | 0.0% | 2.6% |
| N = 76 | | | |

Participants’ responses suggest that the workshops did facilitate national networking; 66% said that they have maintained contacts made in the workshops to a moderate or strong degree. In contrast, only about one-third of participants said they maintained international contacts, either with the instructors or other participants from other countries, to a moderate or strong degree.

3.4.11 Use of Workshop Websites and Printed Materials after Workshop

The first three forest carbon measurement workshops (2010, 2011, and 2012) developed extensive websites. In some workshops, textbooks were used, and in most printed materials were distributed to participants. Some workshop instructors suggested that we ask about the usefulness of these materials and websites to participants, and we did so (Annex G, Question 27). Our survey results show that these sources of information were highly appreciated and used; 87% said that they were moderately to strongly useful.

Table 14: Responses to Question 27: Since the workshop(s) the text, printed materials, and presentations on the workshop websites have been useful to me; *Desde el/los taller/es me han sido de utilidad el libro de texto y/o materiales imprimidas utilizado en el taller y/o las presentaciones mantenidas en el sitio web del taller.*

| Answer Options | Percent | N |
|----------------------------------|---------|----|
| 0 = no; no | 1.4% | 1 |
| 1 = very little; muy poco | 12.1% | 9 |
| 2 = some; moderadamente | 36.5% | 27 |
| 3 = a lot; bastante | 40.5% | 30 |
| 4 = all the time; todo el tiempo | 9.5% | 7 |
| | | 74 |

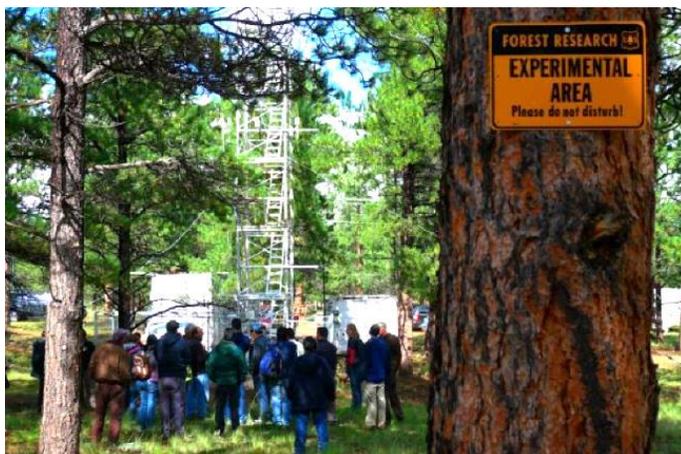
3.4.12 Challenges to Improving Capacity

Workshop instructors also suggested that we ask participants what challenges they have faced in applying what they learned in the workshops, and we did so: (Annex G, Question 28). Lack of funding and lack of time given other work responsibilities were the main challenges reported.

Table 15: Responses to Question 28: What challenges have you faced in implementing what you learned in the workshop in your current work?; *Qué desafíos ha enfrentado en la aplicación de lo que aprendió en el taller en su trabajo actual?*

| Answer Options | Percent | N |
|---|---------|----|
| 1 = lack of institutional support | 9.5% | 7 |
| 2 = lack of time because of my other responsibilities | 33.8% | 25 |
| 3 = lack of funding for this aspect of my work | 50.0% | 37 |
| 4 = lack of other organizational and institutional partners | 16.7% | 14 |
| 5 = another reason | 10.8% | 8 |
| | | 74 |

3.4.13 Other Suggestions from Workshop Participants



2011 Forest Carbon Measurement Workshop, Colorado, USA (Photo credit: Sarah Hines, USFS)

At the end of the online survey we had an open-ended question (Annex G, Question 29): Please give us your suggestions about other workshop themes that would be useful for you, and/or any other comments or suggestions;

Por favor proporciónenos sus sugerencias sobre otros temas de taller que serían útiles para usted y/o cualquier otras comentarios y sugerencias.

Fifty survey respondents offered one or more suggestions (Annex H). The responses are quite diverse, but a few themes or topics stand out as being mentioned by several participants, including:

the importance of teaching about data analysis, not only field methods, in the workshops (mentioned 5 times); the need to improve capacity to use high-resolution imaging techniques like Lidar (mentioned 4 times); and the need for capacity-building in quantifying and valuing other ecosystem services besides carbon sequestration, such as hydrological services (mentioned 4 times). The main result that seems to emerge from a review of the suggestions offered by participants is not repetition of common themes, but rather the high diversity of responses.

3.5 Interviews with Selected Survey Participants

Ten participants who completed the online survey were selected for follow-up interviews because of their strongly positive responses related to a variety of work roles (Annex J). We hoped that these interviews would provide deeper insights into how the courses improved the capacity of the participants to do their jobs, and also to provide interesting personal case studies for the development of communications materials and “success story” documents.

No single individual “success story” based on the interviews stands out. The real “success story” here seems to be that the workshops served the needs, and build the capacity, of a wide range of participants from different institutions and with different work roles. All of the interviews provided case studies of successful capacity-building of various kinds.

For example, some of those interviewed were directly involved in measuring forest or soil carbon at various scales, from local to national, and they described the importance of information learned in the workshops to their jobs. On the other hand, two managers of national protected areas also described the workshops as very useful to them in providing general background and knowledge needed for their job, which in part involves overseeing technicians who may be estimating carbon in forests of the protected areas.

The interviews provided some examples of specific work and work products that benefitted from knowledge and capacity gained in the workshops, for example:

- A Mexican staff member of CONAFOR who works at the national level said that some of what she learned in the Data Interpretation and Linear Regression workshop helped her understand how to take a huge amount of data that exists from a large country like Mexico, including information from satellite imagery, and analyze it. She said that the workshop gave her “the capacity to use improved tools for data analysis that I need in my work in planning and monitoring.”
- A CONANP staff member, manager of the Sierra del Abra Tanchipa Biosphere Reserve, said that the knowledge he gained in the 2014 Forest Carbon Measurement workshop in Baja California is enabling that protected area to take part in a CONANP program, funded by the German Development Aid agency (GIZ), on “[Climate change and protected area management](#).” In this case, USAID funding for forest carbon measurement workshops is “leveraging” further funding for sustainable forest management and biodiversity conservation. He explained that he was not a technical expert on this subject, but he supervises and works with a team of technical experts, so the general knowledge of forest carbon measurement he gained from the workshop is very useful to him in his work. The workshop made him aware of the experiences of other groups working on forest and protected area issues in Mexico that he didn’t know about, and put them on the right track for estimating carbon in their protected area, he said. He is interested in information that will translate into practical benefits for local communities that live in and around the protected area, and also therefore

very interested not only in courses to build capacity of technical staff, but of the people of the communities.

- Another CONANP protected area manager who attended the 2014 Forest Carbon Measurement workshop in Baja California said that it “gave us knowledge, a clear vision,” about the capture and storage of carbon in forests, and of what methods can be used to measure it. That improved understanding has allowed the Selva El Ocote Biosphere Reserve to collaborate with a CONANP program funded by the Global Environment Facility (GEF) called “[Conservation of coastal watersheds to achieve multiple global environmental benefits in the context of changing environments.](#)” In this case again, USAID funding for forest carbon measurement workshops is “leveraging” further funding from other donors. He mentioned that the protected area he manages is part of the watershed for some important rivers, and very important for the production of water for local communities, downstream municipalities, and for hydroelectric power generation. He is also interested in the theme of adaptation to climate change, not only in its mitigation through improved forest management and carbon sequestration.
- A participant in the 2014 Soil Carbon Measurement workshop held in Michigan is a professor and researcher at the Universidad Autónoma del Estado de México (UAEM), and is supervising Masters and Ph.D. degree students in [Instituto de Ciencias Agropecuarias y Rurales](#). They are studying the effects of grazing on soils, soil carbon, and water retention and infiltration. The soils workshop was very useful, she said, in giving her knowledge of how to set up an adequate sampling design for their studies. They hire local people from the communities where they are sampling to help them with the work, and in the process provide a kind of community awareness-raising function about the importance of soils, soil organic matter and soil carbon, and water infiltration and runoff.
- A workshop participant who works for an NGO in Peru, the [Asociación para la Investigación y el Desarrollo Integral \(AIDER\)](#), attended the 2012 Forest Carbon Measurement workshop held in Hidalgo, Mexico. He said that the workshop really helped him develop, apply, and improve his work. At that time, he was working on forest carbon measurement and developing REDD+ projects in Peru, and for him it was useful to compare experiences with people doing the same thing. Hearing about experiences in Mexico and Ecuador helped him in incorporating some aspects of forest monitoring using satellite imagery and field measurements into his work. There are now four REDD+ pilot projects in Peru. In the Tambopata National Reserve in the Peruvian Amazon they have been working with World Bank funding since 2009, and they now have completed two verifications of reduced emissions ([Reduction of Deforestation and Degradation in Tambopata National Reserve and Bahuaja-Sonene National Park within the area of Madre de Dios Region – Peru](#)). They are working in two sites with indigenous communities in the Peruvian Amazon, and they are well along in verification of reduced emissions. And now they have a verification project on the north coast of Peru, a tropical dry forest, with a campesino community. Again in this case, USAID funding for forest carbon measurement workshops is “leveraging” further funding from other donors.
- Another participant in the 2012 Forest Carbon Measurement workshop in Hidalgo, Mexico, was working as the Coordinator for Forest Monitoring of the [Instituto de Conservación Forestal \(ICF\) of Honduras](#). In 2014 Honduras initiated the second national forest inventory, and he used a lot of the information that he had learned in the workshop in developing the methodological guide and manual of procedures for that inventory, especially for measuring carbon. He said that information from the workshop also served him very well the year before (2013) in producing a national forest map for Honduras, and in that effort he also got a

lot of help from two USFS specialists, one of whom had been a workshop instructor. He said that much of what he was able to accomplish as the Coordinator for Forest Monitoring in Honduras was “thanks to the knowledge gained from the workshops.”

A few themes and issues were mentioned by more than one of the persons interviewed, including:

- The value of exchanging experiences among countries and professionals from different places within the same country (e.g., other groups working in Mexico) – mentioned in 5/10 interviews;
- The need for capacity in integrated ecological resource management – not just focusing on carbon storage, but on soil and water issues, forest health (pests and pathogens) and biodiversity values as well – mentioned in 5/10 interviews;
- The importance of capacity in statistical sampling design for national forest inventories, including the components of those that involve estimating carbon in forests and soils. Adequate understanding of statistical sampling methods can enable getting an accurate overview of forests and carbon storage with a realistic, practical amount of data gathering, and prevent later problems of errors and data interpretation – mentioned in 4/10 interviews;
- The need for capacity to map and model fuels and fire risk and vulnerability in forests – mentioned in 3/10 interviews;
- The need to find practical ways to bring benefits to local communities and resource users – mentioned in 2/10 interviews;
- The importance of, and need for capacity in, climate change, not only climate change mitigation, and the links between forests and both adaptation and mitigation – mentioned in 2/10 interviews; and
- The need for improved capacity to use high-resolution imaging tools such as Lidar – mentioned in 2/10 interviews.

The interviews helped to explain why a large majority of respondents (68%) said that the purpose of forest carbon measurement was not only to support a REDD+ financial mechanism, but to support sustainable forest management. Forest carbon measurement in part depends on measuring and mapping forest cover and forest biomass, and both of these kinds of information are also important for managing forest ecosystems sustainably for all other benefits, including their role in hydrological ecosystem services, for the production of timber and wood products, and as habitats for other species. In a certain sense, estimating forest carbon storage can be seen as one aspect of building a more general understanding of forest ecology, and that more general understanding is important for sustainably managing forests for the multiple benefits they provide to societies.

4.0 Conclusions & Recommendations

4.1 Conclusions

Overall, general conclusions based on the results of this evaluation include:

- Workshop instructors were in general satisfied with the workshops, and most eventually came to view the diversity of participants as, in general, a positive factor in their success.

- General carbon measurement workshops serve a diverse group of participants.
- For workshops offered more than once, workshop instructors adapted the content and curriculum from year to year in response to participant's feedback, as well as the needs of new target audiences (such as to focus on forest carbon measurement in protected areas for CONANP staff).
- High levels of satisfaction with workshops were reported by participants in end-of-workshop surveys in all workshops.
- Workshop participants reported high levels of continuing use of information learned in the workshops in their jobs in the online survey. This did not differ between male and female participants, nor among participants from different kinds of institutions.
- All of the kinds of workshops offered were reported to have improved the capacity of participants to do their jobs, and information from all was generally being directly and frequently used in the participants jobs according to the online survey.
- Some participants, depending on their work roles in their institutions, need more advanced and specialized knowledge and training to improve their capacity.
- Government agency staff are significantly more likely than university/research or NGO/other participants to be involved in formulation of government policy, and in public communication and having a public awareness-raising role regarding forests, deforestation, and climate change.

4.2 Recommendations

The following recommendations emerge from the results and conclusions reported above:

- 1) Continue to offer the basic forest carbon measurement workshop for at least a few more years, shifting to different sites within Mexico, or perhaps even offering it in another Latin American country.
- 2) Consider institutionalizing the basic forest carbon measurement course at a Mexican university or research institution, where it could be taught on a regular basis.
- 3) Repeat successful workshops on more advanced topics and continue to develop new, more specialized workshops as needed.
- 4) Continue to try to attract a range of participants with different institutional affiliations and work roles. Continue to recruit generalist participants, as well as specialists, for more general workshops (such as forest carbon measurement). Recruit (to the extent possible) more technically-specialized participants for more advanced, specialized workshops, who will actually apply the specialized knowledge in their jobs (e.g., soil carbon measurement; data analysis; Lidar).
- 5) Try to improve gender balance among workshop participants through moderate "affirmative action" criteria in the selection process, but without unduly shifting the focus from "sustainable forest management" to "women's empowerment/gender mainstreaming through forest-related activities."

6) Broaden the thematic range of workshops to include forest hydrology and watershed management (or even more broadly, ecosystem-based forest management in general).

7) Continue to build capacity across a range of methodologies for forest carbon measurement, modelling, and monitoring. Emphasize applications and practical problem solving at a range of scales, from the local project level to national inventories and MRV for REDD+.

8) Increase emphasis on sharing and comparing experience among regions within a country such as Mexico, and among countries.

9) Increase emphasis on creating an ongoing professional support network among workshop participants that will continue after the workshop

10) Develop a mechanism for individualized, site- or problem-specific technical advice (such as from individuals or small teams of technical advisors) to follow-up

with selected workshop participants, visit selected participants at their field sites, and offer tailored advice and support. The high diversity of suggestions for additional workshop topics and for shifts of emphasis within the workshops offered seems to suggest a need, or desire on the part of workshop participants, for more individualized learning and problem solving related to their specific job needs. A coaching or mentoring system might address some of this need. “On call” technical assistance might also. A stronger professional network of carbon-measurement practitioners would probably also help to meet this need for specific, problem-oriented technical advice.

11) Review the Theory of Change for the PSLM Program, and re-develop a Results Framework that can more clearly explain its overall causal logic. The carbon-measurement aspects of training and capacity-building should be fitted into the larger Results Framework for the program, which would include issues of forests and water, fire, forest products, and forest-based climate change adaptation, in addition to climate change mitigation through forest carbon sequestration. This would assist in presenting a more comprehensive and unified Theory of Change narrative for the PSLM Program. The PMP for the PSLM Program should have indicators that can more clearly monitor progress toward the higher-level objectives of the program, and thereby improve the ability of the program to explain its logic to partners such as USAID, as well as improving the effectiveness and impact of program investments.



Fieldwork in Forest Carbon Measurement Workshop, Hidalgo, Mexico (Photo credit: USFS-IP)

Annexes

Annex A – Statement of Work

Sustainable Development Short-term Consultant Workshop Evaluation and Communication Specialist

The US Forest Service International Programs (USFS/IP) requests METI secure the services of qualified consultants to serve as a Workshop Evaluation and Communication Specialist. The consultants will conduct an evaluation of the USFS/IP climate change workshops in Latin America, specifically South America and Mexico, and will write up the successful lessons learned and provide recommendations.

Background: For the past three years, the USFS/IP has been working with USAID on programs of capacity building related to mitigation of climate change. These programs have focused on training individuals of the different aspects of mitigation of climate change, specifically on the methods for measuring carbon. The trainings include learning about field, statistical and remote sensing methodologies and tools.

Location of Work: The position will be at the consultant's home of residence or at the USFS/IP offices.

Objective: To assess the success and impact of this capacity building effort over the past three years. This will include interviewing past workshop participants and gathering data about workshops that have been repeated over Latin America.

Requirements: The consultant should have the following skills:

- Professional written and spoken proficiency in Spanish;
- Experience conducting evaluations of international development programs;
- Experience and understanding of natural resources management;
- Proven ability to work well with multi-level stakeholders; strong interpersonal skills; and ability to work in a multi-cultural environment;
- Demonstrated capacity building experience; and,
- Strong writing, organizational, and communication skills.

Duties: Conduct and evaluation of carbon measurement workshops in Latin America.

- Develop an evaluation plan and carry out interviews;
- Review existing evaluations;
- Synthesize information that was collected and present it to USFS/IP staff;
- Right a report of main points, lessons learned and recommendations; and,
- Prepare communication materials about workshops.

Oversight and Reporting: The consultant will report directly to the USFS/IP Mexico Program Manager, who will provide guidance.

Communication: The consultant will keep the USFS/IP Mexico Program Manager abreast of his/her activities.

Cell Phone: The consultant may use his/her own cell phone and bill METI for minutes spent on USFS related business.

Period of performance: September 22, 2014 through July 31, 2015. The services may need to be extended through August 31, 2015. Extension will be solely at the government's discretion. This order covers expenses only for the initial period of performance.

Anticipated travel and work requirements: It is estimated these activities will require one senior level consultant for 40 days. Miscellaneous expenses such as local transportation, visas and communication via cell phone and internet on USFS related business will be reimbursed.

Salary: Salary will be commensurate with experience

Please send expressions of interest to: Alexandra Zamecnik; phone (202) 644-4559; alexandrazamecnik@fs.fed.us

Annex B: Workshops Evaluated

| Workshop | Date | Venue | Number of Participants |
|--|---------------------------------|---|------------------------|
| Forest Carbon Measurement/Medición de Carbono Forestal | September 13-17, 2010 | Silas Little Experimental Forest, New Jersey, USA | 13 |
| Forest Carbon Measurement/Medición de Carbono Forestal | September 12-16, 2011 | Manitou Experimental Forest, Colorado, USA | 12 |
| Forest Carbon Measurement/Medición de Carbono Forestal | July 30 to August 03, 2012 | Pachuca, Hidalgo, Mex. | 23 |
| Forest Carbon Measurement/Medición de Carbono Forestal | January 26 to February 01, 2014 | Chiapas, Mex. | 25 |
| Forest Carbon Measurement/Medición de Carbono Forestal | August 03-08, 2014 | Ensenada, Baja California, Mex. | 17 |
| Soil Carbon Workshop/Visita Técnica de Suelos | July 28 to August 02, 2013 | Pellston, Michigan. EEUU | 5 |
| Soil Carbon Workshop/Visita Técnica de Suelos | July 20-30, 2014 | Pellston, Michigan. EEUU | 18 |
| Data Interpretation & Linear Regression/Interpretación de Datos y Regresión Lineal | May 19-23, 2014 | Aguascalientes, Ags. Mex. | 16 |
| Landsat Time-series Analysis | August 25-29, 2014 | Mérida, Yuc. Mex. | 5 |

Annex C – Documents and Other Background Information Sources Reviewed

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Annex D: Workshop Instructors Interviewed and Interview Questions

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Interviewed 20 January 2015

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Interviewed 12 January, 2015

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Interviewed 13 January 2015

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Workshops: Forest Carbon Measurement 2010, 2011, 2012, 2014 Chiapas; Soil Carbon Measurement (planning)
Interviewed 30 January 2015

Phone Interview Questions for Instructors

Background/Preface:

This is a participatory, internal, “friendly” evaluation, whose main purpose is to find out how the program of workshops and courses could be adjusted or improved for greater impact on host country capacity, and also to identify a few of the main “success stories,” so that these can be communicated to USAID/Mexico, USAID/Washington, and Mexican and SilvaCarbon partners.

Questions:

- 1) Confirm which workshops and years the instructor worked with:
- 2) How did your involvement come about? (Initial invitation from USFS-IP, push from your side, etc.)? What was your role in the workshop? (e.g., organizer, lead instructor, assistant instructor)
- 3) Have you been satisfied, in general, with the way the courses were organized and managed?
- 4) What about the participants? Were they the “right” group, the right level? Do you think the selection process for participants could be improved?
- 5) What do you think is/has been the main or most important result or impact of the course(s) you helped to teach?
- 6) More specifically, related to some of the results desired by the USFS-IP Mexico Sustainable Landscapes Program:
 - a) Are students from the courses you taught now helping to gather the information about carbon cycling in forest ecosystems of different types found in Mexico and/or elsewhere in Latin America, and incorporate that into models to estimate the effects of different forest management scenarios on carbon sequestration and emissions?
 - b) Are students from the courses you taught now managing and/or staffing the pilot intensive monitoring sites (w/ carbon towers) in Mexico and/or elsewhere in Latin America?
 - c) Are students from the courses you taught applying any of the tools, methods, technologies in their jobs to build a Mexican MRV system, or in forest inventory, or any other aspects of research and monitoring that underlie a system of forest management in Mexico and/or elsewhere in Latin America?
 - d) Are students from the courses you taught conducting the applied research and collecting the data on forest ecology and functioning that is needed for making science-based decisions about forest management in Mexico and/or elsewhere in Latin America?
- 7) In your opinion, which Mexican (or other Latin American) institutions or agencies are most important to “target” with capacity-building through courses right now?

8) Have you developed and maintained professional relationships with any of the former course participants, and are you now, for example, supporting them with further technical advice? For example...?

9) What would YOU like to know about the results or impact of your workshop(s) that we might ask workshop participants about in this evaluation?

10) Are these four courses the right courses now, or is there a need for a shift, to develop courses at a different level, on new topics, etc? For example, given the slow international process of developing an international system of financing for REDD+ activities...?

Annex E: Workshop Participants

| WORKSHOP | YEAR | VENUE | NAME | e-mail | INSTITUTION | TYPE | COUNTRY | Pilot Survey |
|---|----------------------------|---|-------------------------------------|-----------------------------------|--|-----------------|----------|--------------|
| Intensive Landscape-scale Measurements of Forest Carbon for Reference Sites in the Americas | 2010 | Silas Little Experimental Forest in New Jersey, USA. | Carmen Meneses Tovar | cmeneses@conafor.gob.mx | CONAFOR | Government | México | |
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| Forest Carbon Measurement | 2011 | Manitou Experimental Forest in Colorado, USA | Carlos Edgar Zermeño Benítez | carloszermenobenitez@gmail.com | CONAFOR | Government | México | |
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| WORKSHOP | YEAR | VENUE | NAME | e-mail | INSTITUTION | TYPE | COUNTRY | Pilot Survey |
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| Intercambio de Experiencias Internacionales sobre Protocolos de Monitoreo, Reporte y Verificación (MRV) de Carbono Forestal | 2012 | Atopixco, Hidalgo, Mex | Israel Amezcua Torrijos | Israel_at@hotmail.com | PRONATUR A | NGO | México | |
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| WORKSHOP | YEAR | VENUE | NAME | e-mail | INSTITUTION | TYPE | COUNTRY | Pilot Survey | | | |
|--|----------------------------|--|---|------------------------------------|-------------------------------|-------------------------------|-----------------------|--------------|------------|--------|--|
| Metodologías para la Estimación de Carbono en Áreas Naturales Protegidas | 2014 | Palenque; Marques de Comillas, Chiapas, México | Adalberto Vargas | tvargasg@yahoo.com | AMBIO | NGO | México | | | | |
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| Study Tour: Measuring belowground carbon pools and fluxes | 2014 | Pellston, Michigan, USA | Carlos Alfredo Robles Zazueta | carlosarb12@gmail.com | ITSON-Mex | Research Center | México | |
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| Interpretación de Datos y Regresión Lineal | 2014 | Aguascalientes Ags. México | Masuly Guadalupe Vega Puga | mazuly_88@hotmail.com | ITSON | Academy | México | |
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| Training for Landsat Time-series Analysis – Vegetation Change Tracker (VCT) | 2014 | Mérida, Yucatán, México | José Luis Hernández Stefanoni | jl_stefanoni@cicy.mx | CICY | Research Center | México | |
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Annex F: Online Survey

BIENVENIDO A UNA ENCUESTA SOBRE TALLERES DEL USFS-IP

La oficina de programas internacionales del Servicio Forestal de los Estados Unidos está llevando a cabo una evaluación interna de los talleres de capacitación sobre medición de carbono forestal y otros temas relacionados que se han impartido desde el 2010. El objetivo es determinar la eficacia y el impacto de estos talleres en el fortalecimiento de la capacidad técnica individual así como institucional para la medición de carbono forestal en México y otros países de América Latina. Como un ex participante en uno de estos talleres, estamos solicitando su ayuda en esta evaluación. Por favor complete la siguiente breve encuesta en línea de 29 preguntas, que debe tomar no más de 10-15 minutos de su tiempo. La información de la identidad de los participantes de esta encuesta no será pública. Le solicitamos que complete la encuesta realizada antes de 6 de marzo de 2015. Los resultados de la evaluación permitirá el USFS continuar y mejorar estos talleres de capacitación. ¡Muchísimas gracias!

Next

Antecedentes

1. Nombre:

2. País:

3. Mi trabajo es con un/una:

- 1 = agencia del gobierno
- 2 = ONG
- 3 = universidad o institución de investigación
- 4 = proyecto financiado por donantes
- 5 = otra tipo de institución

4. Institución actual:

5. Trabajo actual:

6. Genero:

- M
 F

7. Marque el/los taller(es) que ha atendido:

- 2010, Medición de Carbono Forestal, New Jersey, USA
 2011, Medición de Carbono Forestal, Colorado, USA
 2012, Medición de Carbono Forestal, Hidalgo, México
 2014, Medición de Carbono Forestal, Chiapas, México
 2014, Medición de Carbono Forestal, Baja California, México
 2013, Visita Técnica de Suelos, Michigan, USA
 2014, Visita Técnica de Suelos, Michagan, USA
 2014, Interpretación de Datos y Regresión Lineal, Aguascalientes, México
 2014, Landsat Time-series Analysis, Yucatán, México

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Preguntas de la encuesta

8. Estoy aplicando directamente lo que aprendí en el/los taller/es en mi trabajo actual.

- 0 = no
 1 = muy poco
 2 = moderadamente
 3 = bastante
 4 = todo el tiempo

9. Mi trabajo actual consiste en medir el carbono en los bosques.

- 0 = no
 1 = muy poco
 2 = moderadamente
 3 = bastante
 4 = todo el tiempo

10. Mi trabajo actual exige un conocimiento de cómo se mide carbono en los bosques, aunque yo no lo haga directamente.

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

11. Mi trabajo actual consiste en capacitar a otros sobre metodologías de medición de carbono en los bosques.

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

12. Actualmente estoy realizando investigaciones aplicadas sobre ecología forestal.

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

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Preguntas de la encuesta

13. Mi trabajo consiste en actualizar a los tomadores de decisiones del sector forestal sobre las prácticas de manejo forestal sostenible.

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

14. Mi trabajo consiste en actualizar a los tomadores de decisiones del sector forestal sobre la deforestación y su efecto en el cambio climático.

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

15. Mi trabajo consiste en la formulación de las políticas del gobierno con respecto a la gestión forestal.

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

16. Mi trabajo consiste en sensibilizar al público acerca de la importancia de los bosques, la deforestación y el cambio climático.

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

17. Mi trabajo contribuye al desarrollo y aplicación de pruebas piloto del sistema de monitoreo, reporte y verificación de (MRV) en mi país.

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

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Preguntas de la encuesta

18. Mi trabajo ayuda a proporcionar información ecológica sobre el ciclo de carbono en los ecosistemas forestales de mi país.

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

19. Mi trabajo contribuye al conocimiento científico sobre la ecología forestal en mi país.

- 0 = no
- 1 = muy poco
- 1 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

20. El/los taller/es ha mejorado mi capacidad para desarrollar mi trabajo:

- 0 = no
- 1 = muy poco
- 2 = un tanto
- 3 = bastante
- 4 = mucho

21. He aplicado parte de lo aprendido del/de los taller/es:

- 0 = nunca
- 1 = una vez al año
- 2 = una vez al mes
- 3 = una vez por semana
- 4 = cada día

22. He mantenido los contactos con otros profesionales de mi país obtenidos en el/los taller/es:

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

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Preguntas de la encuesta

23. He mantenido los contactos internacionales con otros profesionales latinoamericanos obtenidos en el/los taller/es:

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

24. He mantenido contactos con uno o más de los instructores del/de los taller/es:

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

25. Tomadores de decisiones del sector forestal del gobierno necesitan conocer cómo puede medirse el almacenamiento de carbono en los bosques.

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

26. La implementación de un sistema de medición/estimación de carbono forestal en mi país es principalmente para:

- 1 = contribuir a un sistema internacional de apoyo financiero para REDD +
- 2 = apoyar la gestión forestal sostenible, independientemente de si se implementa un sistema internacional para REDD +.
- otro propósito:

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Preguntas de la encuesta

27. Desde el/los taller/es me han sido de utilidad el libro de texto y/o materiales imprimidas utilizado en el taller y/o las presentaciones mantenidas en el sitio web del taller:

- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

28. Qué desafíos ha enfrentado en la aplicación de lo que aprendió en el taller en su trabajo actual

- 1 = falta de apoyo institucional
- 2 = falta de tiempo debido a mis otras responsabilidades
- 3 = falta de fondos para este aspecto del trabajo
- 4 = falta de socios de otras organizaciones e instituciones
- 5 = otro propósito:

29. Por favor proporciónenos sus sugerencias sobre otros temas de taller que serían útiles para usted y/o cualquier otras comentarios y sugerencias:

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Done

Annex G: Online Survey Results

Copy of USFS-IP Forest Carbon Measurement Workshops Evaluation Question 1

| Nombre: | |
|--------------------------|----------------|
| Answer Options | Response Count |
| | 77 |
| <i>answered question</i> | 77 |
| <i>skipped question</i> | 3 |

Question 2

| Pais: | |
|--------------------------|----------------|
| Answer Options | Response Count |
| | 77 |
| <i>answered question</i> | 77 |
| <i>skipped question</i> | 2 |

Question 3

| Mi trabajo es con un/una: | | |
|--|------------------|----------------|
| Answer Options | Response Percent | Response Count |
| 1 = agencia del gobierno | 48.7% | 38 |
| 2 = ONG | 10.2% | 8 |
| 3 = universidad o institución de investigación | 33.3% | 26 |
| 4 = proyecto financiado por donantes | 2.6% | 2 |
| 5 = otra tipo de institución | 5.1% | 4 |
| <i>answered question</i> | | 78 |
| <i>skipped question</i> | | 2 |



Question 4

Institución actual:

| Answer Options | Response Count |
|--------------------------|----------------|
| | 76 |
| <i>answered question</i> | 76 |
| <i>skipped question</i> | 4 |

Question 5

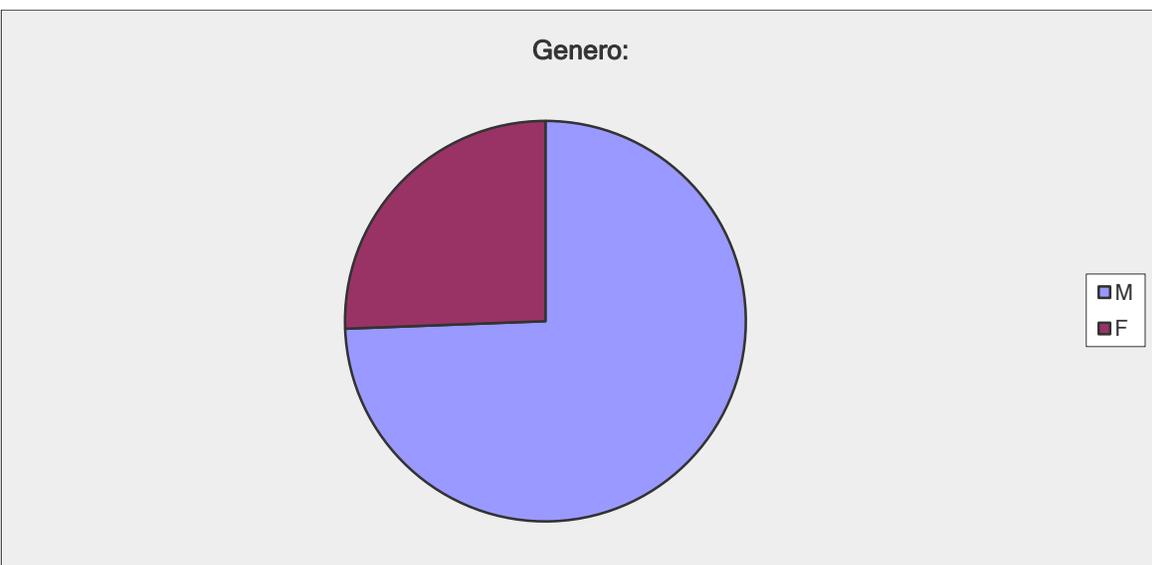
Trabajo actual:

| Answer Options | Response Count |
|--------------------------|----------------|
| | 74 |
| <i>answered question</i> | 74 |
| <i>skipped question</i> | 6 |

Question 6

Género:

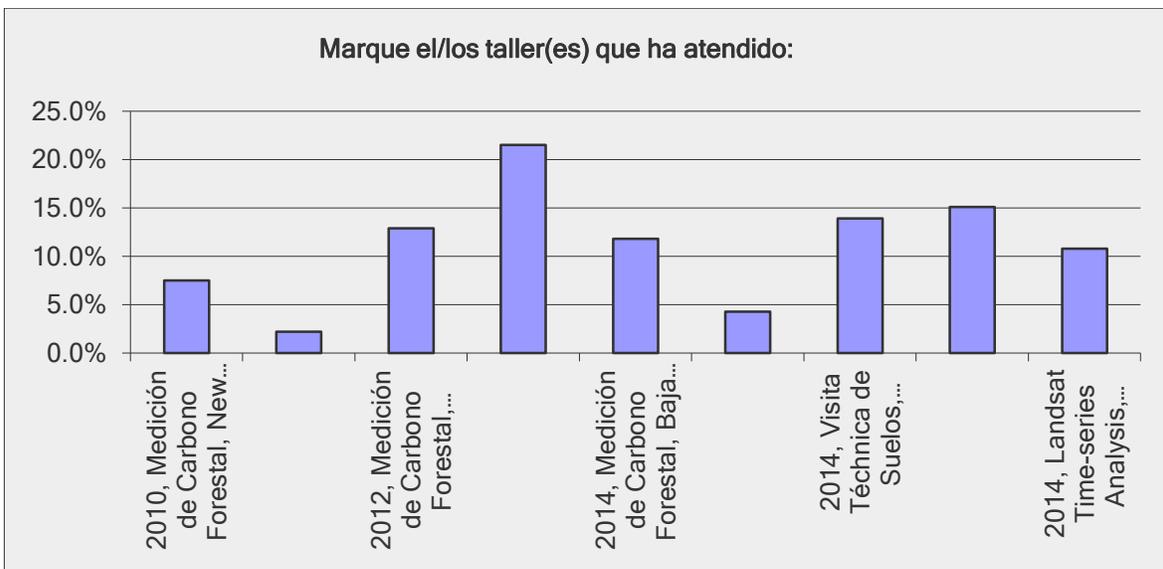
| Answer Options | Response Percent | Response Count |
|----------------|--------------------------|----------------|
| M | 74.4% | 58 |
| F | 25.6% | 20 |
| | <i>answered question</i> | 78 |
| | <i>skipped question</i> | 2 |



Question 7

Marque el/los taller(es) que ha atendido:

| Answer Options | Response Percent | Response Count |
|--|------------------|----------------|
| 2010, Medición de Carbono Forestal, New Jersey, USA | 7.5% | 7 |
| 2011, Medición de Carbono Forestal, Colorado, USA | 2.2% | 2 |
| 2012, Medición de Carbono Forestal, Hidalgo, México | 12.9% | 12 |
| 2014, Medición de Carbono Forestal, Chiapas, México | 21.5% | 20 |
| 2014, Medición de Carbono Forestal, Baja California, México | 11.8% | 11 |
| 2013, Visita Técnica de Suelos, Michigan, USA | 4.3% | 4 |
| 2014, Visita Técnica de Suelos, Michigan, USA | 13.9% | 13 |
| 2014, Interpretación de Datos y Regresión Lineal, Aguascalientes, México | 15.1% | 14 |
| 2014, Landsat Time-series Analysis, Yucatán, México | 10.8% | 10 |
| answered question | | 93 |
| skipped question | | 7 |



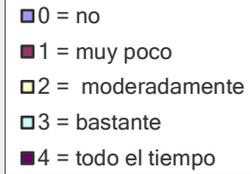
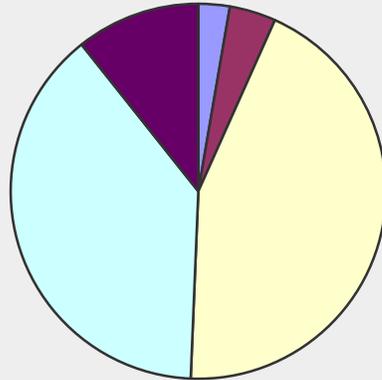
Question 8

Estoy aplicando directamente lo que aprendí en el/los taller/es en mi trabajo actual.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 2.7% | 2 |
| 1 = muy poco | 4.0% | 3 |
| 2 = moderadamente | 44.0% | 33 |
| 3 = bastante | 38.7% | 29 |
| 4 = todo el tiempo | 10.7% | 8 |
| answered question | | 75 |
| skipped question | | 5 |

Question 8

Estoy aplicando directamente lo que aprendí en el/los taller/es en mi trabajo actual.

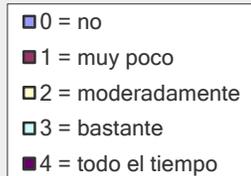
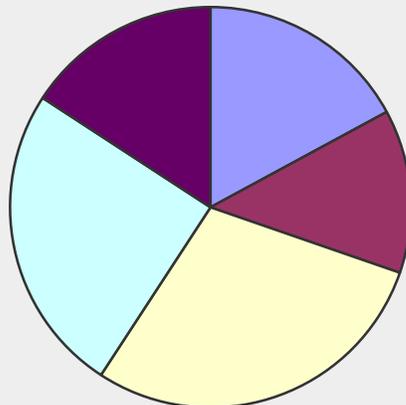


Question 9

Mi trabajo actual consiste en medir el carbono en los bosques.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 17.1% | 13 |
| 1 = muy poco | 13.2% | 10 |
| 2 = moderadamente | 28.9% | 22 |
| 3 = bastante | 25.0% | 19 |
| 4 = todo el tiempo | 15.8% | 12 |
| answered question | | 76 |
| skipped question | | 4 |

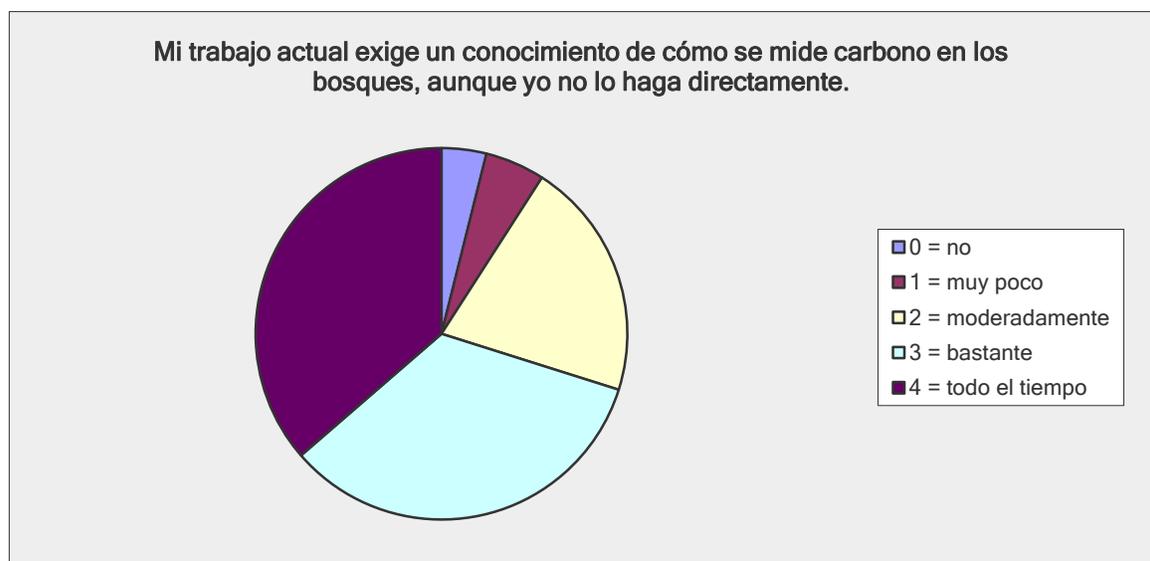
Mi trabajo actual consiste en medir el carbono en los bosques.



Question 10

Mi trabajo actual exige un conocimiento de cómo se mide carbono en los bosques, aunque yo no lo haga directamente.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 3.9% | 3 |
| 1 = muy poco | 5.2% | 4 |
| 2 = moderadamente | 20.8% | 16 |
| 3 = bastante | 33.8% | 26 |
| 4 = todo el tiempo | 36.4% | 28 |
| answered question | | 77 |
| skipped question | | 3 |



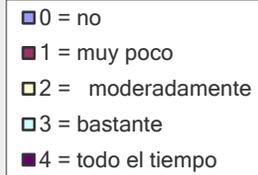
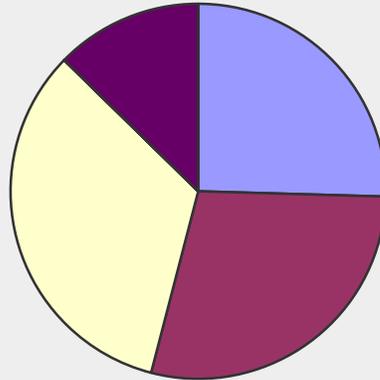
Question 11

Mi trabajo actual consiste en capacitar a otros sobre metodologías de medición de carbono en los bosques.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 21.1% | 16 |
| 1 = muy poco | 23.7% | 18 |
| 2 = moderadamente | 27.6% | 21 |
| 3 = bastante | 17.1% | 13 |
| 4 = todo el tiempo | 10.5% | 8 |
| answered question | | 76 |
| skipped question | | 5 |

Question 11

Mi trabajo actual consiste en capacitar a otros sobre metodologías de medición de carbono en los bosques.

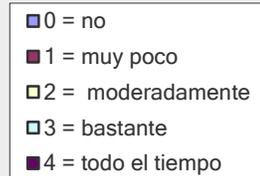
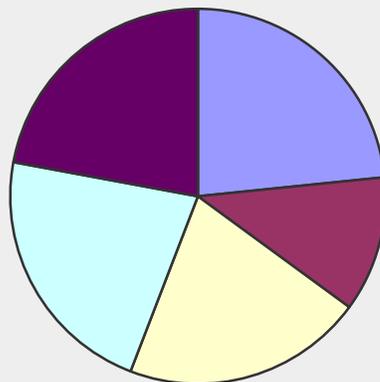


Question 12

Actualmente estoy realizando investigaciones aplicadas sobre ecología forestal.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 23.4% | 18 |
| 1 = muy poco | 11.7% | 9 |
| 2 = moderadamente | 20.8% | 16 |
| 3 = bastante | 22.1% | 17 |
| 4 = todo el tiempo | 22.1% | 17 |
| answered question | | 77 |
| skipped question | | 3 |

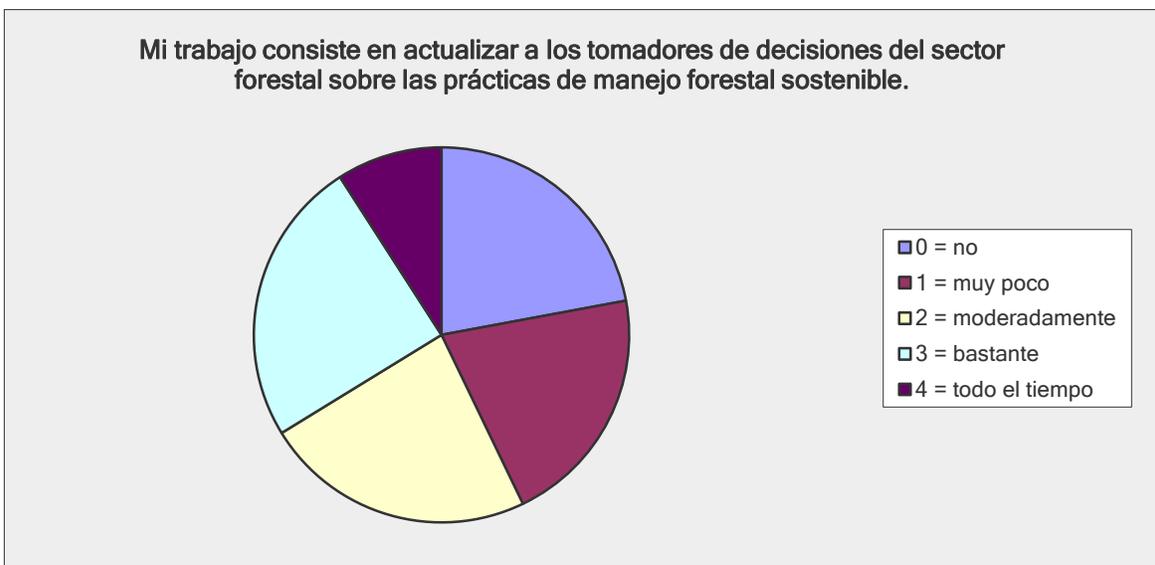
Actualmente estoy realizando investigaciones aplicadas sobre ecología forestal.



Question 13

Mi trabajo consiste en actualizar a los tomadores de decisiones del sector forestal sobre las prácticas de manejo forestal sostenible.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 22.1% | 17 |
| 1 = muy poco | 20.8% | 16 |
| 2 = moderadamente | 23.4% | 18 |
| 3 = bastante | 24.7% | 19 |
| 4 = todo el tiempo | 9.1% | 7 |
| answered question | | 77 |
| skipped question | | 3 |



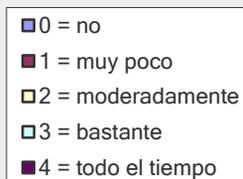
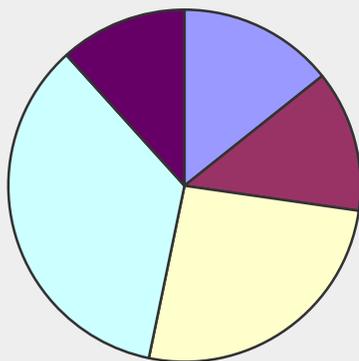
Question 14

Mi trabajo consiste en actualizar a los tomadores de decisiones del sector forestal sobre la deforestación y su efecto en el cambio climático.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 14.3% | 11 |
| 1 = muy poco | 13.0% | 10 |
| 2 = moderadamente | 26.0% | 20 |
| 3 = bastante | 35.1% | 27 |
| 4 = todo el tiempo | 11.7% | 9 |
| answered question | | 77 |
| skipped question | | 3 |

Question 14

Mi trabajo consiste en actualizar a los tomadores de decisiones del sector forestal sobre la deforestación y su efecto en el cambio climático.

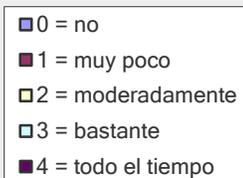
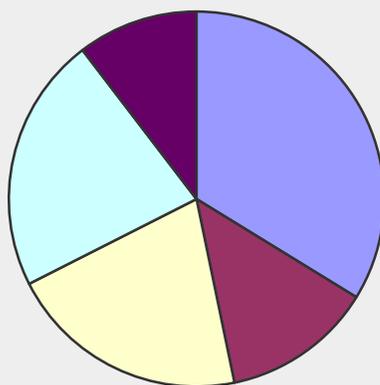


Question 15

Mi trabajo consiste en la formulación de las políticas del gobierno con respecto a la gestión forestal.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 33.8% | 26 |
| 1 = muy poco | 13.0% | 10 |
| 2 = moderadamente | 20.8% | 16 |
| 3 = bastante | 22.1% | 17 |
| 4 = todo el tiempo | 10.4% | 8 |
| answered question | | 77 |
| skipped question | | 3 |

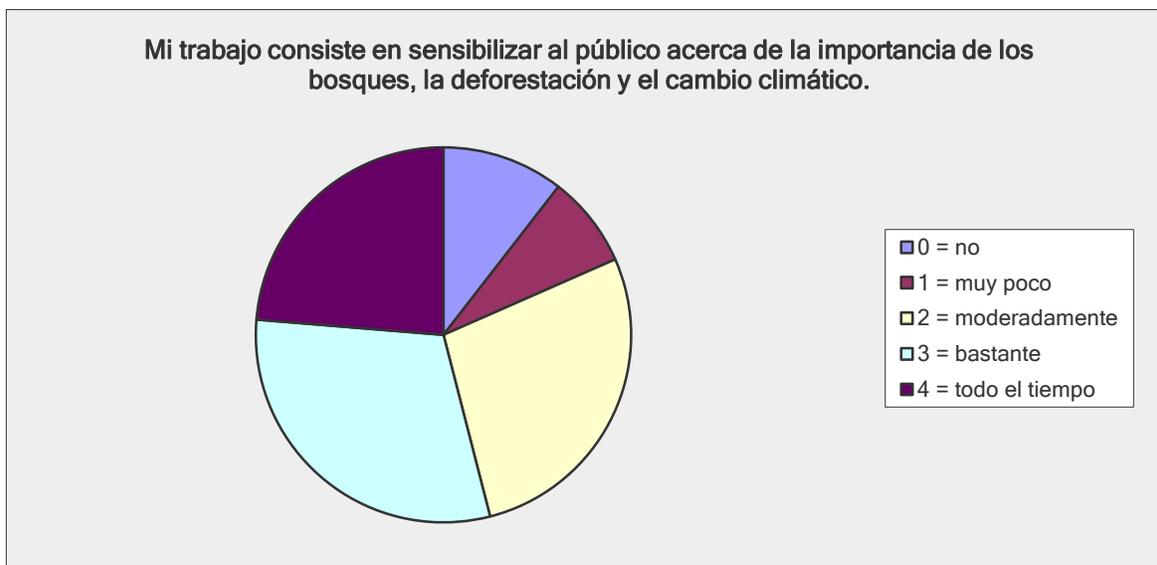
Mi trabajo consiste en la formulación de las políticas del gobierno con respecto a la gestión forestal.



Question 16

Mi trabajo consiste en sensibilizar al público acerca de la importancia de los bosques, la deforestación y el cambio climático.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 10.5% | 8 |
| 1 = muy poco | 7.9% | 6 |
| 2 = moderadamente | 27.6% | 21 |
| 3 = bastante | 30.3% | 23 |
| 4 = todo el tiempo | 23.7% | 18 |
| answered question | | 76 |
| skipped question | | 4 |



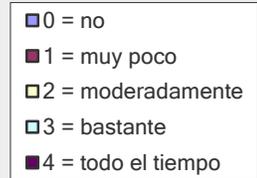
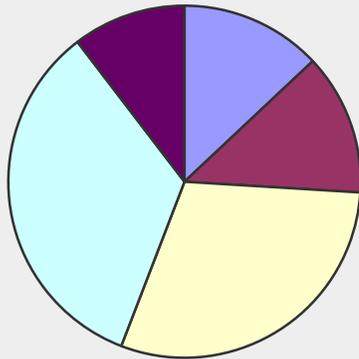
Question 17

Mi trabajo contribuye al desarrollo y aplicación de pruebas piloto del sistema de monitoreo, reporte y verificación de (MRV) en mi país.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 13.0% | 10 |
| 1 = muy poco | 13.0% | 10 |
| 2 = moderadamente | 29.9% | 23 |
| 3 = bastante | 33.8% | 26 |
| 4 = todo el tiempo | 10.4% | 8 |
| answered question | | 77 |
| skipped question | | 3 |

Question 17

Mi trabajo contribuye al desarrollo y aplicación de pruebas piloto del sistema de monitoreo, reporte y verificación de (MRV) en mi país.

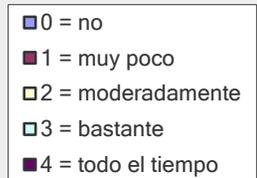
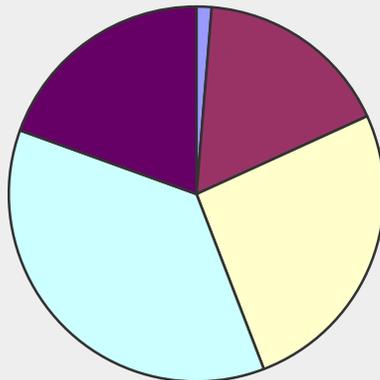


Question 18

Mi trabajo ayuda a proporcionar información ecológica sobre el ciclo de carbono en los ecosistemas forestales de mi país.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 1.3% | 1 |
| 1 = muy poco | 16.9% | 13 |
| 2 = moderadamente | 26.0% | 20 |
| 3 = bastante | 36.4% | 28 |
| 4 = todo el tiempo | 19.5% | 15 |
| answered question | | 77 |
| skipped question | | 3 |

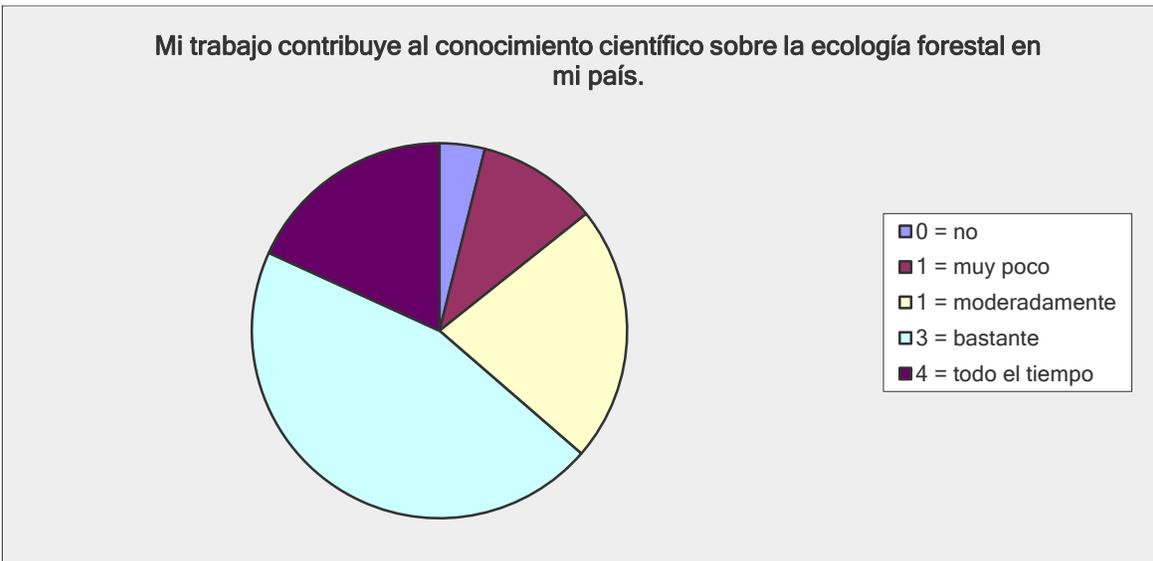
Mi trabajo ayuda a proporcionar información ecológica sobre el ciclo de carbono en los ecosistemas forestales de mi país.



Question 19

Mi trabajo contribuye al conocimiento científico sobre la ecología forestal en mi país.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 3.9% | 3 |
| 1 = muy poco | 10.4% | 8 |
| 1 = moderadamente | 22.1% | 17 |
| 3 = bastante | 45.5% | 35 |
| 4 = todo el tiempo | 18.2% | 14 |
| answered question | | 77 |
| skipped question | | 3 |



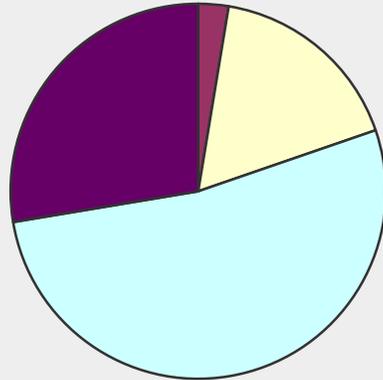
Question 20

El/los taller/es ha mejorado mi capacidad para desarrollar mi trabajo:

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 0.0% | 0 |
| 1 = muy poco | 2.6% | 2 |
| 2 = un tanto | 17.1% | 13 |
| 3 = bastante | 52.6% | 40 |
| 4 = mucho | 27.6% | 21 |
| answered question | | 76 |
| skipped question | | 4 |

Question 20

El/los taller/es ha mejorado mi capacidad para desarrollar mi trabajo:

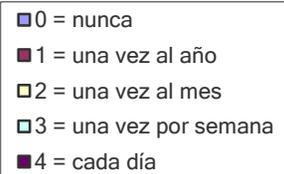
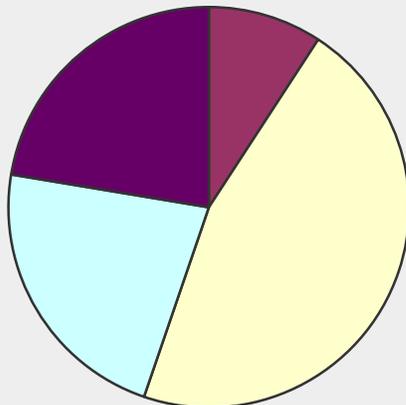


Question 21

He aplicado parte de lo aprendido del/de los taller/es:

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = nunca | 0.0% | 0 |
| 1 = una vez al año | 9.2% | 7 |
| 2 = una vez al mes | 46.1% | 35 |
| 3 = una vez por semana | 22.4% | 17 |
| 4 = cada día | 22.4% | 17 |
| answered question | | 76 |
| skipped question | | 4 |

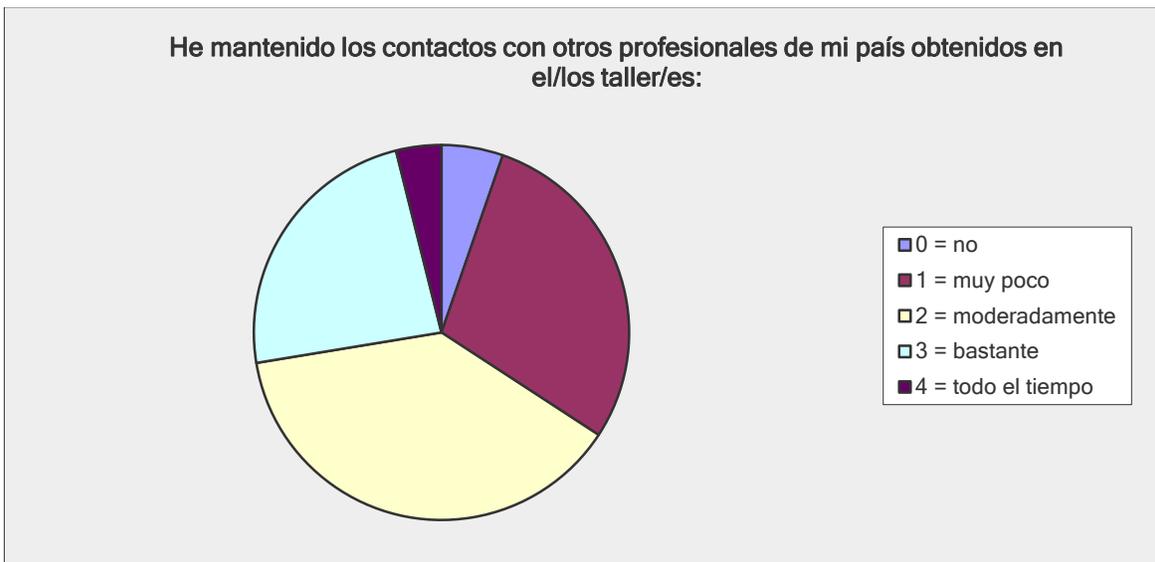
He aplicado parte de lo aprendido del/de los taller/es:



Question 22

He mantenido los contactos con otros profesionales de mi país obtenidos en el/los taller/es:

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 5.3% | 4 |
| 1 = muy poco | 28.9% | 22 |
| 2 = moderadamente | 38.2% | 29 |
| 3 = bastante | 23.7% | 18 |
| 4 = todo el tiempo | 3.9% | 3 |
| answered question | | 76 |
| skipped question | | 4 |



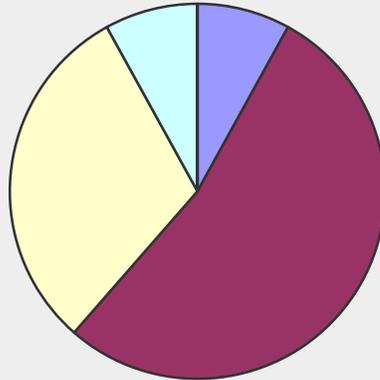
Question 23

He mantenido los contactos internacionales con otros profesionales latinoamericanos obtenidos en el/los taller/es:

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 7.9% | 6 |
| 1 = muy poco | 52.6% | 40 |
| 2 = moderadamente | 30.1% | 23 |
| 3 = bastante | 7.9% | 6 |
| 4 = todo el tiempo | 0.0% | 0 |
| answered question | | 76 |
| skipped question | | 4 |

Question 23

He mantenido los contactos internacionales con otros profesionales latinoamericanos obtenidos en el/los taller/es:

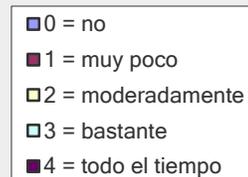
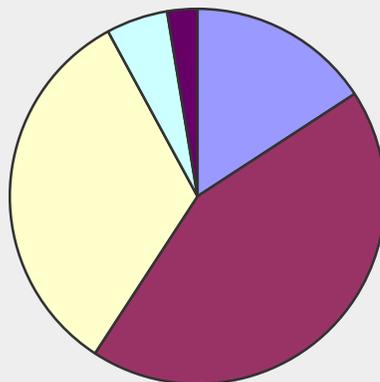


Question 24

He mantenido contactos con uno o más de los instructores del/de los taller/es:

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 15.8% | 12 |
| 1 = muy poco | 43.4% | 33 |
| 2 = moderadamente | 32.9% | 25 |
| 3 = bastante | 5.3% | 4 |
| 4 = todo el tiempo | 2.6% | 2 |
| answered question | | 76 |
| skipped question | | 4 |

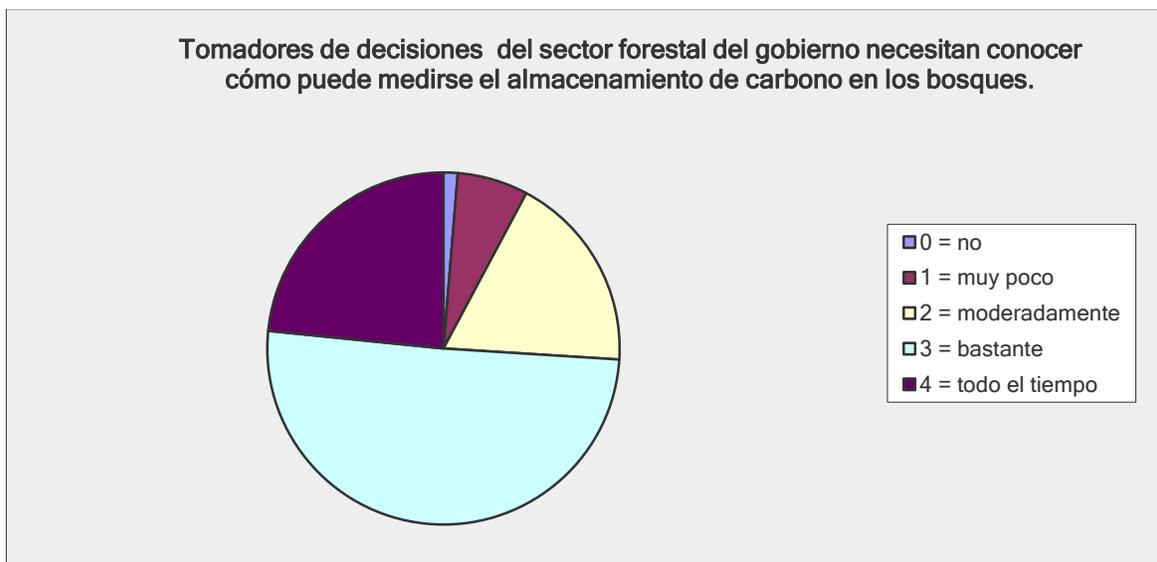
He mantenido contactos con uno o más de los instructores del/de los taller/es:



Question 25

Tomadores de decisiones del sector forestal del gobierno necesitan conocer cómo puede medirse el almacenamiento de carbono en los bosques.

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 1.3% | 1 |
| 1 = muy poco | 6.5% | 5 |
| 2 = moderadamente | 18.2% | 14 |
| 3 = bastante | 50.6% | 39 |
| 4 = todo el tiempo | 23.4% | 18 |
| answered question | | 77 |
| skipped question | | 3 |



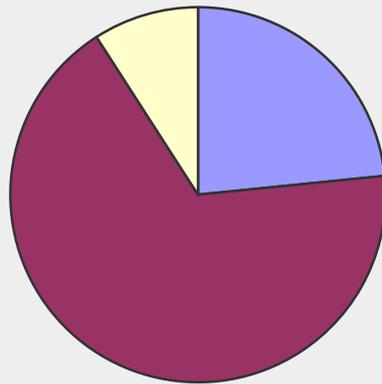
Question 26

La implementación de un sistema de medición/estimación de carbono forestal en mi país es principalmente para:

| Answer Options | Response Percent | Response Count |
|---|------------------|----------------|
| 1 = contribuir a un sistema internacional de apoyo financiero para REDD + | 23.4% | 18 |
| 2 = apoyar la gestión forestal sostenible, independientemente de si se implementa un sistema internacional para REDD +. | 67.5% | 52 |
| otro propósito: | 9.1% | 7 |
| answered question | | 77 |
| skipped question | | 3 |

Question 26

La implementación de un sistema de medición/estimación de carbono forestal en mi país es principalmente para:



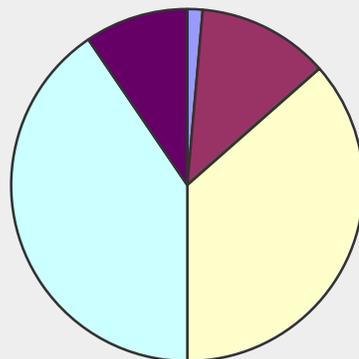
- 1 = contribuir a un sistema internacional de apoyo financiero para REDD +
- 2 = apoyar la gestión forestal sostenible, independientemente de si se implementa un sistema internacional para REDD +.
- Otro propósito:

Question 27

Desde el/los taller/es me han sido de utilidad el libro de texto y/o materiales imprimidas utilizado en el taller y/o las presentaciones mantenidas en el sitio web del taller:

| Answer Options | Response Percent | Response Count |
|--------------------------|------------------|----------------|
| 0 = no | 1.4% | 1 |
| 1 = muy poco | 12.1% | 9 |
| 2 = moderadamente | 36.5% | 27 |
| 3 = bastante | 40.5% | 30 |
| 4 = todo el tiempo | 9.5% | 7 |
| answered question | | 74 |
| skipped question | | 6 |

Desde el/los taller/es me han sido de utilidad el libro de texto y/o materiales imprimidas utilizado en el taller y/o las presentaciones mantenidas en el sitio web del taller:

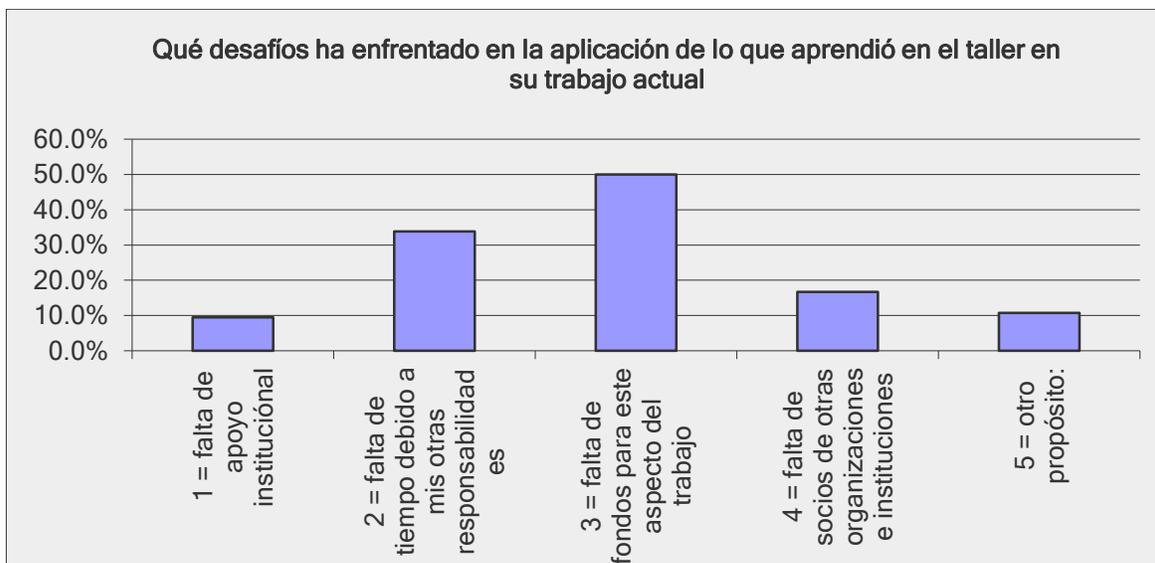


- 0 = no
- 1 = muy poco
- 2 = moderadamente
- 3 = bastante
- 4 = todo el tiempo

Question 28

Qué desafíos ha enfrentado en la aplicación de lo que aprendió en el taller en su trabajo actual

| Answer Options | Response Percent | Response Count |
|---|------------------|----------------|
| 1 = falta de apoyo institucional | 9.5% | 7 |
| 2 = falta de tiempo debido a mis otras responsabilidades | 33.8% | 25 |
| 3 = falta de fondos para este aspecto del trabajo | 50.0% | 37 |
| 4 = falta de socios de otras organizaciones e instituciones | 16.7% | 14 |
| 5 = otro propósito: | 10.8% | 8 |
| answered question | | 74 |
| skipped question | | 6 |



Question 29

Por favor proporciónenos sus sugerencias sobre otros temas de taller que serían útiles para usted y/o cualquier otras comentarios y sugerencias:

| Answer Options | Response Count |
|--------------------------|----------------|
| | 50 |
| answered question | 50 |
| skipped question | 30 |

Annex H: Online Survey Participant's Suggestions

Workshop participants' suggestions in response to Question 29: Por favor proporciéndonos sus sugerencias sobre otros temas de taller que serían útiles para usted y/o cualquier otras comentarios y sugerencias: (N = 50)

- 1) Continuar con las capacidades técnicas de personal técnico y tomadores de decisiones.
- 2) Promover puentes con socios u organizaciones internacionales. 3) Crear mecanismos de comunicación con expertos internacionales.
- Un taller para el desarrollo de eq. alométricas, incluyendo: trabajo de campo, trabajo de laboratorio, procesamiento de datos hasta la generación del modelo deseado.
- Dinámica y flujo de carbono en suelos (raíces), así como la integración e interpretación de los almacenes y flujos de carbono forestal para la modelación de estos componentes a diferentes escalas.
- Talleres de biodiversidad forestal y ecología
- Estimación de biomasa forestal a través de LiDAR
- relación gobierno, sector privado y universidades
- La verdad fue una experiencia muy buena participar en un taller. Sobre temas que serían útiles pues básicamente tecnología LIDAR (datos, proceso y aplicación) para zonas forestales.
- Control de calidad de los datos y propagación de incertidumbres
- Me sería útil aprender a clasificar los suelos de acuerdo a sus perfiles y horizontes, ya que tengo una maestría en suelos pero necesito practicar con personas más experimentadas.
- Valorización de otros servicios ecosistémicos
- Cuantificación de degradación forestal
- Valorización de otros servicios ecosistémicos
- Modelación del cambio de uso del suelo
- El taller brindo elementos para la toma de decisiones
- Limpieza de datos de inventarios y sobre el análisis de los datos. Además como hacer más eficiente su diseño.
- Es necesario seguir contando con este tipo de capacitaciones para manernos actualizados y poder enfrentar las situaciones que se presentan dentro de las ANP's.
- Son muy buenos
- Descomposición de hojas, de madera, índice de área foliar, respiración de suelo. (en general sobre flujos de carbono)
- Generación de modelos alométricos y la propagación de los errores
- Más contenidos/discusión sobre integración de los componentes de monitoreo intensivo del carbono.
- Actualmente estamos haciendo pilotos y acciones para determinar indicadores para medir degradación de ecosistemas, o estado de conservación, este tema es importante porque vincula todo el proceso de generación de información de determinado recurso, sería muy útil tener un intercambio de experiencias con otros países.
- Más énfasis en carbono en suelos y manglares
- Ahondar o abordar con mayor detalle la parte calculo-estadística. Modelación de los procesos ecosistemas involucrados en el ciclo del carbono.
- Enfocar algunos temas de más interés en un curso taller que conlleve a la formación de personal más capacitado en el tema específico
- Adaptación al cambio climático y la gestión de riesgos ante desastres
- Me pareció muy bien organizado todo, solo creo que agregaría un poco más de tiempo, ya que son temas muy amplios y un cuanto complejos

- Capacitación sobre los temas de manejo ecosistémico
- Implementar un ciclo completo de talleres
- Process models, belowground process studies-techniques,
- El taller es muy bueno, solo recomiendo que se dieran actualizaciones del mismo.
- Además de las técnicas de medición en campo sobre reservorios de carbono sería importante un curso sobre procesamiento y análisis de los datos.
- Después de la fase de campo es necesario reforzar el trabajo tanto de laboratorio como de los procedimientos para el cálculo de carbono con datos de los países latinoamericanos participantes para redondear lo aprendido
- Cálculo de ecuaciones para estimación de carbono en ecosistemas diferentes a bosques
- Aplicaciones SIG en los sistemas mrv y su respectiva cuantificación de la incertidumbre
- La experiencia en el extranjero es buena, pero ya es necesario que se realicen talleres de suelos en la península de Yucatán.
- Más temas relacionados con el análisis de series de tiempo y cambios en la cobertura de suelo.
- Sería útil que pudieran proporcionar capacitación sobre inventarios forestales con técnicas lidar, ordenación de masas forestales o clasificación de imágenes y detección de cambios, pero que estos talleres no estén solo restringidos al personal que trabaja directamente en los proyectos de mrv o de geomática e inventarios; en la institución existimos otro tipo de personal técnico que a diario nos enfrentamos en la planeación y diseño de nuevas políticas y modelos de intervención territorial en los bosques y selvas, desde un enfoque de buenas prácticas de manejo y conservación de la biodiversidad, y no hemos sido considerados lo suficiente y contamos con las capacidades para generar buenos resultados.
- La cuantificación de otros servicios ecosistémicos, en particular los hidrológicos, es un tema que sería muy útil para complementar el manejo territorial en la Reserva en que trabajo.
- Integración sensores remotos - monitoreo en campo
- Divulgar información acerca de los sitios en los cuales se subirá la información derivada de los talleres, por ejemplo, en un pregunta mencionan sitio web del taller, y en el taller al cual asistí no dieron información de algún sitio en donde se subiría dicho material. Me parece que sería buena idea el divulgar la información de estos talleres a otros sitios, por ejemplo, a universidades, asociaciones civiles, institutos, esto con el fin de enriquecer y fortalecer las capacidades de una mayor cantidad de personas.
- Entiendo el curso al que asistí no es sobre suelos, sin embargo me hubiera gustado: 1) Incluyeran una breve introducción sobre las funciones ecológicas de los suelos. 2) Textura de los suelos, cómo determinarlas en campo y 3) Complementar el curso con un poco más de análisis geográfico y estadístico. Aprovecho para agradecer la oportunidad de participar en uno de sus cursos pues fue muy enriquecedor para mí, tanto profesionalmente como personal.
- Aplicación del conocimiento en estudios de caso
- Los talleres prácticos son herramientas excelentes de transferencia de tecnología
- Experiencia de otros países en MRV, causas y estrategias para reducir deforestación, metodologías para estimar degradación forestal, herramientas para el monitoreo del bosque (gabinete y campo), conocer experiencias que lograron reducir la deforestación con actividades concretas.
- Los cursos deben utilizar información sobre el país en el que se imparta el curso a fin de que los asistentes puedan comprender mejor la información con el conocimiento previo de los sitios donde se procesa la información.
- Estimación de carbono en raíces gruesas; uso y aplicación de modelos de dinámica de carbono a diferentes escalas de tiempo y espacio.
- Los talleres son muy útiles, si no se ha aplicado lo aprendido, puede ser por falta de presupuesto o apoyo institucional.

- Taller sobre el empleo de modelos como CENTURY, manejo de datos de Lidar.
- Creo que son útiles y aportan a mi práctica diaria. Gracias!
- Continúen compartiendo información sobre captura de carbono en América.

Annex I: Guide for Post-Survey Interviews

Guión para las Entrevistas

En primer lugar, gracias por participar en esta evaluación, apreciamos sus opiniones y su tiempo.

1) Sus respuestas en la encuesta fueron positivas, en gran parte, y por eso nosotros queremos entender un poco más sus experiencias usando la información del taller en el trabajo suyo. Usted, en la encuesta, dijo que “el taller ha mejorado la capacidad para desarrollar su trabajo mucho...” Puede darme un ejemplo, o ejemplos, que mostrar eso?

2) Dijo también que su trabajo consiste en: [Las preguntas se ajustará dependiendo a los papeles registrados por cada uno de los 10 participantes.] Nos interesan ejemplos y detalles que muestran como la información del taller le ayuda en el trabajo...

a) ... medir el carbono en los bosques... (Q9, Q11, Q17)

b) ... realizando investigaciones aplicadas sobre ecología forestal...(Q12, Q18, Q19)

c) ... formulación de las políticas del gobierno con respecto a la gestión forestal... (Q15)

d) ... actualizar a los tomadores de decisiones del sector forestal sobre la deforestación y su efecto en el cambio climático... (Q13, Q14)

e) ... sensibilizar al público acerca de la importancia de los bosques, la deforestación y el cambio climático... (Q16)

3) ¿Cómo podría el taller que asistió han sido más útil para usted, en su opinión?

4) ¿Para los futuros talleres, hay otros temas o tópicos que recomendaría?

5) En la encuesta, preguntamos sobre los desafíos que usted ha enfrentado en la aplicación de la información del taller en su trabajo actual. Nos interesan ejemplos y detalles que muestran los desafíos...

6) ¿Hay algo más que te gustaría decir a ayudarnos a entender el valor de los talleres a usted, a su trabajo?

Bueno, finalmente, otra vez, muchas gracias por ayudarnos en esta evaluación...

Annex J: Participants Interviewed

| Name | Email | Date/time scheduled | Country, institutional affiliation | Workshop(s) attended | Work role(s) -- top scoring (see key to work roles/questions below) |
|-------------------------------------|---|---|--|---|--|
| Alejandra Aguilar Ramírez Sartorius | danayemaya7@gmail.com | Interviewed on 4/30/15 | México, gov't = CONAFOR | Data interp. & linear regression, 2014 | policy formulation, and informing policymakers |
| Gregorio Angeles-Pérez | gangeles@colpos.mx | Interviewed on 5/11/15 | México, university/research | Forest Carbon Measurement 2010, 2012, 2014 Chiapas, 2014 Baja; Soils 2013 | carbon measurement, and forest research |
| Alejandro Durán Fernández | aduran@conanp.gob.mx 011 52 489 388 2639 | Interviewed on 4/29/15 | México, gov't = CONANP; Director RB Sierra del Abra Tanchipa | Forest Carbon Measurement 2014 | policy formulation, informing policymakers, and raising public awareness |
| Roberto Escalante López | rescalante@conanp.gob.mx | Interviewed on 5/13/15 | México, gov't = CONANP, Director of RB Selva El Ocote | Forest Carbon Measurement 2014 | raising public awareness |
| Carlos Antonio López Sánchez | calopez@ujed.mx | Interviewed on 5/11/15 | México, university/research = Instituto de Silvicultura e Industria de la Madera | Landsat Time-series Analysis 2014 | carbon measurement, and forest research |
| Marlin Pérez Suárez | marpersua@gmail.com | Interviewed on 5/13 | México, university/research | Soils 2014 | carbon measurement, forest research, and public awareness |
| David Tejada Sartorius | dtejada@conafor.gob.mx | Interviewed on 5/14/15 | México, gov't = CONAFOR | Soils 2013 | policy formulation |
| Berioska Quispe Estrada | bquispe@minam.gob.pe | Interviewed on 5/1/15, 5/4/15, and by email follow-up | Perú, gov't = Ministerio del Ambiente | Forest Carbon Measurement 2014; Soils 2013 | carbon measurement, policy formulation, and public awareness |
| Percy Recavarren Estares | precavarren@aider.com.pe | Interviewed on 5/12/15 | Perú, , ONG | Forest Carbon Measurement 2012 | carbon measurement |
| Efraín Duarte | efrainduarte@gmail.com | Interviewed on 5/1/15 | Honduras, Gov't agency | Forest Carbon Measurement 2012 | carbon measurement, and public awareness |

Work Roles

Measuring carbon in forests and soils (Q9, Q11, Q17)

Q9: Mi trabajo actual consiste en medir el carbono en los bosques.

Q11: Mi trabajo actual consiste en capacitar a otros sobre metodologías de medición de carbono en los bosques.

Q17: Mi trabajo contribuye al desarrollo y aplicación de pruebas piloto del sistema de monitoreo, reporte y verificación de (MRV) en mi país.

Forest ecology research (including carbon cycling) (Q12, Q18, Q19)

Q12: Actualmente estoy realizando investigaciones aplicadas sobre ecología forestal.

Q18: Mi trabajo ayuda a proporcionar información ecológica sobre el ciclo de carbono en los ecosistemas forestales de mi país.

Q19: Mi trabajo contribuye al conocimiento científico sobre la ecología forestal en mi país.

Government policy formulation on forest management (Q15)

Q15: Mi trabajo consiste en la formulación de las políticas del gobierno con respecto a la gestión forestal.

Informing decision makers about sustainable forest management and climate change (Q13, Q14)

Q13: Mi trabajo consiste en actualizar a los tomadores de decisiones del sector forestal sobre las prácticas de manejo forestal sostenible.

Q14: Mi trabajo consiste en actualizar a los tomadores de decisiones del sector forestal sobre la deforestación y su efecto en el cambio climático.

Raising public awareness about the importance of forests in climate change (Q16)

Q16: Mi trabajo consiste en sensibilizar al público acerca de la importancia de los bosques, la deforestación y el cambio climático.

Annex H: Biographical Sketch of Evaluation Consultant

Dr. Bruce Byers is a practicing ecologist, independent consultant, and writer with more than 30 years of professional experience in more than 40 countries. His work focuses at the interface of ecology and sustainable development, combining his academic background in ecology and evolution with extensive practical experience in applied social sciences. Bruce Byers Consulting, the independent consulting business he founded in 1994, provides technical assistance to U.S. government agencies, NGOs, and the private sector worldwide, carrying out assessments, analyses, evaluations, and applied research that lead to the design of effective strategies and programs in complex ecological and social contexts. Bruce has extensive experience in: biodiversity conservation, forestry, and natural resources management; climate change adaptation and mitigation; environmental communication, outreach, and behavior change; and monitoring and evaluation. He has led many multi-disciplinary and international teams in this work. His oral and written communication skills are reflected in numerous presentations and publications, which synthesize complex information and clearly communicate findings to diverse target audiences and stakeholders. He is a member of the Public Affairs Committee of the Ecological Society of America.

