

SCOPING STUDY 2

ASSESSMENT OF GAPS FOR THE TERRESTRIAL CARBON ACCOUNTING TRAINING



**Centre for Climate Risk & Opportunity Management
in Southeast Asia Pacific (CCROM - SEAP)
Bogor Agricultural University**



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1. INTRODUCTION

1.1. Background

Through Act Number 16/2016, the Government of Indonesia has ratified the Paris Agreement to the United National Framework Convention on Climate Change. Under the Paris Agreement, both developed and developing countries are expected to contribute in addressing climate change, especially through post-2020 GHG emission reduction efforts. The Agreement is binding in nature, and it has several mandatory provisions while others are more of recommendation and guidance. In the mandatory provisions, developing countries oblige to (i) continue and enhance their domestic mitigation efforts; (ii) prepare Nationally Determined Contributions (NDC), communicated every five years and complemented with information that provides clarity, transparency, and understanding; (iii) perform accounting on mitigation achievements, taking into account environmental integrity, transparency, accuracy, completeness, comparability, consistency, and avoiding double counting; (iv) in the case of cooperative approaches in implementing NDCs, do so voluntarily, aiming also to foster sustainable development and to apply robust accounting; (v) in the case of non-market approaches, enhance the participation of private and public organizations; (vi) prepare and enhance adaptation planning and communicate it every five years; and (vii) regularly provide national inventory reports and information to track progress on the implementation of NDC.

The Government of Indonesia, along with other developing nations, has declared its voluntary emission reduction target to reduce its emissions by 26% in 2020 through its own domestic actions and up to 41% through international support. In connection to the Paris Agreement, the Government of Indonesia has submitted its Nationally Determined Contribution and committed to further reduce its emissions to 29% in 2030 without international support and up to 41% with international support. Several policies and regulations have been issued by the Government of Indonesia to support the implementation of these mitigation actions. Among others are Presidential Regulation No. 61/2011 on the National Action Plan for Greenhouse Gases (GHG) Emission Reduction, Presidential Regulation No. 71/2011 on GHG Inventory, and Government Regulation No. 46/2016 on the Implementation Procedure of KLHS (Strategic Environmental Assessment) that mandates sectoral ministries and local government to assess environmental strategic issues, one of them being climate change, in developing their long-term development plan and spatial plans. The government is also currently preparing a draft of regulation on an environmental economic instrument, a set of economic policies to encourage the central and local government, or anyone, to act towards environmental conservation, such as mitigation and adaptation to climate change.

The Government of Indonesia (GoI) puts Forestry and Land Use Sectors (FOLU or terrestrial ecosystem) as a primary sector along with the energy sector in meeting its emission reduction target. Reducing emissions from deforestation and forest degradation (REDD+) are the main

activities for the FOLU sector. The GoI has submitted its emission baseline and also forest reference emission level (FREL) to UNFCCC. The emission baseline and FREL will be used as reference to measure Indonesian achievement in reducing emissions from the implementation of mitigation actions and also from deforestation and forest degradation. The UNFCCC, through a technical team of experts, has technically assessed the FREL. An online system to monitor, evaluate and report the implementation of the actions and their impact on emission reductions as well as verification system has also been developed. A National Forest Monitoring System (NFMS) and National Forest Inventory System (NFIS) have been further developed to support the measurement, reporting and verification (MRV) system.

One of big challenges in the implementation of the mitigation program is the limited availability of experts who understand the international and national context, as well as have the technical capability to assess the impact of the implementation of the mitigation policies and programs on GHG emission reductions, and that can perform the calculation and reporting of carbon emissions and removals in accordance with international rules. In addition, the ability to assess the accuracy of the calculation of the carbon emissions and removals or 'uncertainty assessment' is also very important to show the extent of the reliability of the data reported both to national and international levels.

In this regard, The Carbon Institute (<http://carboninstitute.org>), a consortium consisting of Greenhouse Gases Management Institute (GHGMI), the Centre for Climate Risk and Opportunity Management IPB (CCROM SEAP IPB, (<http://ccromseap.ipb.ac.id>), and the Forest Carbon Accounting and Monitoring Centre-China (FCAMC), is developing the training curriculum for Terrestrial Carbon Accounting (TCA). This consortium will develop and organize training activities of World Class TCA, which are held in various countries that have been adapted to the needs of the country concerned so as to overcome the challenges faced by each country.

The curriculum of TCA is integrated from the policy aspect to the technical aspects that can be divided into six aspects presented in Appendix 1. It was developed from the previous TCA curriculum that is equivalent to 145 hours of lectures (see http://ghginstitute.org/wp-content/uploads/2016/01/Raising-the-REDD-Bar_2013-TCA-Certificate.pdf). To sharpen the TCA curriculum in accordance with the conditions in Indonesia but remain in line with international rules, we conducted interviews of various stakeholders. The response given to this questionnaire is a valuable input in preparing the training curriculum of the Indonesian National TCA Program.

1.2. Objectives

The main objective of the 2nd scoping study is to identify gaps in Terrestrial Carbon Accounting Training, while the specific objectives are:

- a) To understand what specific needs government and other actors have in unmet TCA training.
- b) To identify key issues related to TCA training such as course content, learning objectives, ideal trainees candidates, potential resource person for the training, logistical issues, etc.
- c) To identify key supporters who support and invest TCA certificate program

2. INDONESIAN CONTEXT FOR TCA

2.1. State of the Implementation of Low Carbon Development

Indonesia ratified the Climate Change Convention (UNFCCC, United Nation Framework Convention on Climate Change) in 1994 through Law Number 6/1994 and is legally included as a Party to the Conference. Under this framework, Indonesia is a non-Annex 1 party and is committed to fully implement the convention. One of the requirements under the convention is to report the activities relevant to climate change to the UNFCCC through Indonesian National Communications. Indonesia has submitted its Initial National Communication (INC) to the UNFCCC in 1999 followed by its Second National Communication (SNC) in 2010 and 1st BUR in 2015. At the present time, the Third National Communication (TNC) is being prepared and will be submitted in 2017.

As previously mentioned, the Government of Indonesia (GoI) has made significant progress in addressing climate change issues. In 2010, the National Planning Agency (BAPPENAS) developed a progressive policy framework for climate change, i.e., Indonesia Climate Change Roadmap (ICCSR), which lays down the principles, approach and priorities to mainstream climate change adaptation and mitigation in development planning. This is to bridge the National Action Plan on Climate Change into the 5 year Mid-Term Development Plan (RPJMN) 2010-2014, and to provide inputs for the subsequent RPJMN plans until 2030. In September 2009, the President of Indonesia announced at the G20 Summit on Sept 2009 that by 2020 Indonesia will reduce GHG emissions by 26 percent unilaterally and up to 41 percent with international support from Business As Usual (BAU) levels. Along with the target of reducing GHG emission by 26 percent by 2020, the Government has issued Presidential Decree No. 61 Year 2011 on “National Action Plan on GHG Emission Reduction (RAN-GRK)”, which provides a strategy or plan for implementing direct and indirect activities related to GHG emission reduction. RAN-GRK

provides guidance to ministries in planning, implementing, monitoring, and evaluating the national action plan of GHG emission reductions and guidance to provincial governments in formulating regional action plans for reducing GHG emission (RAD-GRK). In the same year the Presidential Decree No. 71 Year 2011 on Conducting National GHG Inventory was issued by the GoI to enable the regular provision of information on the level, status, and trend of GHG emission and removals, including carbon stocks, at the national, provincial, and municipal/regency levels; and to provide information on GHG emission reductions achieved from national climate change mitigation actions.

On October 4th, 2016, the President of Indonesia signed the Paris Agreement into Law Number 16/2016. After signing, Indonesia can sit in the agreement governing body (the CMA), which will meet at the annual UN climate conference. As an archipelago country, Indonesia has a mayor potential to be on the receiving end of negative climate impacts. It also has large potential to contribute to mitigation and adaptation to counter the negative impacts of climate change.

Ratification of the Paris Agreement should be the country's political commitment to reduce emissions by 29% by 2030 and ensure adaptation policies can prevent ecological disaster. The Government of Indonesia is supporting local governments in designing, developing and implementing low carbon development. Program/actions for reducing emissions are not the priority for local governments, therefore it is necessary to increase the understanding of local government that doing mitigation action and programs also addresses development issues. Low carbon development is prepared in deferent stages through (i) the development of tools and modeling low carbon spatial plan, (ii) enhancing the capacity of local government and other related stakeholders, and (iii) policy formulation and development plans.

Low-carbon development has recently attracted attention from various countries and researchers, which may give different interpretations on the concept. As a following step, most countries need to massively increase the quantity and quality of carbon accounting. There are a range of needs for enhanced carbon accounting capacity: international, national, provincial, academic, local, and private sector.

2.2. Existing Training on TCA

There are many TCA-related trainings offered at a wide range of universities, research agencies, government and non-government agencies in Indonesia, but none provide a comprehensive academic curriculum for developing TCA professionals. Many workshops and training programs have been held to build capacity for TCA-related subjects, most of which are only a few days in length and do not cover enough depth to develop skilled TCA professionals.

Bogor Agricultural University and other universities offer courses related to the six core topics of TCA instruction, particularly the ones related to TCA statistics, as statistics exist in most of the study programs at IPB. The TCA topics related to Field method and IPCC guidelines are found mainly in Faculty of Forestry, and Faculty of Mathematic and Natural Science, and Faculty of

Agriculture. None of the courses completely covers all six TCA topics. Courses related to the communication of TCA results do not exist in any study programs.

The 6 core course areas for comprehensive TCA instruction are: Policy Context, Remote Sensing/GIS (activity data), Field Measurements (emission factors), IPCC Guidelines/Land Classification, Statistics, and the Communication and Analysis of Results.

Similar conditions were found in many agencies or institutions outside the university. Most of the training courses cover well the policy aspect of TCA, but involve very little development of skills necessary for the accounting aspect of terrestrial carbon. The training program with relatively good coverage of the TCA instruction is the training program conducted by the LAMA-I. However, the duration of the training is too short and may not be enough to meet the TCA competency.

3. METHODOLOGY FOR GAP ASSESSMENT

The gap assessment on the TCA was conducted through an interview process with the aim of obtaining various perspectives on the objective questions related to the needs of TCA Training in Indonesia. A set of questions related to the course content, learning objectives, logistical issues, and relationship-building are developed as shown in Appendix 1. The interview process was done in 4 phases: (i) identification of respondents (policy makers, key persons in government agencies, students), (ii) setting up the interviews and preparing, (iii) interviews, and (iv) writing up the results.

Phase 1: Identification of respondents.

Respondents who were interviewed in the 1st phase were key people or policy makers in the government agencies and students. The most important people and agencies to interview were those connected with the target audience and potentially able to direct funding for the enrolment of the target audience to the TCA Certificate programs. The government agencies are national ministries to understand different divisions within the national ministries and agencies, representatives from several provincial agencies to help understand TCA needs at the subnational level, and also students.

Phase 2. Setting up the interviews and preparing

The qualitative interviews were guided using questionnaires. To give the understanding of the respondent the questionnaires came with an introduction letter explaining the needs of TCA certificate, objectives, and efforts to develop this certificate through collaboration between academics and government agencies. The introduction consist of several points:

- a) The entry into force of the Paris Agreement,
- b) Aspects of carbon markets and policies,
- c) The importance of good measurements and reporting for terrestrial carbon (forests, agriculture, wetlands),
- d) The goal of the training, and
- e) The 6 course areas that capture the core skills for Terrestrial Carbon Accounting. The purpose of the interview was to prioritize the skills taught within these 6 areas so that they meet government needs and are not redundant with other efforts.

Phase 3: The interviews

This stage was to record key information such as the person, their title, their role related to GHG inventories, and answers to all the questions that asked as listed in the questionnaire, as well as recording any other interesting things that may help in developing strong TCA programs.

The questionnaire consisted of 5 (five) thematic question areas, i.e. (i) course contents, (ii) ideal candidates, (iii) logistical consideration, (iv) training fee, and (v) development of relationship building of the TCA. Every thematic area has a list of questions.

These questions are directed to understand the needs and logistical constraints of the government parties connected to the target audience and to generate interest among the right government parties in the TCA Certificate Programs.

Phase 4. Writing up the results, and any follow up questions that come up

This stage is to summarize the main findings during interview in a report and also to follow up questions that come up during the analysis. This is a great opportunity to find out really critical things to help develop TCA certificate programs that may have not gotten discussed in the first interview.

To make it easier to analyze the answered questionnaires, the responses from respondents were documented in a spreadsheet.

4. Gaps Findings

4.1. Respondents

The interview involved 154 respondents consisting of bureaucrats, academics, practitioners and students from S1 (bachelor), S2 (magister) and S3 (doctor) at Bogor Agriculture University (Figure 1). Most of the respondents were students of undergraduate and master's programs (77%), and the remaining are student of doctoral programs (9%), government (11%) and NGO/Private sector organizations (3%). The students interviewed are from the field of studies related to forestry and climatology, while respondents from the Government and NGOs were personals in which their tasks are connected to the TCA, i.e. from the Ministry of Environment and Forestry, Development Planning Agencies, Local Environmental Offices, and Environmental NGOs.

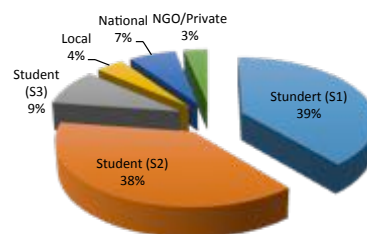


Figure 1. Types of respondents of the TCA

4.1. TCA Training

4.1.1. TCA Course Topics

The course topics of the TCA are designed with main objective to develop understanding and technical capacity of trainees in evaluating and assessing the impact of the implementation of low carbon development on GHG emissions which meet with international standard and agreement. The trainees should have knowledge and understanding not only of national but also international policies related to low emission development (LED) and how the emission reduction results from the implementation of LED are reported and communicated following international agreement. Therefore the TCA course covered six topics (Figure 2) that include one policy context, four technical aspects of TCA, and one on reporting and communication. The four technical topics include methods for developing and generating activity data and emission factors, and the international standard method for the calculation of the emissions and level of uncertainty in the emission calculations.

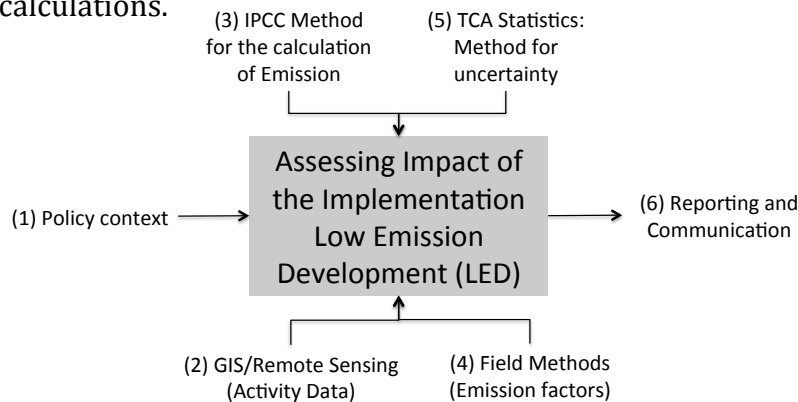


Figure 2. Six TCA course topics

Respondent views related to the six (6) topics was assessed. It was found that most of respondent considered that all the TCA topics are important to be covered in the TCA curriculum (Figure 3). The average score of the topics indicates that climate policy gets the highest score and followed by GIS/RS, IPCC methods and land classification, Field Method, communication and TCA statistics (Figure 4).

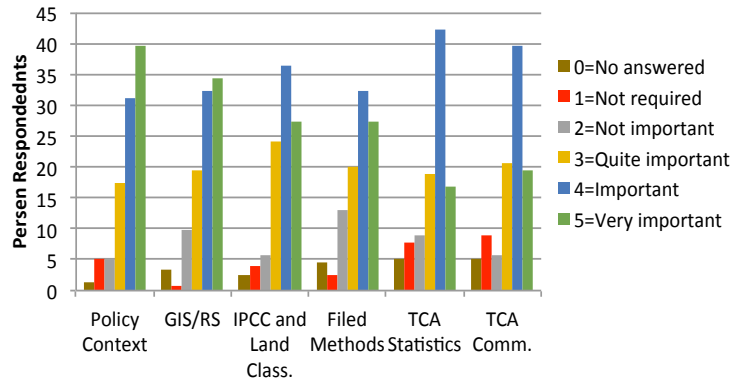


Figure 3. Respondent views in the importance level of TCA topics

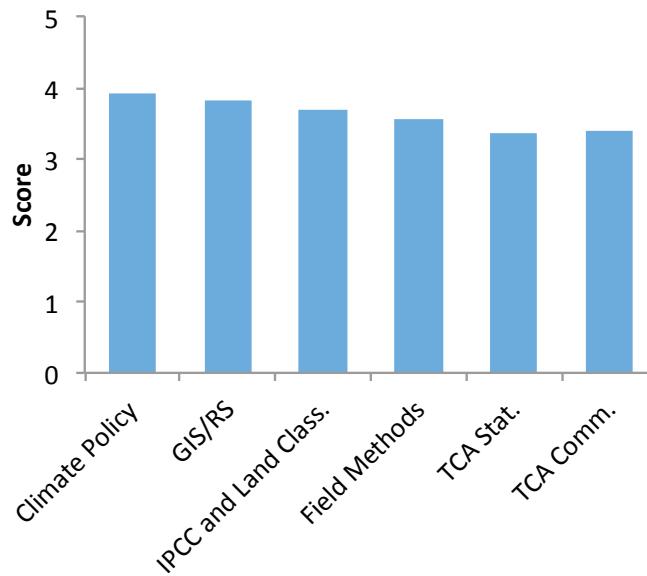


Figure 4. Score on the importance level of the TCA topics

Respondents view on the level importance of sub-topics to be taught in each TCA topic is further assessed (Figure 5). In **climate policy context**, three sub-topics to be included are (1) policy aspects related to the UNFCCC which may cover National Determined Contributions/NDCs, National GHG Inventories, FREL for REDD+, and MRV under the Paris Agreement, (2) Other Guidance covering World Bank standardized carbon schemes, voluntary carbon markets, local carbon markets, etc. and (3) national or local forest policies and National Greenhouse Gas policies or reporting. In the context of this question the respondent considers all sub-topics are almost equally important with score of between 3.61 to 3.96. However, respondents tend to see

that national forestry policy is more important than others with score of 3.96. This suggests that the course content should accommodate more national policy contents than other policy aspects.

For the GIS/RS, there are 5 sub-topics to be covered, namely GIS Software, GPS usage, Remote Sensing, Software Tools, as well as Supervised and Unsupervised Classification. Respondents also consider that the five sub-topics are also equally important with score of between 3.60 – 4.12, but more emphasized on GIS Software and software tools with score of equal or more than 4.0 (Figure 5).

For IPCC/Land classification, there are five sub-topics to be covered. These include 2006 IPCC Guidelines implementation for the preparation of the GHG inventory, National forest classification maps, forest types and classifications, National Forest Inventory Methods, analysis of time series of land cover map based on its classification, QA/QC (Quality assurance and data quality checking) and data management systems. The score for the five sub-topics also are not so much different, i.e. between 3.58 to 4.06 (Figure 5). Views of the respondents on sub-topics of other TCA course topics also shows similar pattern. All of the sub-topics have been considered are equally important. No much variation in term of score between the sub-topics (Figure 5).

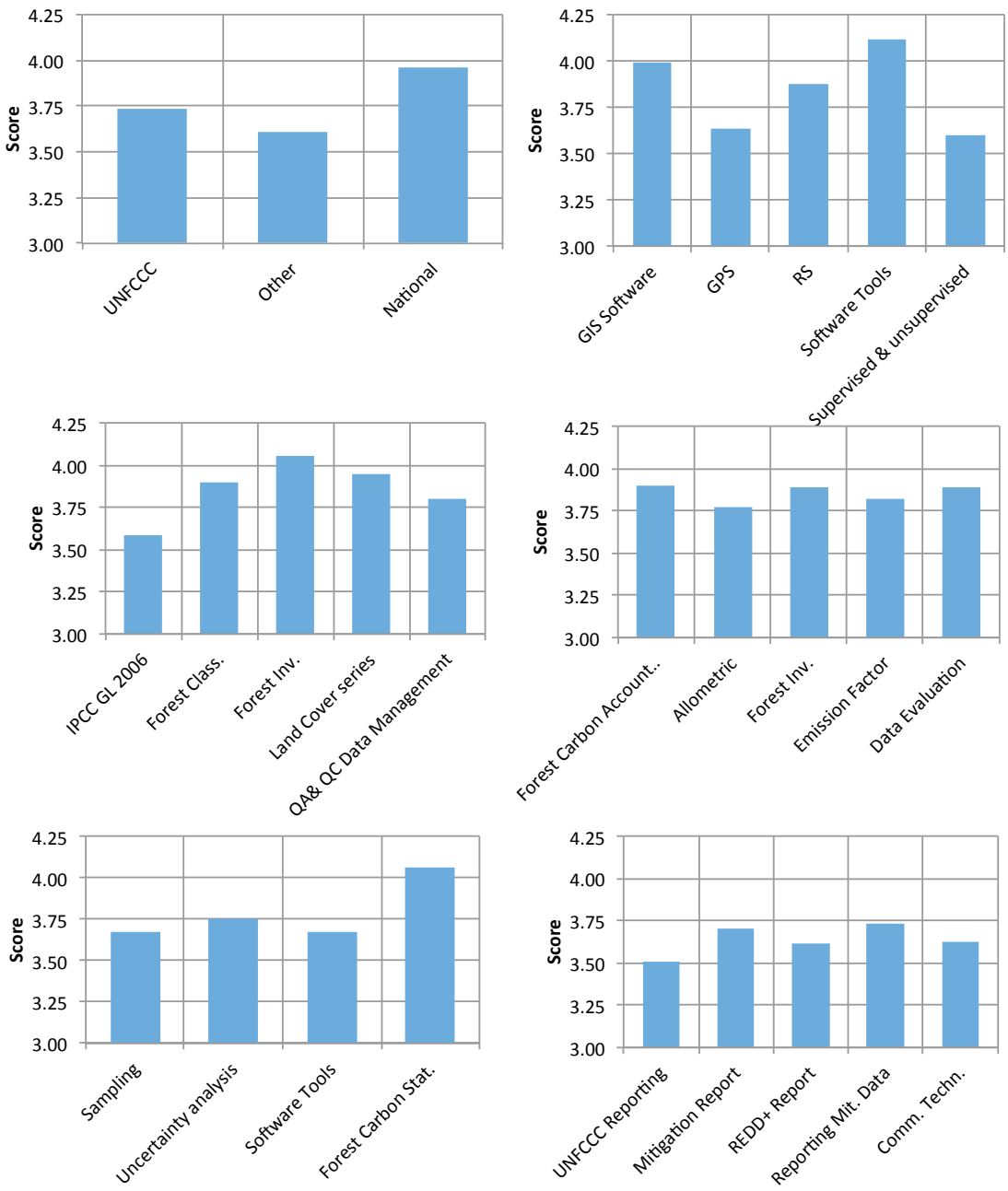


Figure 5. Important level of sub-topics in each TCA topic

Sub-topics for the Field Method include forest carbon measurement (permanent sample plots, sampling techniques), allometric equations for forest carbon estimation, national forest inventory system, generation of emission factor, and data evaluation technique. For the TCA statistics, the sub-topic to be covered includes basic statistics (statistical test, sampling, regression, etc.), uncertainty analysis/error propagation with bootstrapping technique (Monte Carlo technique), software usage (R), and application of statistical techniques/methods for forest/forest carbon.

For TCA Communication, the sub-topics to be covered include UNFCCC reporting (such as NDC, National communications, Biennial Update Report, etc.), national mitigation reporting (PEP-MER, PPV-MRV, SRN system), REDD+ (Including Forest Carbon Partnership facility-FCPF, Forest Investment Program-FIP, etc.), preparation of data on the implementation of mitigation actions and reporting of emission reduction achievements in accordance with the established format, and Communication techniques (presentation and writing).

The overall result of this analysis suggests that all sub-topics in each TCA topics should be covered with equally emphasized.

Based on result of interview on depth of knowledge of respondent on the six topics, on average the knowledge of the respondent to the six TCA topics is not deep. The average score is between 2.92 and 3.41 (scale from 1-5 with 5 as the highest score). The lowest knowledge is on the TCA communication and then followed by the TCA statistics.

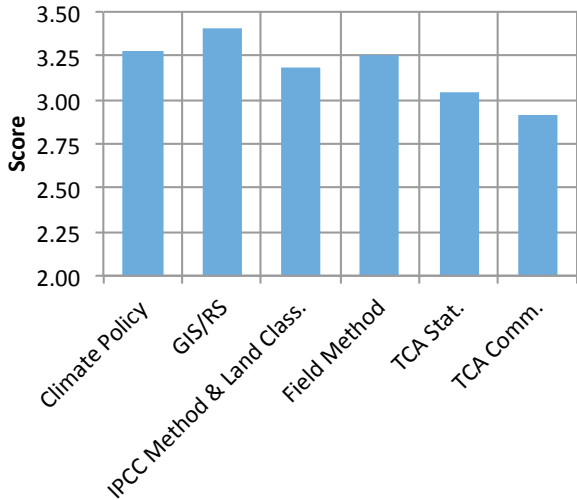


Figure 5. Score on depth of knowledge of respondents on the six TCA topics

Further assessment of respondents’ knowledge on MRV suggests that their knowledge on the MRV is still very low. Around 92% of respondents do not know about MRV, which should be an important element of the TCA training. In the assessment, questions being asked include the following:

- Has SKPD (local government)/your agency already done MRV?
- What kind of form of MRV has ever been performed and who/which division did it?
- Is there any MRV institution in your area? Yes/No,
If yes which agency or SKPD (local government) is responsible in performing this activity?
For Greenhouse Gases Inventory: Local Environment Institution, For Greenhouse Gases Mitigation, Bappeda.
- How long will it take for the establishment of MRV in your institution?
- If No, why there is no institutionalization yet?

- Preferably for MRV related activities on climate change, which division of SKPD (local government) is the most appropriate to handle the activities? For M and R, the sections related to GHG emission/emission sources, for V, the section related as coordinator of GHG Inventory and mitigation implementation

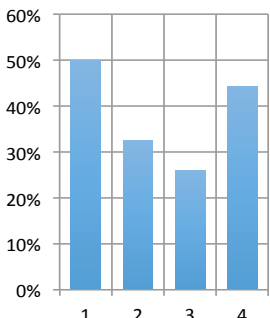
Respondents that provide answer on the question are the mostly respondents from the government agencies (8%).

4.1.2. Learning Objective and Outcomes

The TCA training is designed to equip trainees with competency in terrestrial carbon accounting. The competency is not only related to the capacity for calculating and to estimating GHG emission from terrestrial ecosystems and evaluating how the development contributes to the change of the emission but also the capacity for communicating the results following the modalities defined by the national and international authorities.

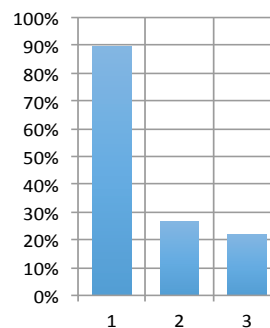
To assess the expectation of respondents on the TCA course, a set of learning objectives was designed for each TCA course topic. Respondent views on the learning objectives are presented in Table 1. In general, the majority of respondents agreed only to pre-specified objectives. However, very few of the respondents provided feedback on other types of learning objectives that they expect. This suggests that the understanding of the respondents on the overall TCA issues is not very deep. It is in line with Figure 5, most of respondents considered themselves still have limited knowledge.

Table 1. Learning objective of the TCA courses

Learning Objectives	Respondent's View
<p>Topic 1: Policy Context</p> <ol style="list-style-type: none"> 1. Understand international issues of global warming and climate change, particularly on the Paris Agreement and its relation to national and regional development policies. 2. Understand the link between land-based sector development and national climate change mitigation policy. 3. Understand other international mechanisms that can support the implementation of climate change mitigation actions (voluntary carbon markets, local carbon markets, and other carbon market schemes) 4. Can explain well what sector and region needs to be prepared to implement measurable, reportable and verifiable climate mitigation activities and their relationship to developed national systems (such as SRN, PEP etc.) 	 <p>Note: Number in x axis indicate the learning objective number presented in left column.</p>

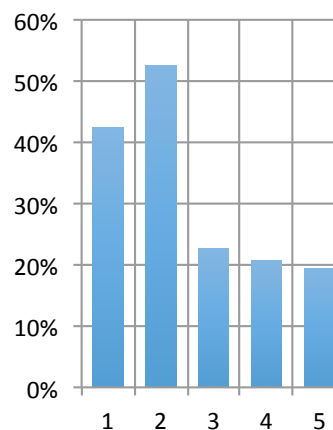
Topic 2: GIS/RS

1. Able to use remote sensing data and utilize GIS to map land use change and classify land use and forest cover according to the classification established by the IPCC.
2. Able to use GPS to determine the position of a location.
3. Able to use Google earth engine and other applications to verify and improve the accuracy of land and forest classification data.



Topic 3: IPCC Method and Land Use Classification

1. Able to classify the spatial data series of land cover/forest change according to IPCC category
2. Able to integrate spatially-based data with statistical observational data to obtain annual series activity data of land cover change with a more detailed categorization
3. Able to use IPCC method in analyzing the key categories (main sources of emission)
4. Able to use several methods of data quality checking and to perform quality assurance of the key categories data (QA/QC)
5. Able to use IPCC 2006 guidelines to develop GHG inventory in land-based sectors



<p>Topic 4: Field Methods</p> <ol style="list-style-type: none"> 1. Able to implement the standard method in determining the location and in sampling forest inventory data, which are required for the calculation of the emissions and absorption from terrestrial ecosystems 2. Able to use the observational data from national forest inventory and other sources to estimate local emission factors 3. Able to develop an appropriate allometric equation according to forest types and utilize it to estimate the amount of carbon stocks in various land cover types 	<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>60%</td> </tr> <tr> <td>2</td> <td>45%</td> </tr> <tr> <td>3</td> <td>30%</td> </tr> </tbody> </table>	Category	Percentage	1	60%	2	45%	3	30%		
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<p>Topic 5: TCA Statistics</p> <ol style="list-style-type: none"> 1. Able to use some statistical or mathematical techniques to fill in missing data (interpolation technique and data extrapolation) 2. Able to use some statistical or mathematical techniques to determine the data outliers 3. Able to perform uncertainty analysis of emission and absorption by using parametric statistical technique (Monte Carlo) and non-parametric technique (bootstrapping) 4. Able to use R programming language to perform spatial uncertainty analysis 	<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>45%</td> </tr> <tr> <td>2</td> <td>35%</td> </tr> <tr> <td>3</td> <td>48%</td> </tr> <tr> <td>4</td> <td>23%</td> </tr> </tbody> </table>	Category	Percentage	1	45%	2	35%	3	48%	4	23%
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<p>Topic 6: TCA Communications</p> <ol style="list-style-type: none"> 1. Able to use the national guidelines in reporting the results of the GHG emission and absorption calculation (e.g. SIGN) and the achievement of emission reduction (e.g., PEP and SRN) 2. Able to report the results of the emission reduction from other mitigation activity schemes based on carbon market and not 'double counting' with domestic initiatives 3. Able to separate land-based mitigation activities with the REDD+ activities 	<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>62%</td> </tr> <tr> <td>2</td> <td>41%</td> </tr> <tr> <td>3</td> <td>28%</td> </tr> </tbody> </table>	Category	Percentage	1	62%	2	41%	3	28%		
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Some of respondents provided their views on the additional skills and knowledge that trainees should have from the training. The important knowledge is related to national and international mechanisms of supports provided for the implementation of mitigation actions and synchronization of climate change mitigation and development, and also on skills related developing baseline (reference level) emissions, proposals for carbon projects, using sampling technique for ground checking to assess accuracy level of the image interpretation, and developing emission factor using spatial statistical techniques.

Based on the learning objectives developed above, the learning outcomes (skill and abilities) being designed and to be owned by the trainees are the following:

1. Able to communicate well the development policies of the forest and land sector and its relation to national and regional mitigation policies (emission reductions) to meet the national commitment to the framework of the United Nations Convention on Climate Change (UNFCCC) and opportunities to support the implementation of mitigation policies
2. Able to use GIS and remote sensing techniques to obtain activity data related to land use according to the standard land use classification and able to access and use global, national and local data that is required to estimate the emission and absorption of GHG from terrestrial ecosystems (land and forestry)
3. Able to use IPCC 2006 guidelines to estimate and calculate GHG emission and absorption from land-based activity at some level of accuracy (Tier)
4. Able to develop and use methods to generate emission factors from the observational data and other secondary data (proxy data)
5. Able to conduct measurements of forest carbon stocks in accordance with the standard method
6. Able to use statistical/mathematical techniques for error propagation, assessment of the level of uncertainty of the GHG emission or absorption from terrestrial ecosystems such as bootstrapping, and Monte Carlo technique
7. Able to prepare reports on the implementation of low carbon development activities, especially from land-based mitigation activities in accordance with a system that has been developed by the national institution.

Not much different from the respondent's views on the learning objectives, most of respondents agreed only on the first two outcomes, while the other outcomes are expected only by less than 20% of respondents (Figure 6).

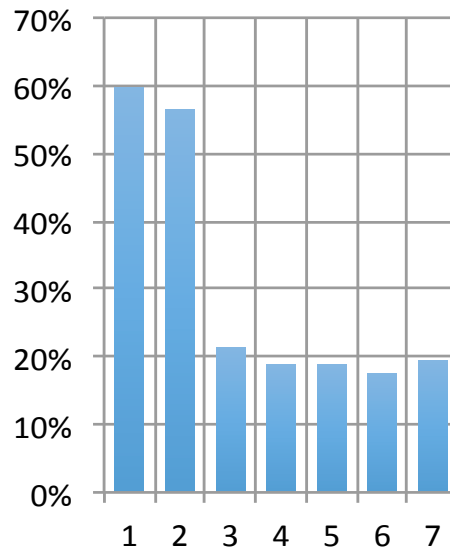


Figure 6. Respondent's view on learning outcomes of the TCA training

4.2. Resource Person of TCA Topic

Resource persons for the TCA training may come from various agencies who have good knowledge on the each TCA topics. From the survey, majority of the respondents do not provide their views on appropriate resource person either at national or local level for the six TCA topics. However, respondents from the national governments recommend some names and also name of agencies or institutions that can support the implementation of the training (Table 2 and 3).

Table 2. Potential resource persons for TCA statistics proposed by Respondents

No	Name of Resource Person and Agencies	TCA Topics					
		1	2	3	4	5	6
1	Dr. Nur Masripatin (Ministry of Environment and Forestry-National Government)	X				X	X
2	Dr. Belinda Margono (Ministry of Environment and Forestry-National Government)		X	X			
2	Prof. Mas Agung Sardjono (Local Government)		X	X			
3	Dr. Haruni (Forest and Environmental Research and Development Agency)				X		
4	Prof. Rizaldi Boer (Bogor Agricultural University)	X				X	X
5	Ir. Wahyudi Wardoyo (The Nature Conservancy)	X					

Table 3. National and local agencies that can provide resource persons for the TCA training

No	Agencies for Resource Persons	TCA Topics					
		1	2	3	4	5	6
1	Centre for Climate Risk and Opportunity Management, Bogor Agricultural University	X	X	X	X	X	X
2	Ministry of Finance	X					
	Directorate General of Planology, MoEF		X	X	X	X	
2	Directorate General of Climate Change	X					
3	Directorate of GHG Inventory and MRV	X			X		X
	National Agency for Geospatial Information		X	X			
	Forest and Environmental Research and Development Agency				X		
4	IPSDH		X	X	X	X	X
5	REDD Task Force from Aceh and East Kalimantan				X		
6	Universities (University of Indonesia, Gajahmada University)	X	X		X	X	
2	ICRAF/CIFOR		X	X	X		X

4.3. The Role of Government in TCA Training

Related to the role of government in the implementation of TCA training, most of respondents stated that role of government is to cover cost for the training (Figure 7). Government can support in the form of providing recommendations and also as resource persons. Some participants' views suggest that the government can also play role in providing facilities for the implementation of training and providing good data to be used for the training.

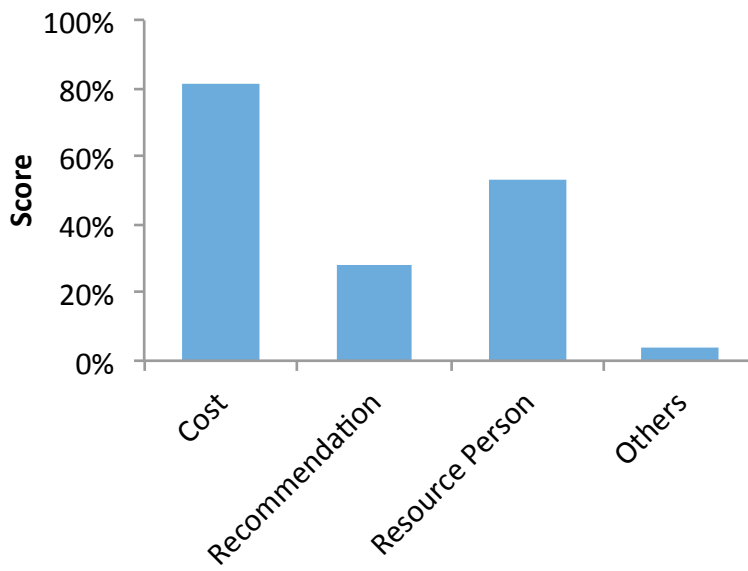


Figure 7. Government's role in TCA Training

In terms of data that can be brought for the training, 61% of respondents stated that they could bring real data for the training. This indicates that most of respondents already have enough data on their workplace. Types of Data that can be provided if they attend the training is the statistical data (56%), spatial data (47%), and forest carbon data (16%). This indicates that most of respondents have the data in their respective agencies. However, in order to obtain the data, most of respondents said that they should get permission from their supervisors and time required to get such permission is between one and two weeks.

4.4. Logistical Consideration

The logistical questions are assessed to understand number of participants for TCA training, number of training days, and good time for conducting the course. Respondents views on the number of participants that need TCA training each year in their own ministries or agencies are presented in Figure 8. It is indicated that more than 50% of the respondents stated that at least more than 2 people per year from their own ministries and agencies will need TCA training. In term of duration, most of respondent (83%) stated the TCA training should be at least 2 weeks (Figure 9).

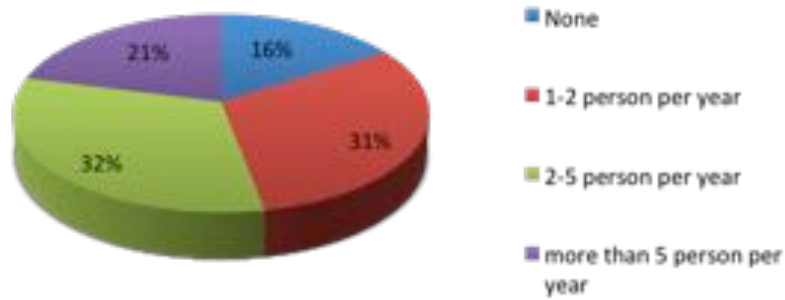


Figure 8. Number of participants needing TCA training each year from the respondents' institution

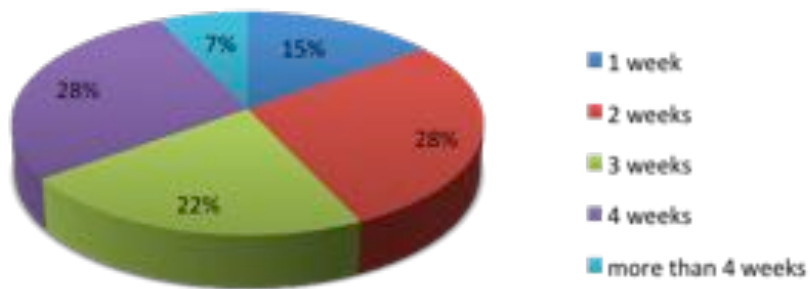


Figure 9. Duration of TCA Training

Respondents' views in term of number of days required for each TCA topic quite varied. Most respondents mentioned that each topic might require one day (Figure 10).

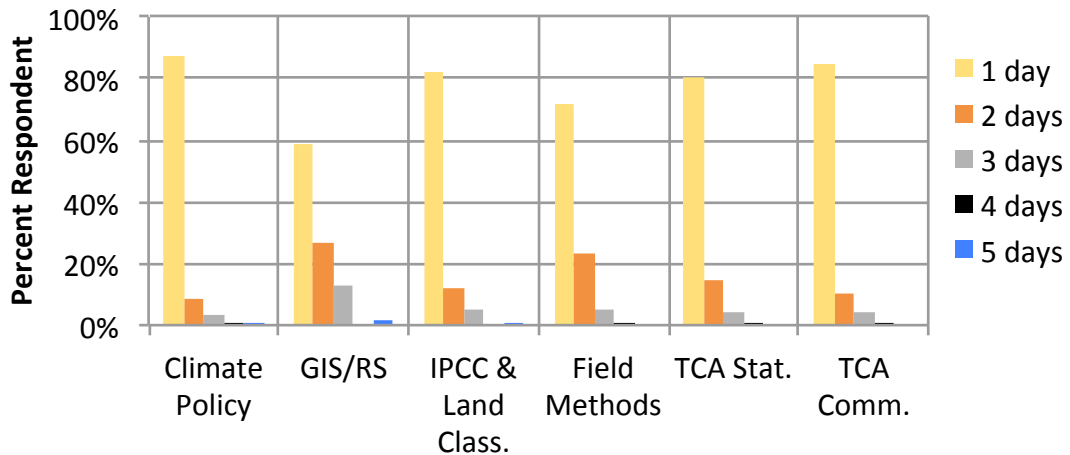


Figure 10. Number of Course Days for Each of TCA Topic

According to respondents, the best time for conducting the training course between July and August (Figure 11). This view may be affected the profession of the respondents. Most of the respondents are student, and the preference time, July and August, are the period of semester break.

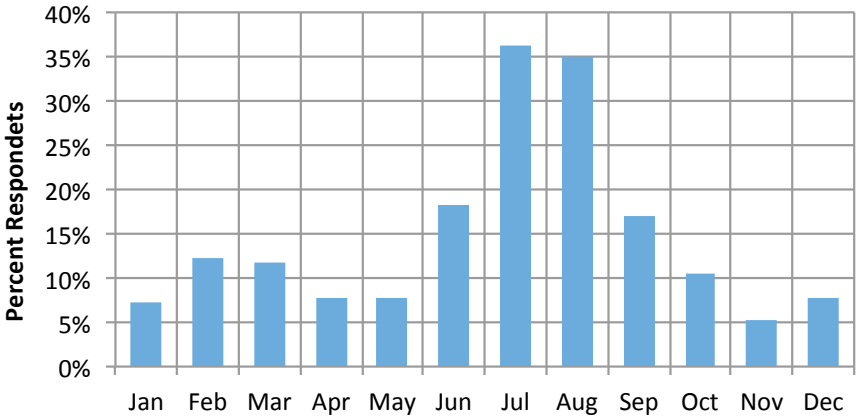


Figure 11. Training Schedule

Respondent’s views on other logistical questions are: Training should be done once a year (67.5%), and the rest around 32.5% of respondents stated that training should be done twice a year. About 99.4% of respondent stated that the competence of any TCA topics would be useful and used by their agencies. From this number, 59% of respondents need a TCA certificate state with pass, the training curriculum and the grade for each TCA topic, and 39% of respondents answered it is necessary to state the training certificate equivalent with international standard (Figure 12).

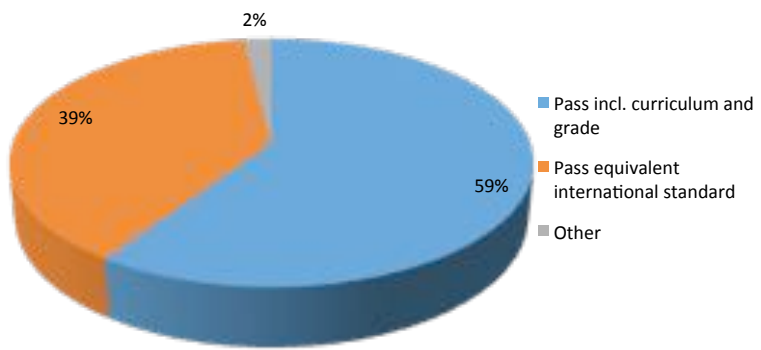


Figure 12. TCA certificates state

4.5. Potential Candidate and Fee for the TCA Training

The information of candidate and training fee are collected to understand the characteristic of participants for TCA training such as educational background, level of echelon, needs for grouping participant, background of participant, a specific background/prerequisites, fee and source of fee, and support needs. Based on the interview it is known that all educational background is expected to participate in the TCA training. However, most of respondents stated that participant with forestry background will be better (90%), and followed by agriculture/soil science/biology/natural sciences background (55%), statistics (43%) and other disciplines 13% (Figure 13).

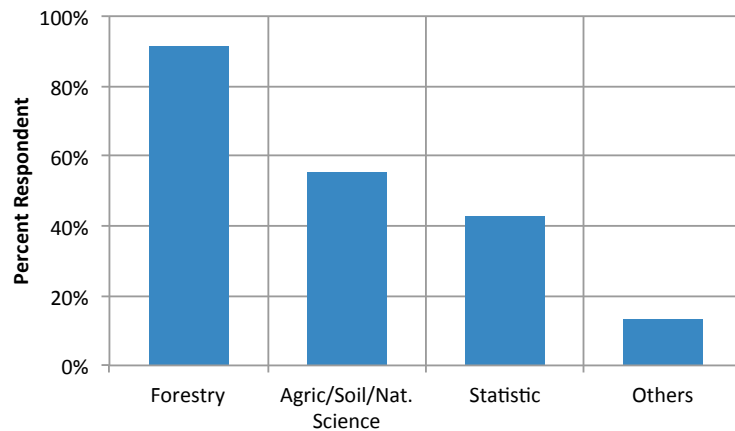


Figure 13. Educational background of participants for TCA Training

For the level of echelon, TCA training participants can be from any echelon as long they already graduated from academic or university. About 30% of respondents answered that the training participants can be from bachelor graduates, 25% stated the training participants are suitable for echelon 3 and below, 24% stated that the training participants from technical/functional staff, and 17% stated the training participants are suitable for echelon 3 above. The remaining 4% may be from others (Figure 14).

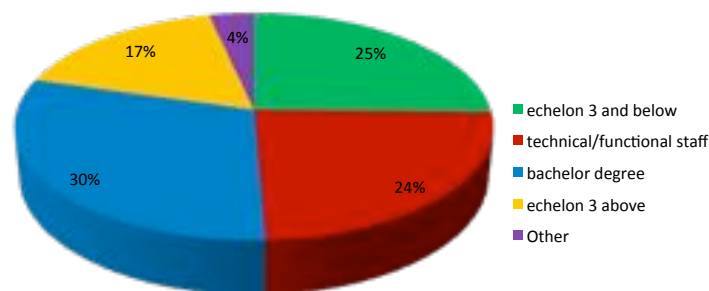


Figure 14. Position of training participants

For the grouping of participants, about 68.2% of respondents stated that TCA training participants should be grouped into several categories depending on the participant's positions, availability of time, and educational background. Meanwhile the remaining 31.8% of respondents did not agree the grouping of participants. In the policy-maker group, climate policy topic is more in demand. Further interest by the policy-maker group is TCA communications and field method. For the technical/functional staff, the most desirable topic is the TCA statistics, followed by the IPCC and land classification, field method, and RS/GIS. Meanwhile other topics are useful as a complement. For academic staff/researchers, TCA's most interested topic is TCA statistics, followed by field method as well as TCA communications (Figure 15).

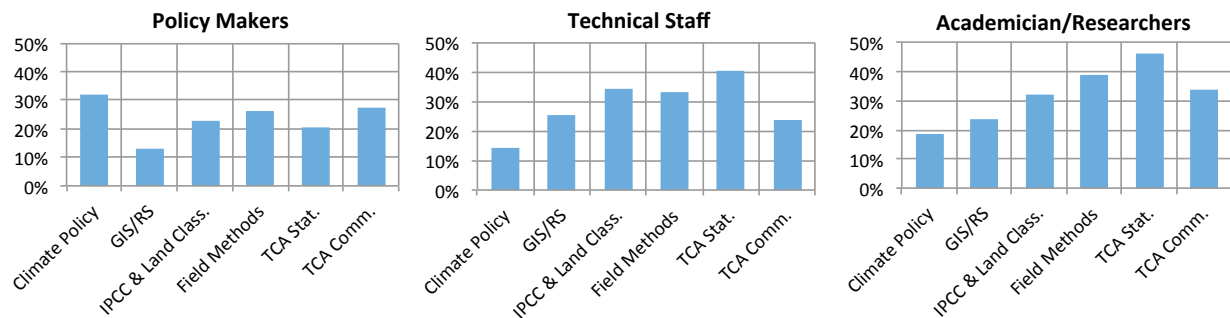
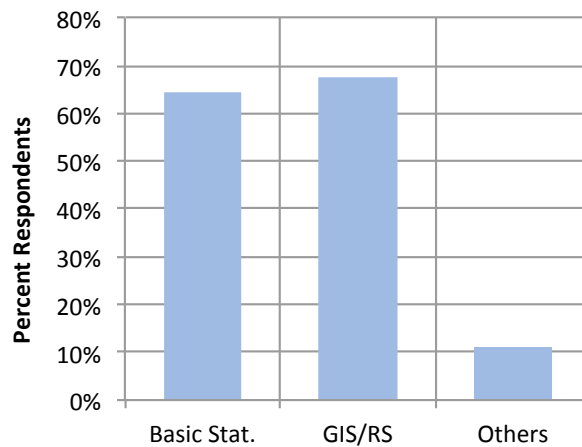


Figure 15. TCA Topics for grouping of participants

In term of prerequisites of TCA Participants, about 78.57% respondents stated the TCA training participants should have certain prerequisites to follow TCA training. From this number about 47% suggest that TCA participants should have a basic knowledge of GIS/RS, followed by 45% a basic knowledge of statistics, and 8% other basic knowledge related to climate change issues (Figure 16).



Graph 16. Prerequisite of TCA Participants

Respondent’s view on training fee is described as follow. For participating in the TCA training, 14% of respondents agreed to pay the training fee with their own expense, while the remaining 86% stated the training fee should be paid with sponsor. Respondents’ views indicate that the source of funding is expected to be government (85%), but funding could also be from international partner institutions. Related to amount of training fee, about 59% respondents stated that the fee should be less than 5 million rupiah, 33% respondents between 5 and 10 million rupiah, while the remaining 8% agreed that the fee could be more than 10 million rupiah (Figure 17).

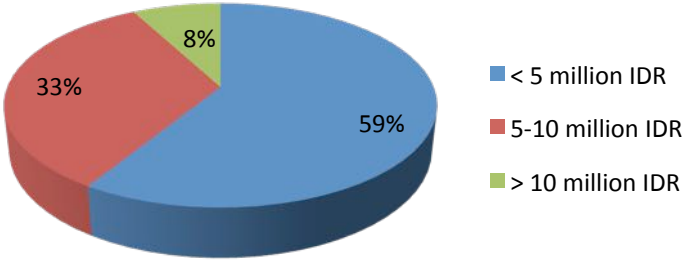


Figure 17. TCA training Fee

In term of support that should be provided to participants of the training before and after the training is presented in Figure 18. Most respondents stated that before the training, participants should be provided with information on reading material and types of data required before the training, while after the training the alumni of the training still can get services which include consultation services, facilitation of alumni meetings, providing up to date information on TCA and other information (Figure 18).

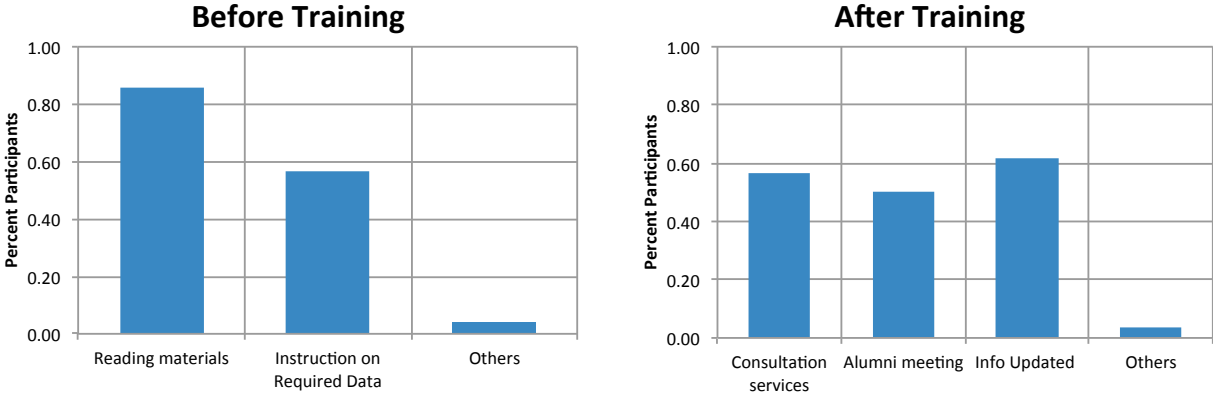


Figure 18. Expected Support for the TCA training

4.6. Development of Relationship Building of the TCA

Based on the interviews, it is known that the development of relationship building the TCA according to some respondents can be done through giving an understanding of benefits that can be obtained by the institutions, introducing them through seminars, providing an annual program, cooperation, holding special meetings and research related to TCA, and conducting joint research.

Related to the question on interest in obtaining TCA curriculum prior to COP 23, most respondents stated they are interested in obtaining TCA curriculum before COP 23 (73%). This enthusiasm indicates that institution or agency related to the respondents have high interest on the TCA training.