

# Training report – Training in National Forest Inventory, 16. – 19.10.2017

## Agenda

<b>Training Agenda: National Forest Inventory (16-19 October, 2017)</b>	
<b>Day 1 - Monday, 16 October, 2017</b>	
<b>8:00 – 9:00</b>	<b>Registration</b>
<b>9:00 - 9:15</b>	Welcome Remarks by IGF/ NPD
<b>9:16 – 9:30</b>	Speech by Chief Guest (TBD)
<b>9:31 – 9: 40</b>	House Keeping
<b>9:40 – 10:10</b>	Introduction to Training Module & Expectations of Participants
	<b>Trainer/ Facilitator: <i>Petri Latva-Käyrä</i></b>
<b>10:01 – 10:50</b>	Evolution of REDD+ and Country Requirements to Access REDD+ Result Based Payments
	<b>Trainer/ Facilitator: <i>Mr. Kamran Hussain</i></b>
<b>10:51-11:10</b>	<b>Tea/ Coffee Break</b>
<b>11:11-12:30</b>	Inventory planning (Stratification, Plot size, Clustering, Spatial autocorrelation, designing plot sample, Improving accuracy)
<b>11:21-13:30</b>	Calculating sample size for strata (Exercise)
	<b>Trainer/ Facilitator: <i>Petri Latva-Käyrä</i></b>
<b>13:31 – 14:30</b>	<b>Lunch/ Prayers</b>
<b>14:31 - 15:20</b>	Calculating sample size for strata (Exercise continues)
	<b>Trainer/ Facilitator: <i>Petri Latva-Käyrä</i></b>
<b>15:20 – 16:10</b>	Estimation of Emission Factors at Sub-National Level – Case Study of Northern Province of Pakistan (Khyber Pakhtunkhwa)
	<b>Trainer/ Facilitator: <i>Anwar Ali</i></b>
<b>16:10 – 16:30</b>	<b>Tea/ Coffee Break</b>

<b>Day 2 – Tuesday, 17<sup>th</sup> October 2017</b>	
<b>9:00 – 10:00</b>	Field measurement data form
<b>10:01 – 11:00</b>	Systematic sampling and LULUC interpretation (Lecture and Exercise)
	<b>Trainer/ Facilitator: <i>Petri Latva-Käyrä</i></b>
<b>11:01-11:15</b>	<b>Tea/ Coffee Break</b>
<b>11:16 – 11:45</b>	Digital field measurements collection application (ArboWebForest Mobile) – Lecture and Demo
<b>11:46 – 13:00</b>	Field Measurement Practices (Lecture)
<b>13:00 – 14: 00</b>	<b>Lunch/ Prayers</b>
<b>14:00 – 16:00</b>	Field Measurement + GPS Exercise (Outside)
<b>16:01 – 16:40</b>	Discussion and Questions + Tea/ Coffee break
	<b>Trainer/ Facilitator: <i>Petri Latva-Käyrä</i></b>

Day 3 – Wednesday, 18 <sup>th</sup> October, 2017	
9:00 – 10:00	Field data processing and plot calculation (lecture)
10:00 – 11:00	Field data calculation in MS Excel (Demo & Exercise)
11:01 – 11:15	<b>Tea/ Coffee Break</b>
11:16 – 13:00	Field data calculation in MS Excel (Demo & Exercise Continues)
13:01 – 14:00	Lunch and Prayers
14:01 – 14:30	Field data calculation in R Studio (Demonstration)
14:31 – 15:30	Carbon Mapping (Lecture and Demonstration)
15:31 – 16:30	Calculation of Forest Reference Level (Exercise)
16:31 – 17:00	Questions + Tea/ Coffee Break
Trainer/ Facilitator: <i>Petri Latva-Käyrä</i>	

Day 4- Thursday, 19 <sup>th</sup> October 2017	
9:00 – 10:00	Estimating Emission Factors for Deforestation (Lecture + Exercise)
10:01 – 11:00	Estimating Emission Factors for Forest Degradation (Lecture + Exercise)
11:01 – 11:15	<i>Coffee Break</i>
11:16 – 12:00	Forest Carbon Accounting Principles and Protocols (IPCC)
12:01 – 13:00	Accounting for Emission Reductions (Exercise)
Trainer/ Facilitator: <i>Kamran Hussain/ Anwar Ali</i>	
13:01-14:00	<b>Lunch and prayers</b>
14:01 – 15:00	<b>Closing and Certificate Distribution</b>

## Content

### Day 1

#### **Evolution of REDD+ and Country Requirements to Access REDD+ Result Based Payments – Lecture**

*By Mr. Kamran Hussain*

The lecture gave the participants a good overall picture of the REDD+ results based payments and the requirements. The lecture gave a good starting point for the training by establishing the framework in which the NFI also needs to work.

#### **Inventory planning – Lecture**

*By Mr. Petri Latva-Käyrä*

The inventory planning consisted of three major parts, the sampling design, the inventory design, and the estimation design. The most prominent of those being the sampling design. Sampling design includes stratification, sample plot shape and size, the sample size and plot allocation. All of the aforementioned aspects of sampling design are closely connected to each other. For example,

stratifications goal is to increase the efficiency of sampling by lowering variation within the strata, which lowers the plot size needed to achieve certain accuracy. Second part of inventory planning is the inventory design. This includes all planning concerning the measurements themselves, e.g. planning of logistics, selecting field teams, training all teams, purchasing equipment, etc. The final part of planning is the estimation design. Estimation design includes everything concerning the calculation phase, e.g. selection of the allometric models, testing the compatibility of field data for the selected models, selecting variance estimators and accuracy assessment methods.

The participants were active and asked questions on multiple aspects of planning. As the inventory planning is perhaps the most important individual step in national forest inventory this was great to notice.

### **Calculating sample size for strata – Exercise**

*By Mr. Petri Latva-Käyrä*

As the exercise on the topic of inventory planning, the participants calculated the optimal sample size using a set of example data. The data consisted of six strata with average aboveground biomass and standard deviation of the average, as well as the average sample plot size and total area of each stratum. The training participants calculated according to given instructions the optimal sample size for entire inventory and for the individual stratum. Optimal sample size takes into consideration both the area of each stratum and the different variation of aboveground biomass in different forest types.

Moreover, the participants learned that the optimal sample size is not the final result, but the sample size should be added 10 – 20 % of extra plots to be sure that the final measured and quality checked number of plots will be at least equal to the optimal sample size.

### **Estimation of Emission Factors at Sub-National Level – Case Study of Northern Province of Pakistan (Khyber Pakhtunkhwa) – Lecture**

*By Mr. Anwar Ali*

Mr. Anwar Ali presented the results from a carbon assessment project conducted in Khyber Pakhtunkhwa). He presented the process plan and methodology in project, and the results of the project with included discussion of the results.

## **Day 2**

### **Field measurement data form – Lecture and discussion**

*By Mr. Petri Latva-Käyrä*

The participants got a chance to look at the new field data collection forms and tell their opinion and any improvements or corrections they saw fit. The field forms are a work in progress, but it was extremely important to get feedback from the people who have the best knowledge on their respective forests. This included for example the important information of how many trees (DBH of 5 cm or more) on average can a field team find from a 1000 m<sup>2</sup> field plot. The participants were enthusiastically involved in the discussion.

### **Systematic Sampling and LULUC interpretation – Exercise**

*By Mr. Petri Latva-Käyrä*

The exercise included visual interpretation of land use and canopy cover using Collect Earth software, which combines Google Earth very high-resolution imagery from different time periods and Collect easy-to-use interface and database. Basic GIS knowledge helps the visual interpretation and the use of the Collect Earth interface, but most participants were successful on interpreting some sample plots. The exercise was short, and its purpose was to give all the participants an idea what has been done for the 10 minutes systematic sampling grid, which was used as the first-phase sample in inventory planning.

### **Digital field measurements collection application (ArboWebForest Mobile) – Demonstration**

*By Mr. Petri Latva-Käyrä*

In this demonstration, the participants were shown a demonstration of the ArboWebForest Mobile Android application for field data collection. The application is a professional tool made to be used in field data collection and it is meant to replace pen-and-paper. The replacement of pen-and-paper will help to ensure the data quality when the data do not have to be transformed from paper forms to digital tables. The participants were very interested in the application.

### **Field Measurement Practices – Lecture**

*By Mr. Petri Latva-Käyrä*

This lecture introduced the participants to the different measurement practices when measuring different carbon pools in the field.

### **Field Measurement Practices and GPS exercise – Exercise**

*By Mr. Anwar Ali and Mr. Petri Latva-Käyrä*

All participants got a chance to in practice hear how field plot should be established and how GNSS/GPS coordinates should be collected. The participants also got a chance to test DBH measurements with caliper and measurement tape as well as height measurements using Vertex IV and Vertex V equipment.

## **Day 3**

### **Field data processing and plot calculation – Lecture**

*By Mr. Petri Latva-Käyrä*

The lecture explained every step of a field data calculation, for example the preprocessing and development of height-diameter models. Moreover, all the different carbon pools were covered, and their calculation stages were clarified.

### **Field data calculation in MS Excel – Exercise**

*By Mr. Petri Latva-Käyrä*

The participants got a chance to calculate the full field data calculation process for one plot. One plot had tall trees, standing and downed dead trees, shrubs, nontree biomass, litter and soil.

### **Field data calculation in R Studio – Demonstration**

*By Mr. Petri Latva-Käyrä*

The participants were introduced to the statistical programming language R, and the program R Studio which can be used to use R language. When a code is ready made for field data calculation, the calculation of field plot data is much faster than when compared to doing calculation in Excel. However, the R language is very difficult for anyone who do not have experience in programming. Thus, taking this tool into use requires much training, but after learning it, many statistical calculations can be done much easier than with other tools.

### **Carbon Mapping and Forest Reference Level – Lecture**

*By Mr. Petri Latva-Käyrä*

The lecture consisted of explaining the ultimate results of the NFI and Satellite Land Monitoring System in respect to REDD+, the emissions factors and the activity data. The participants were introduced to how these two are generated and how they can be combined to generate Forest Reference Level or do Carbon mapping.

### **Calculation of Forest Reference Level – Exercise**

*By Mr. Petri Latva-Käyrä*

The participants got a chance to calculate the emission factors from average carbon stocks of different land uses, and combining those with the respective areas for each activity classes. The combination of these two resulted in carbon dioxide emissions or reduction from different activity classes and finally forest reference level.

Day 4

### **Estimating Emission Factors for Deforestation – Exercise**

*By Mr. Kamran Hussain*

The exercise included the calculation of emission factors for one forest area. The participants got the chance to calculate the amount of emissions coming from deforestation in that area and the confidence intervals of that figure.

### **Estimating Emission Factors for Forest Degradation – Exercise**

*By Mr. Kamran Hussain*

This exercise included in-depth calculation on emissions arising from selective logging which causes forest degradation.

## Feedback

### **From the participants**

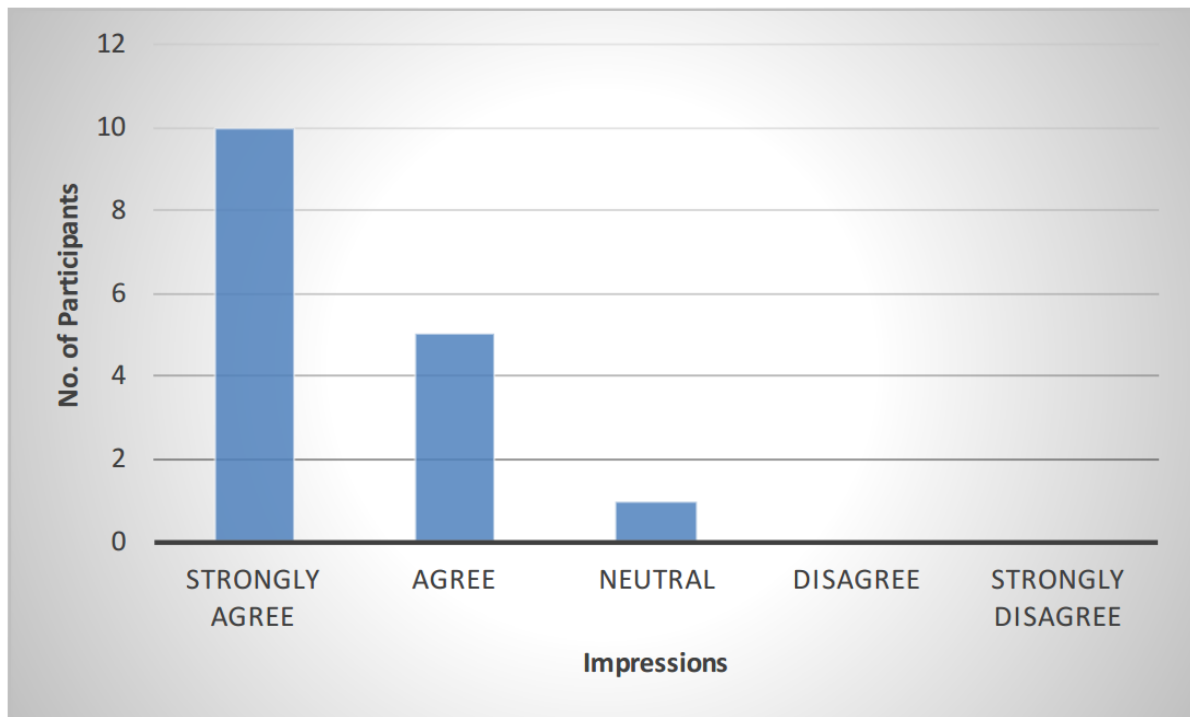
Participants evaluated the training as good and they are of the view that this training provided a great learning experience and clarification about field data collection, statistical calculations and hands-on experience of the software (Collect Earth). This training also imparted practical field demonstration and equipment handling. Few of the participants suggested to extend the time of field visit demonstration. Overall all the aspects were useful, and objective of the training was met. Annex 1 has the detailed summary of participant feedback.

### **From trainer (Petri Latva-Käyrä)**

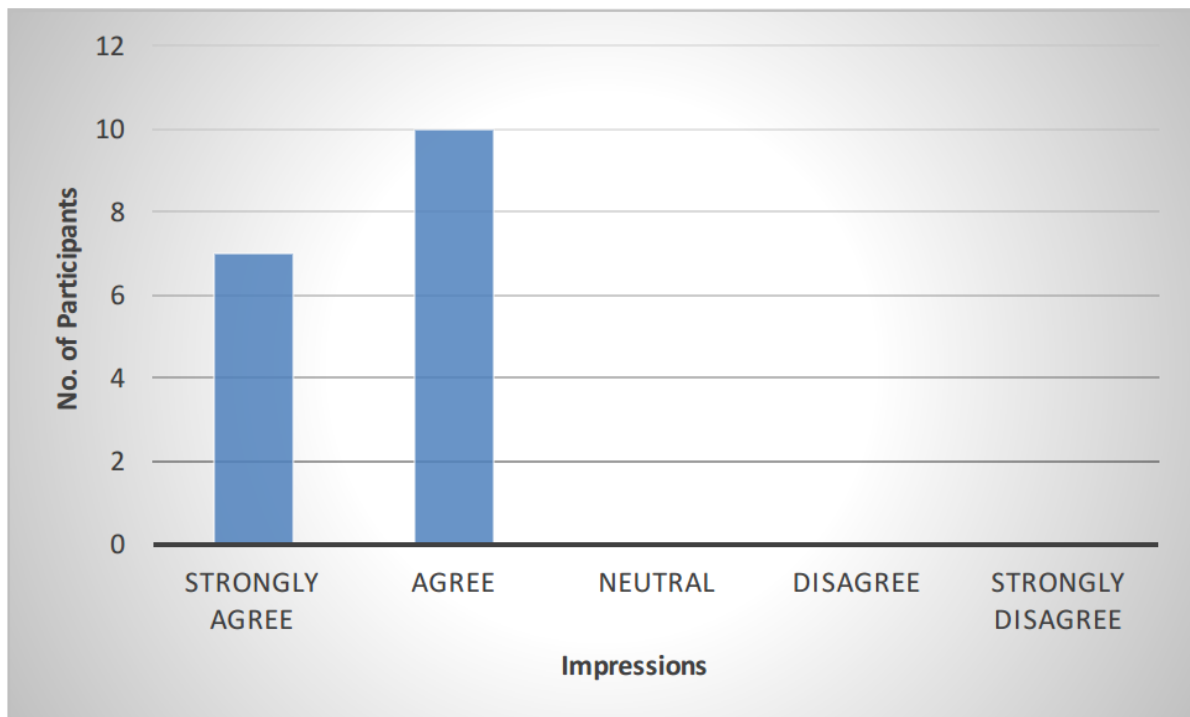
The participants were enthusiastically involved in the different parts of the training. The participants were asked before the training their respective topics of interest, and these were also reflected on the topics they most enthusiastically participated in. It was great to notice that even on topics some of the participants were not entirely familiar with, they still wanted to learn and asked many questions, if there was something they did not know.

## Annex 1 Participant feedback summary

Q1. The training met my expectations

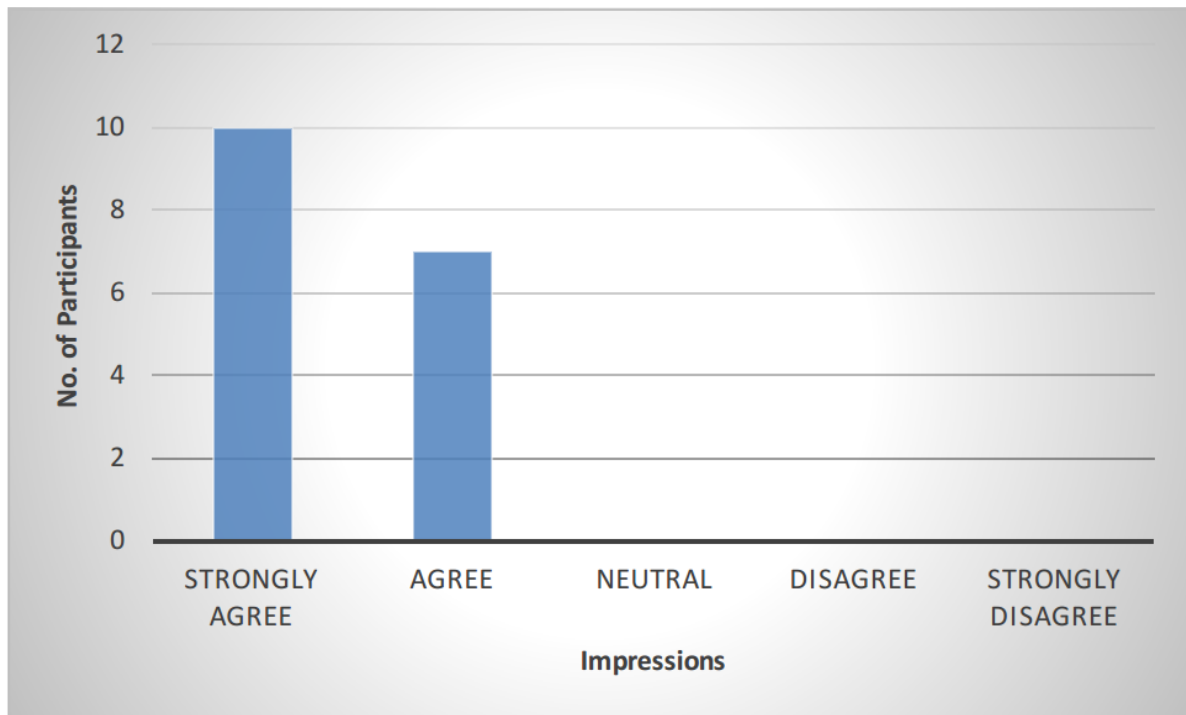


Q2. I will be able to apply the knowledge learned.

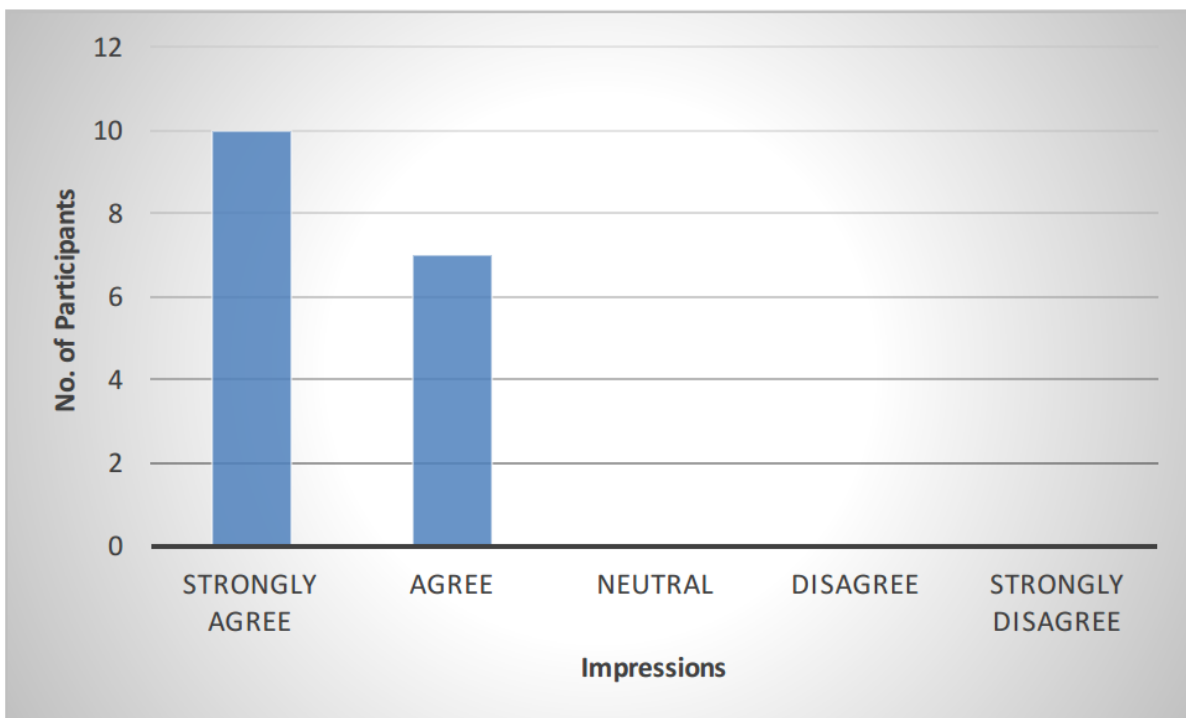




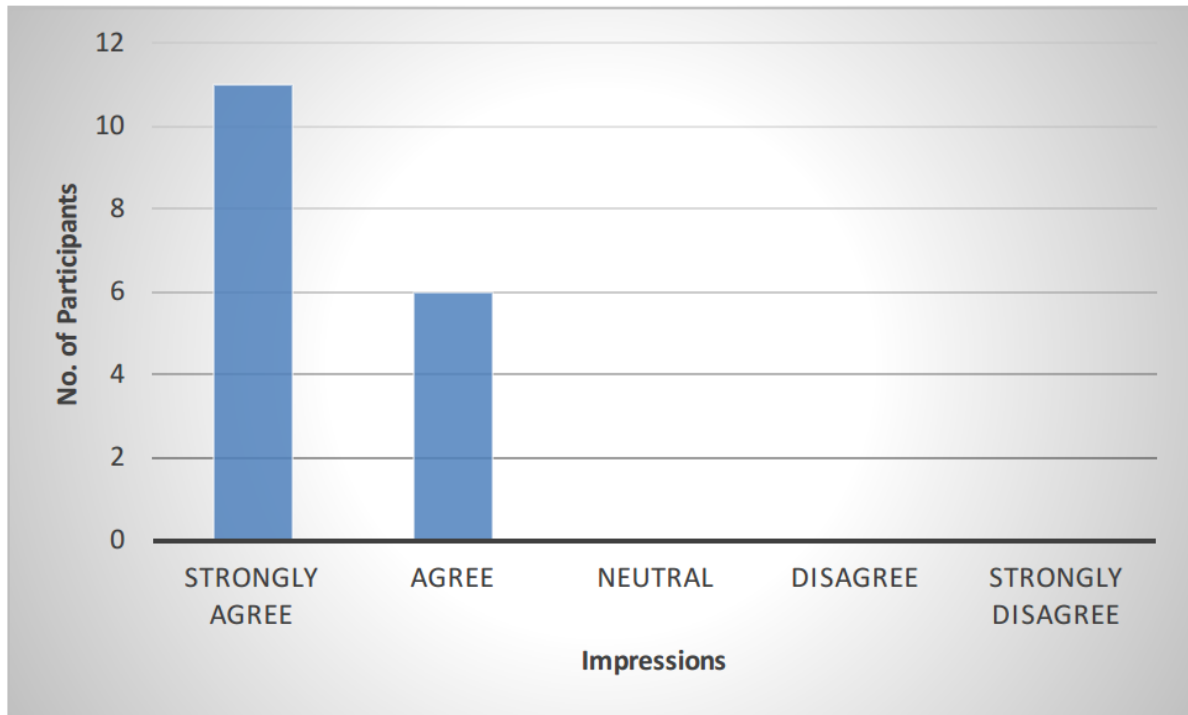
Q3. The training objectives for each topic were identified and followed.



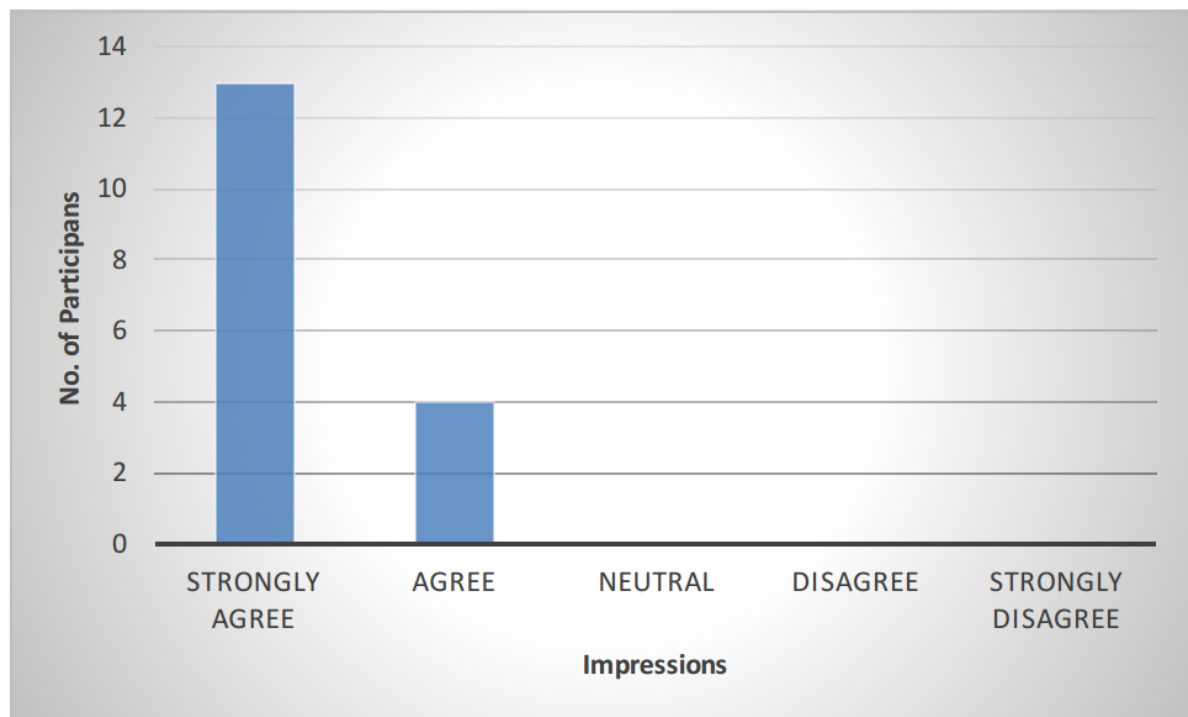
Q4. The content was organized and easy to follow



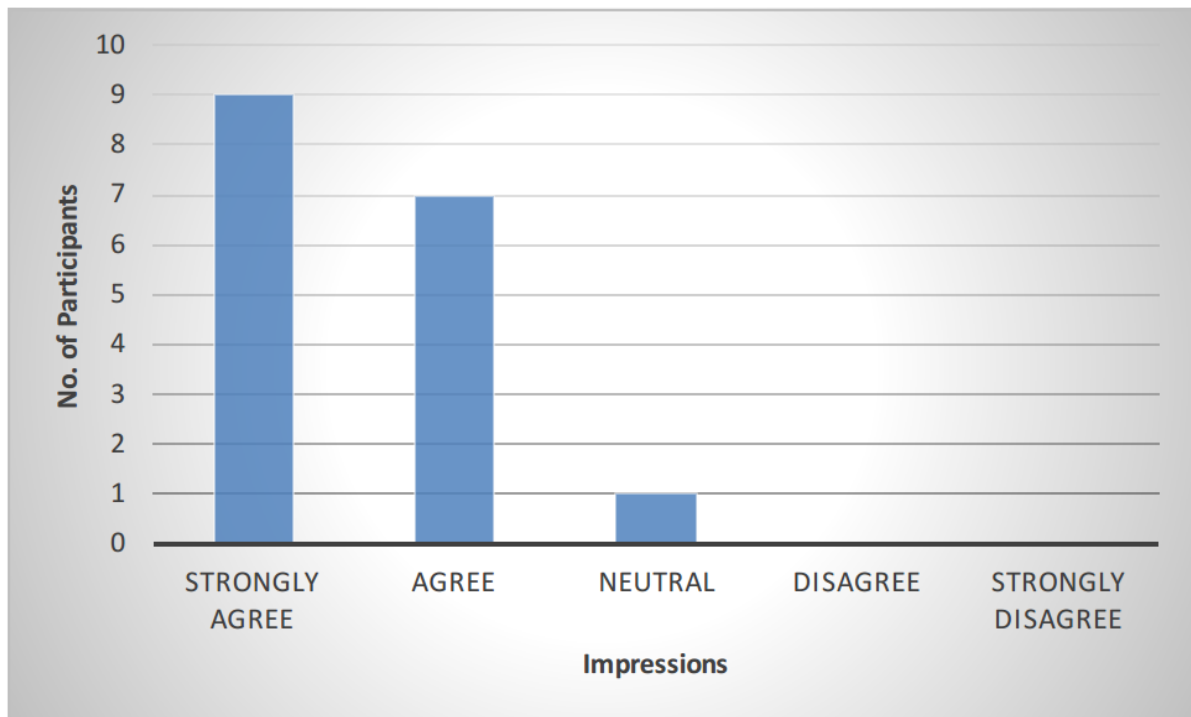
Q5. The training material distributed was pertinent and useful.



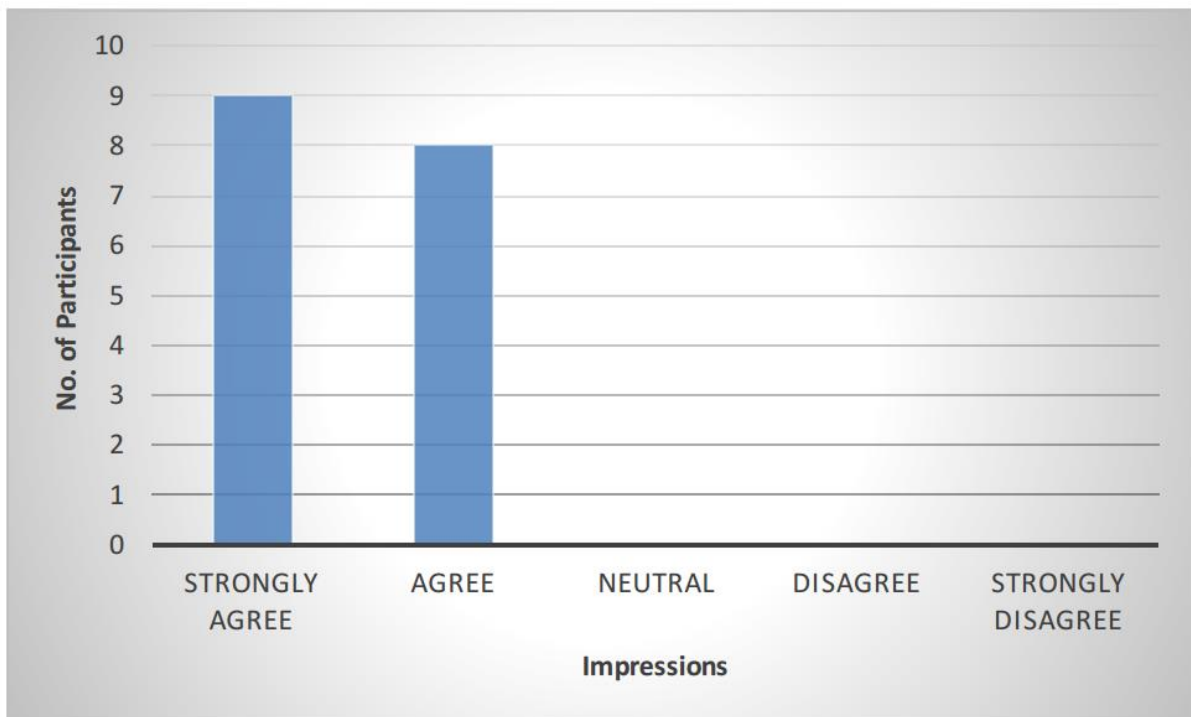
Q6. The trainer had adequate knowledge on the Subject



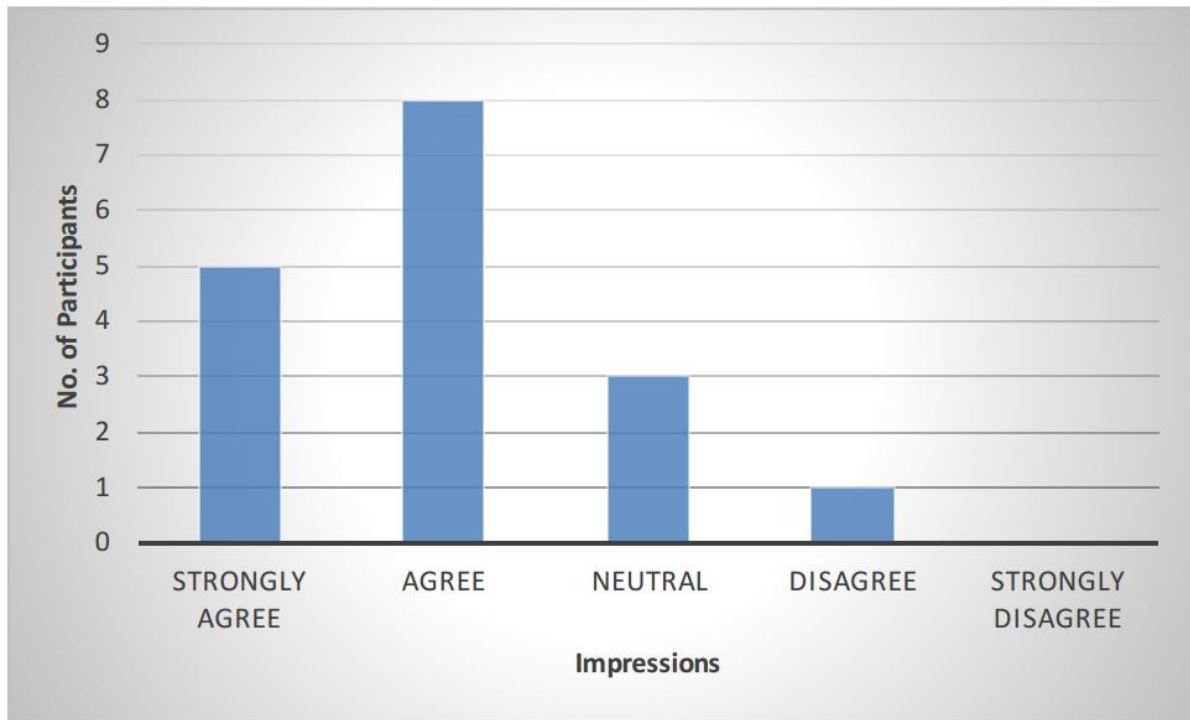
Q7. The quality of instruction was good



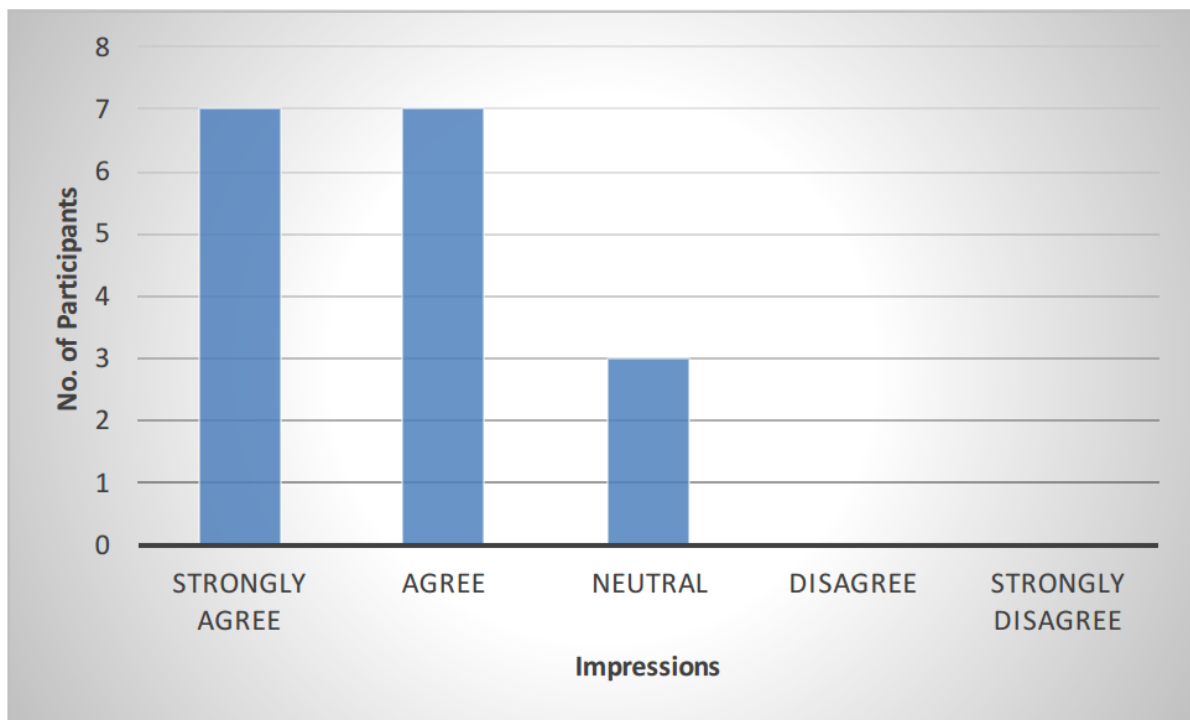
Q8. The trainer met the training objectives



Q9. Class participation and interaction were encouraged



Q10. Adequate time was provided questions and discussion



Q11. How do you rate the training overall?

