QUALITY ASSURANCE AND QUALITY CONTROL FOR THE BANGLADESH FOREST INVENTORY

Quality Assurance and quality Control for the Bangladesh Forest Inventory

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LIST OF ACRONYMS

Acronyms	Description
ACF	Assistant Conservator of Forest
BFI	Bangladesh Forest Inventory
CWD	Coarse Wood Debris
DBH	Diameter at Breast Height
DCCF	Deputy Chief Conservator of Forest
DCF	Deputy Conservator of Forest
DWM	Down Woody Material
IP	Indigenous people
MQO	Measurement Quality Objectives
QA/QC	Quality Assurance/Quality Control
RP	Reference Point
SP	Skilled Person
TC	Team Cordinator
TE	Team Expert

1 INTRODUCTION

Quality assurance and quality control are fundamental for the Bangladesh Forest Inventory (BFI) to reach its objectives and for Bangladesh to fully benefits from this inventory and guide proper decisions in tree and forest management and conservation at all levels.

Quality assurance (QA) encompasses all activities performed to ensure that the field data achieve the desired quality (USDA, 2012). It focuses on identification and documentation of operations and procedures that affect data quality. Quality control (QC) is a system of routine of technical activities to measure and control the quality of the inventory to maintain data quality within an acceptable range. It ensures the data integrity, correctness and completeness, identifies and addresses errors and omissions, and documents and archives inventory material and record all QC activities.

QA/QC activities include a planned system of review procedures conducted both by BFI personnel and by personnel which is not directly involved in the BFI development process (external review). The review provides valuable feedback for the inventory. Major elements of QA/QC are illustrated in Figure 1. QA/QC plan is prepared in order to provide a framework for each activity to be completed (Tulyasuwan, Federici, M., Jonckheere, & Henry, 2011).

1.1 PURPOSE AND SCOPE OF THIS MANUAL

This report provides information about the:

- Organizational structure, to identify the roles and responsibilities for QA/QC activities (chapter 2); and
- General inventory QC/QA procedures, i.e. a description of the QC/QA routines checks that will be implemented across all phases of inventory (chapter 3).
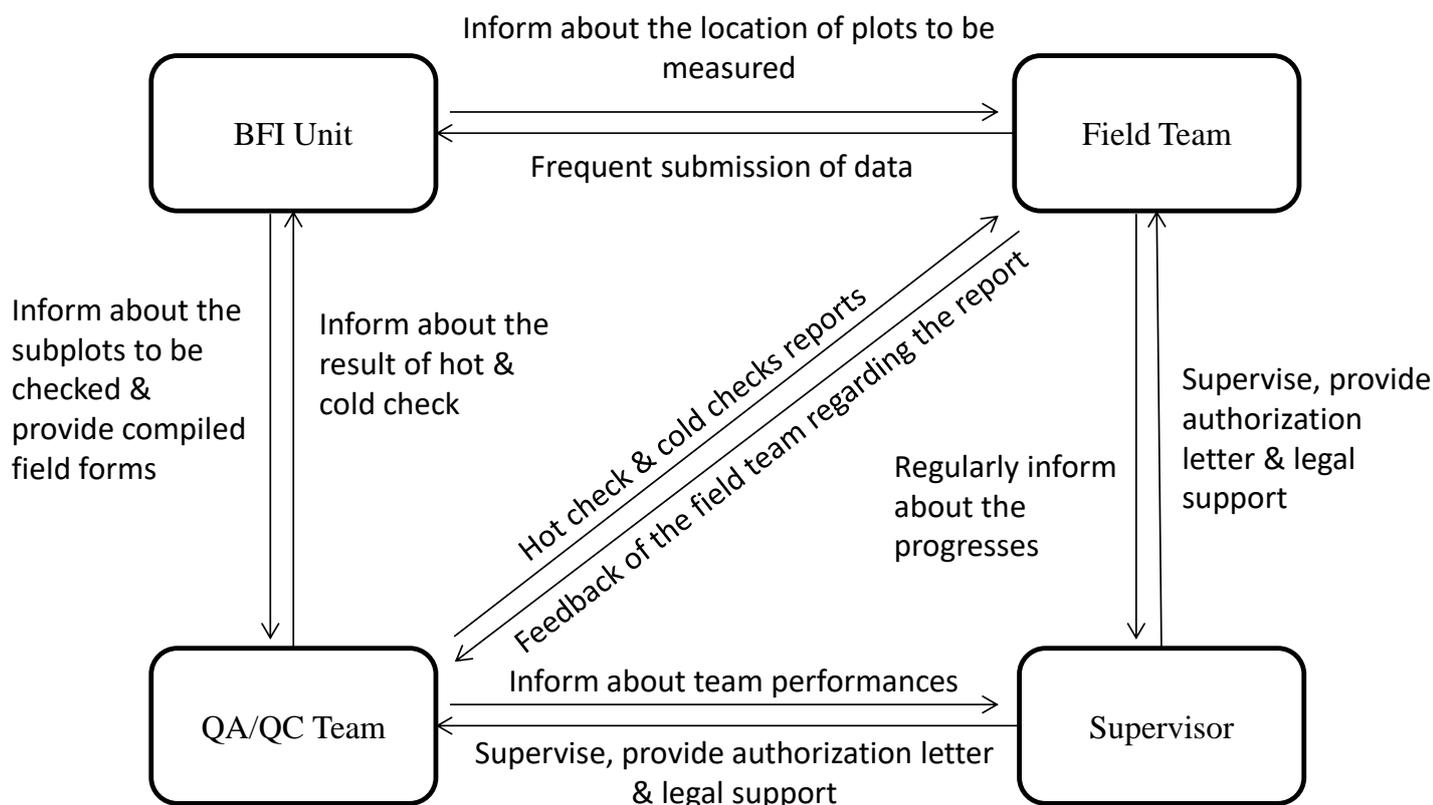
Figure 1: Organisational structure of QA/QC process for the BFI.

1.2   THE QUALITY OF THE DATA

Improvement of the quality of the data can be done at different stages of the inventory: (1) before field work, (2) during field work (including hot checks & cold checks) and (3) after field work.

The goal of the QA is to ensure that data attained meets the minimum specified standards. Data collected for QA purposes can also provide the feedback that is necessary to develop realistic measurement quality objectives (MQOs), revise data collection methods to reduce errors, improve training, and aid in the interpretation of results. The main criteria used to interpret the level of data quality are (Michael. E. Schomaker et al., 2007):

> 1. Precision—the ability of a method to reproduce the same value
>
> 2. Accuracy—the ability of a method to yield the "true" value
>
> 3. Completeness—the amount of valid, usable data produced by a method
>
> 4. Comparability—the ability to combine data collected by different methods, in different locations, and by different data collectors.

The effectiveness of the QA will contribute to prevent data quality problems, assessment and appraisal, and correction.

1.3   MEASUREMENT QUALITY OBJECTIVES

Each variable has a Measurement Quality Objectives (MQOs) composed by 2 parts: (1) a tolerance, and (2) a compliance standard. (1) is the maximum measurement error accepted, expressed in percentage on the real value, and (2) is the maximum number of errors accepted, expressed in percentage on the number of measured individuals.

> E.g. For variable "DBH" (diameter at breast height):
>
>> 1.   Tolerance = ±10%

In this case, for example, for a tree of 50 cm of diameter the tolerance will be of ± 5 cm (which is the 10% of 50) and all measurements bigger than 55cm or smaller than 45cm have to be considered as errors.

>> 2.   Compliance standard = at least 90% of measurements

That is, for example, if 50 trees have to be measured, at least 45 have to be measured correctly (i.e. within the tolerance range). If less than 45 trees have been measured correctly, it means that the MQO has not been reached and this has to be reported in the QA/QC score sheet (see the APPENDIX). The compliance standard is 90% for all tree measurements (such as DBH, Height, etc...) and 100% for the remaining variables.

1.4   CORRECTION

Correction is modification of training, field protocols, and/or the QA/QC procedure to improve data quality. The need for correction and the effect of previous corrections are most objectively evaluated through analysis of hot check and cold check data. Hot checks and training feedback make it possible to implement corrective actions sooner.

Any modification to the methodology is done with extreme caution, because of its potential effect on trend analysis. The need for corrective action decreases over time as the numbers of experienced crew personnel increase.

2   ORGANIZATIONAL STRUCTURE

2.1   THE BFI UNIT

The BFI unit in the Forest Department is responsible for coordinating and executing all BFI field activities, and finally to collate, validate, and disseminate the results. The BFI unit provides the logistical support and supervision to the field (Forest Biophysical and Socio-Economic aspects) personnel and is responsible for monitoring, supervising, and backstopping the fieldwork. The BFI unit should provide field report checks, in order to ensure timely completion for field work, data quality and homogeneity among field teams. The BFI team controls and coordinates the data collection process, the transfer of field forms, and the validation of field forms in preparation for data entry.

2.2   THE SUPERVISORS

Field administration forest zones of Bangladesh are divided into 9 forest circles, each of them headed by a Conservator of Forests. Each of them except Conservator of Forests, Wildlife and Nature Conservation Circle will serve as a Supervisor for the national forest inventory purpose. Supervisors will be responsible for coordinating and ensuring the execution all BFI field activities. Supervisor will coordinate all field teams' activities and QA/QC field activities. The supervisor should provide immediate response and support to field teams if an emergency occurs. Supervisor will convene meeting with field teams and QA/QC teams to remove any errors he comes across during his visit. Supervisor will send a monthly report to DCCF, Planning Wing with copy to CCF abound his observation and recommendations.

2.3   THE FIELD TEAM

Each field team consists of 7 members (Rahman, 2016).The field team will be accompanied by an IP member (preferably the forestry graduate/diploma in forestry) while they are working in Chittagong Hill Tracts and Madhupur Tracts.

The BFI unit will distribute the work of inventory to the field teams. The field team coordinators should select their camping sites in such a manner that maximum number of sample plots can be covered from a camp in the minimum traverse of distance. They should see that the day to day programme is so chalked out that they are not required to make wasteful journeys and will submit their programme to the QA/QC Team coordinators and Supervisor, and also to the local Divisional Forest Officer.

2.4   THE QA/QC TEAM

Each QA/QC team consists of following 4 members (Rahman, 2016). The QA/QC team will be accompanied by an IP member while they are working in Chittagong Hill Tracts and Madhupur Tracts.

Table 1: Composition of the QA/QC team

Position	Nos.	Status	Responsibility
QA/QC Team Coordinator (TC)	1	A DFO/ACF will be the Team Coordinator (TC). They will be nominated by the Forest Department.	TC will organize and distribute fieldwork including delineation of plots; record measurements; local contacts; access the sampling units; quality control of the overall work and maintain liaison with BFI Unit
Technical Expert (TE)	1	Faculty members from SUST/IFESCU/KU with special knowledge on species and bio-	TE will support the bio-physical measurement, maintain records, and help organize other duties assigned by TC.

		diversity.	
Assistant	1	Forest guard will be nominated as Assistant by the Forest Department.	Assistant will assist in plot layout and distance measurements; soil profile establishment, soil sample extraction, bio-physical measurement and any other duties assigned by TC & TE.
Daily Labour	1	Daily labourer will be recruited from local community who has access to the community.	They will be responsible for carrying of equipment, identifying local tree species names (as far as they can), facilitate access to/and movement in plots, facilitate distance measurement, orientation in the field;
TOTAL	4		

The QA/QC Team coordinator (TC) will be stationed close to the location where BFI field work is active. QA/QC TC will be the first point of contact for field teams in case of technical matters and local Divisional Forest Officers will be first point of contact in case of any emergency.

The QA/QC TC will provide a monthly field work progress reports to the BFI Unit.

The QA/QC TC will also ensure that the technical quality of BFI field measurements adhere to this manual. The QA/QC team is responsible for **hot check of 3% plots and cold check of 7% plots**. The QA/QC team will go through the observed shortcomings and errors of measurements with the field teams in the feedback session. Differences in measurements between QA/QC team and field teams are to be discussed and unclear issues should be solved.

2.5 TECHNICAL SUPPORT AND SUPERVISION OF THE OVERALL QA/QC PROCEDURE

The BFI unit in BFD is the unit in charge of providing the technical support and the overall supervision of the QA/QC procedure as well as the BFI process.

The BFI unit is not yet established and operational. Before its operationalization, FD-RIMS with the technical support from FAO and Silvacarbon, will provide the technical support and the supervision of the QA/QC procedure.

3   GENERAL INVENTORY QC PROCEDURES

This section describes the routine checks that are implemented across all phases of inventory development.

3.1 BEFORE THE FIELD WORK

The pre-field preparation is crucial to minimize any source of errors and ensures the teams receive the proper information and necessary logistic support to fully implement their duties within the limited time available. To this end:

- Contact the supervisor and the BFI unit to receive any necessary information and authorization.
- Check the location of the plot from the office using available maps and the sketch map prepared by the field inventory team (see field form F2: Route to the field plot (253)).
- Enquire about the location of the local FD office and the mode of transport to reach there.
- Prepare list of inventory equipment and field forms received and carry them to field following the checklist,
- Collect contact numbers of all members particularly working in the same zone, contact local forest staff of the decentralized offices, concerned Divisional Forest Officers and Supervisors.
- Printed pdf of the field forms.

3.2 DATABASE VALIDATION RULES

The BFI database is built using "Open Foris Collect" and the field data are recorded using the mobile application "Open Foris Collect Mobile". The applications allow includes validation rules which restrict entry of erroneous data and assist correctness, consistency and accuracy of the data collected. Validation rules defined for the BFI includes:

- **Data type validation:** verifies that the data entered is consistent with the expected primitive data type defined for that specific field. Eg: it is not possible to enter characters in numeric fields, such as DBH.
- **Range checks and constraint validation**: verifies that the entered value falls within an accepted value range. Eg: a warning is provided when DBH are bigger than 150 cm.
- **Checks for missing record**
- **Cross checks:** check whether the data entered in different fields is consistent with a set of underlying assumptions. Ex. Diameter-height relationship. A warning is provided whenever the ratio of DBH to tree height is aberrant.

3.3 FIELD CHECKS

3.3.1 HOT CHECKS

Objective: To assess the precision of the measurements of a field crew, and provide immediate feedback that will improve the precision of future measurements.

Definition: A QA/QC team accompanies a field team to a plot. The QA/QC team observes how the regular team works paying attention to measurement techniques, communication, and efficiencies.

In brief, the QA/QC team is measuring alongside the field team assisting in data collection. This is a teaching moment, not a grading period. The QA/QC team and the field team move around each other as long as possible. The field teams will have opportunity to ask questions, and also if an example comes up they can discuss it together. The QA/QC team can also take a measurement after a team member has taken a measurement (e.g. height or DBH), then the member can get feedback immediately and practice with the QA/QC member to get better measurements. It is recommended to carry out hot-checks especially with the new field crews.

At least 3% of the plots are hot checked.

3.3.1 COLD CHECKS

Objective: To assess the precision of the measurements of a field crew by re-measuring a plot after 2-4 weeks.

Definition: A QA/QC team measures a plot which has previously been measured by a field crew, compare the results and produce a scoring report (see following section) which will be submitted to the field crew and to the BFI unit for discussion. The location of the plot to be cold-checked is determined by the BFI unit. It is important that the field teams don't know which plots will be cold-checked by the QA/QC team, so that to no alter their field work performance. <u>The cold-check has to take place within 4 weeks from the first measurement</u>.

Which variables the QC/QC team has to re-measure during a cold-check?

The QA/QC team will validate the land features, objects, and land features proportion of all the 5 sub-plots. The dendrometric variables (such as DBH, height etc.) will be re-measured only on 1 sub-plot, randomly selected by the QA/QC team. If the selected sub-plot contains less than 15 trees, than the QA/QC team will need to re-measure an additional subplot. If, again, the total number of re-measured trees is smaller than 15,

the QA/QC team would need to re-measure a third sub-plot and so on, **until at least 15 trees have been re-measured**. It is important to remember that once the QA/QC team starts re-measuring a sub-plot, **it has to complete it.**

At least 7% of the plots are cold checked.

Cold-check score sheet and reporting

The cold-check process requires the data collected by the QA/QC crew to be checked against the data collected by the field team. The QA/QC team completes the check with a copy of the field team's data in hand so they can directly cross check the results. Through this process, all the errors that have been identified by the QA/QC team have to be entered into the **cold-check score sheet**. The score sheet, once filled, automatically provides a QA/QC score which can be used to assess the work of the field crew. A score of 100% means that no errors have been found, scores smaller than 85% are considered unsatisfactory. A detailed description of the score sheet is provided in the appendix.

Based on the information contained in the score sheet, the QA/QC team compiles a **cold-check report** which will contain the score, as calculated by the score sheet a summary of the inspections, including a list of all relevant errors that has been found, and all other comments and follow-up actions. The report will be submitted to the field crew for discussion and to the BFI unit. The QA/QC team cordinator is responsible for preparing cold-check score sheet and report.

3.3.1 CHECKS FOR SOIL AND PLANT SPECIMEN SAMPLES

Objective: To ensure that the soil samples and plant specimens are properly collected and labelled.

Definition: The soil samples and plant specimen need to be propely collected and sent to the laboratory for analysis and identification on the latest two weeks after the field data coleciton. The BFI unit must be informed about the transfer of the samples in order to prevent any loss of field samples data for any reasons.

Regarding the soil samples, two types of sample are collected in the field: (1) soil texture samples and (2) bulk density samples. The total number of samples should be 9 for a mangrove plot and 6 for non-mangrove plots for both bulk density and texture. This means the total number of samples including texture and bulk density per plot is 18 in mangrove plots and 12 for non-mangrove plots.

The correctness of the labeling of the soil and plant specimen needs to be controlled. All labels have to be clear, readable and consistent with the notation provided in the BFI manual. The number of samples having a incorrectly labelled must be reported in the score sheet.

When reaching the laboratory, the condition of the samples will be checked. The samples should be collected, kept and packed carefully following the instruction provided in the manual. The number of samples which are not in a good condition are reported as errors in the score sheet (spreasheets 9 and 10).

3.3.1 FREQUENT TRANSFER OF FIELD DATA TO A CENTRAL LOCATION FOR BACK-UP

Objective: To prevent loss of data due to lost or damaged tablets or corrupted digital files, or due to lost field forms.

Definition: The data need to be transferred within one week to the BFI unit after the completion of each plot. This will help prevent loss of data for any unavoidable reasons, avoid re-measurement of plot and enable central staff to check the correctness of data on a regular basis.

The soil and plant specimen samples need to be sent to the laboratory for analysis on the latest after two weeks after their collection. Once the lab technicians receive the samples, they will complete the QA/QC form for the soil and plant specimen collection.

3.4 AFTER THE FIELD WORK: CHECK FOR ERRORS IN THE OFFICE

Objective: Despite all cautions it is likely that there might be some unexpected values in the field form recorded by the field crews. Such errors should be checked in the office to maintain quality of data.

Definition: In the office, the BFI unit undertakes several data check to identify unexpected values (e.g., unreasonably large values of DBH, height, etc., or tree species being recorded in unexpected locations). These checks can be done using statistical software, such as R. The research officers, foresters currently working in the BFI Unit will be assigned to check and report such errors. Data quality control has to encompass also the results concerning soil organic carbon contents produced by the laboratory.

3.5 TRANSFER OF ALL DATA, EITHER BEFORE OR AFTER ERROR-CHECKING, TO A CENTRAL DATABASE

Objective: All data should be transferred to a central data base after QC and error-checking for further use.

Definition: Data received from QA/QC team in the field and checked for error in the office should be stored in a central data base. This data can be then used for further analysis and interpretation.

3.6 DOCUMENTATION

All necessary documentation regarding QA/QC has to be archived in the RIMS and BFI units of the Forest Department in order to ensure improvement of future training. Documentation should "includes any of the physical records, such as the QA/QC plan, checklists, notes, calculation sheets, and reports that were utilized to conduct and document the QA/QC activity" (IPCC, 2003).

4   IMPROVEMENT PLAN
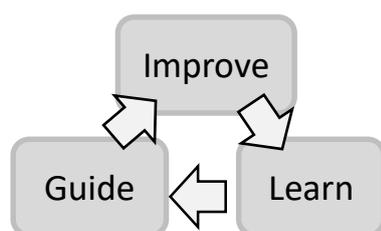
Objective: Identification of the necessary actions to improve the next national forest inventory cycle

Definition: To improve the quality of next inventory necessary actions needs to be taken. These may include improvement of sample design, prioritization of biophysical variables to meet the stakeholders' requirement, and, regarding the QA/QC, implementation strategies for data collection, data collection process, identification of sources of errors and aptitude of data collector.

The improvement plan will be developed by the BFI unit that aims to facilitate continual improvement of the Bangladesh Forest Inventory. It helps priorities improvement activities, adhere national forest inventory to national priorities and the internationally accepted principles meet the needs of policy-makers, researchers and the public and facilitate continual inventory improvement. Documentation of improvement plan helps guide the BFI unit to improve the quality of the national forest inventory for the next cycle. The improvements areas will mainly center around three issues: (1) identifying source of errors, (2) coordination between institutions especially for data collection, and (3) building capacity.

5   CONCLUSION

Differences in measurements are only considered "errors" when they are greater than the tolerance set for the variable in question and beyond the compliance standard. Measurements of the QA/AC teams must be done very carefully to ensure that they are correct, before determining whether the field team's measurements are incorrect. A minimum number of Hot and Cold checks should be done on every crew. A particular care should be given to the Cold Check evaluations, pointing out what the field crew should work on as well as pointing out positive aspects of their work. Before making a determination of right or wrong, consider the field crew's notes and look at the situation from their perspective. The QA/QC procedure is crucial to ensure the successful implementation of the Bangladesh Forest Inventory and its improvement over time.

6   REFERENCES

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7 APPENDIX 1: COLD CHECK SCORE SHEET

OVERVIEW

The cold-check score sheet is an excel file in which the QA/QC team report the number of errors that have been identified for each variable. The spreadsheet calculates a score to assess the quality of the work of the field-crew. The score sheet consists of eight spreadsheets (which approximately correspond to the sections of BFI manual) as well as a spreadsheet of summary (Figure 2). All eight spreadsheets must be filled by the QA/QC team. **The only cells that have to be filled are those colored in yellow**. The orange cells are auto calculated based on the values entered into the yellow cells. The orange cells must not be manually edited.

BASIC INFORMATION ABOUT THE INSPECTION

Information regarding the location of the plot, date of the inspection and names of field team members and of the QA/QC team members must be entered in the "SUMMARY" sheet in rows 2 to 10 ().

BFI Quality Assurance-Quality Control Scoring Summary 2016					
SPREADSHEET	1		SCORING SUMMARY		
PLOT RECORD					
PLOT NUMBER					
FIELD TEAM			QA/QC TEAM		
FIELD TEAM INVENTORY DATE	/ /		QA/QC TEAM INVENTORY DATE	/ /	
DEPARTURE TIME	.... :		DEPARTURE TIME	.... :	
START TIME	.... :		START TIME	.... :	
END TIME	.... :		END TIME	.... :	
FIELD TEAM NUMBER			QA/QC TEAM NUMBER		
TEAM LEADER NAME			TEAM COORDINATOR NAME		
DEPUTY TEAM LEADER NAME			TECHNICAL EXPERT NAME		
INSPECTION RESULTS					
INSPECTION STATUS	#REF!				
WORKSHEETS	ACCEPTABLE OR SATISFACTORY	SCORE	SATISFIED	UNSATISFIED	N/A
PLOT	90	100.0	X		
LAND FEATURE	90	100.0	X		
SUBPLOT	90	100.0	X		

Figure 2 The cold-check Score Sheet.

WHICH ERRORS HAVE TO BE REPORTED IN THE SCORE SHEET

Each variable has its own MQO, which is composed by a tolerance and a compliance standard (see section 1.3). The compliance standard is 90% for the dendrometric variables (such as DBH, tree height, etc…) and 100% for all other variables. The tolerance differs for each variable and is reported in the BFI manual. The QA/QC team must report are only the errors that are beyond the MQOs mentioned section 1.3). Let's illustrate this concept with an example.

As mentioned in chapter 1.3 the tolerance for the variable DBH is ± 10%, with a compliance standard of 90%. Let's assume that a plot contains 50 trees. According to the compliance standard at least 45 of these trees (45 = 90*50/100) have to be measured correctly (within the tolerance range). That is, the maximum number of trees that can be measured wrongly (i.e. beyond tolerance range) is 5. If 11 out of 50 trees have been measured wrongly, the number of error to be reported is 6 (11-5 = 6).

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REPORTING THE ERRORS

Lists of BFI variables are contained in the following spreadsheets:

- SUMMARY (1)
- PLOT (2)
- LAND (3)
- SUBPLOT (4)
- DWM (5)
- SOIL (6)
- TREE_SAPLING (7)
- BAMBOO (8)
- PLANT SPECIMEN (9)
- SOIL SAMPLE (10)

While the spreadsheets 1 to 8 are filled by the QA/QC team, the spreadsheet 9 and 10 are filled by the laboratory staff.

In these spreadsheets the the column "Section" contains the manual section that deals with that specific variable.

The column called "Tolerance" referes to the tolerance threshold against which to determine the overall error, as defined in chapter 1.3. For certain variables, such as "Plot Number" or "Plot status" no errors area tolerated meaning all entries are expected to be correct (Figure 3). The number of error encountered by the QA/QC team has to be entered in the column "# of Errors" (column "E").

BFI Quality Assurance-Quality Control Scoring Summary 2016				
Spreadsheet	2	PLOT LEVEL DATA		
SCORE		100.0		
STATUS		Satisfactory		
TOTAL VALUE		91.0		
TOTAL ERROR		0.0		
PERCENT ERROR		0.0		
DATA ITEM	TOLERANCE	ITEM VALUE	# of ERRORS	ITEM ERROR
PLOT RECORD (61)				
PLOT NUMBER (611)	no errors	10		0
INVENTORY DATE (612)	no errors	10		0
ARRIVING FROM (613)	no errors	2		0
DEPARTURE TIME (614)	no errors	2		0
VALUE		24		
ERROR				0
PLOT LOCATION (62)				

Figure 3. Spreadsheet 2: "PLOT" covers variables from Section 6 of the BFI manual.

CALCULATING THE SCORE

The "Item Value" defines the coefficient of importance which is assigned to each error and is used to calculate the QC/QC score. More significant errors have a higher value (for example an error in the identification of the tree species (Item value = 10) is more significant than a mistake in the selection of the Forestry Office (Item value = 2).

The highest Item Value (which constitutes the most significant error) is the "MISSED OR EXTRA TREES, SAPLINGS & SEEDLINGS" section in the "TREE_SAPLING" tab (Figure 4). Missing a big tree (as well as adding a

non-existing one) has impacts valoume and carbon estimates and therefore has the highest "item value" of 154.

MISSED OR EXTRA TREES, SAPLINGS & SEEDLINGS				
LIVE TREE (DBH>10cm)	no errors	154		0
DEAD TREE (DBH>10cm)	no errors	90		0
SAPLING (2 -9.9 cm DBH)	no errors	90		0
	no errors	29		0
VALUE	363			
ERROR				0
TREE, SAPLING & SEEDLING DATA COMMENTS				

Figure 4. The The missed or extra tree table is in Spreadsheet 7 in the "TREE_SAPLING" tab .

All errors are multiplied by their respective "item values" and summed up for each section. The final score is the ratio of the sum of the errors, expressed in percentage. The score is automatically calculated and it is reported in each section beside the error section (Figure 5).

BFI Quality Assurance-Quality Control Scoring Summary 2016	
Spreadsheet 7	TREE AND SAPLING AND SEEDLING
SCORE	100.0
STATUS	Satisfactory
TOTAL VALUE	285.0
TOTAL ERROR	0.0
PERCENT ERROR	0.0

Figure 5. Scores are auto-calculated in the section at the top of each tab. The status is satisfactory when the score is greater than 85%.

If the score is less than 85% the work is considered unsatisfactory. This information is reported for each section in the field "Status" (Figure 5). Additional checks regarding the placement of the subplots are recorded in the SUMMARY tab. The tolerance for subplot placement is +/- 4 degrees and +/- 1m.

THE INSPECTION SUMMARY

The calculated scores are summarized in the SUMMARY tab shown in Figure 6 which also provides an **overall cold-check score in the Inspection Status cell.** This score is calculated based of the score of each single section (the overall inspection is satisfactory only when all sections are satisfactory). The comments provided from each section are automatically collated at the bottom of the page.

INSPECTION RESULTS					
INSPECTION STATUS	SATISFACTORY				
WORKSHEETS	ACCEPTABLE OR SATISFACTORY	SCORE	SATISFIED	UNSATISFIED	N/A
PLOT	90	100.0	X		
LAND FEATURE	90	100.0	X		
SUBPLOT	90	100.0	X		
DWM	90	100.0	X		
SOIL	90	100.0	X		
TREE, SAPLING AND SEEDLING	90	100.0	X		
BAMBOO	90	100.0	X		

Figure 6. inspection summary table in spreadsheet 1.

The submission of each form is aslso assessed in the SUMMARY tab (see Figure 7). Forms are considered "Unsatisfactory" if they are illegiable, damaged beyond readability or are missing. Appropriate comments should be provided to describe why the forms are unsatisfactory.

RETURNED FORMS	SATISFACTORY	UNSATISFACTORY	NOT INSPECTED	REMARK
F1 – PLOT 1/3				
F2 – PLOT 2/3				
F3 – PLOT 3/3				
F4 – LAND FEATURE				
F5 – LAND FEATURE				
F6 – LAND FEATURE				
F7 – SUBPLOT				
F8 – SEEDLING				
F9 – COARSE WOOD DEBRIS				
F10 – FINE WOOD DEBRIS				
F11 – SOIL AND LITTER				
F12 – TREE AND SAPLING DATA				
F13 – BAMBOO				
F14 – SPECIMEN DATA COLLECTION				
OPEN FORIS DATA				

Figure 7. Assessment of packet, subplot placement and comments in spreadsheet 1.