



# Proceedings of second workshop on the development of the Bangladesh Forest Inventory final report



**Bangladesh Forest Department**  
**23 April 2019**



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## DISCLAIMER

This publication reflects the contributions from the project of “Strengthening National Forest Inventory and Satellite Land Monitoring System in Support to REDD+ in Bangladesh” with technical support from the Food and Agriculture Organization of the United Nations (FAO) and financial support from United States Agency for International Development (USAID). This information herein does not reflect the official position of the supporting international agencies including USAID, FAO and national entities such as Forest Department. Should readers find any errors in the document or would like to provide comments for improving quality they are encouraged to contact Bangladesh Forest Department.

## Abbreviation and Acronyms

ACF	Assistant Conservator of Forests
BFD	Bangladesh Forest Department
BFI	Bangladesh Forest Inventory
CCF	Chief Conservator of Forests
CHT	Chittagong Hill Tracts
DCCF	Deputy Chief Conservator of Forests
DCF	Deputy Conservator of Forests
ECA	Ecologically Critical Area
FAO	Food and Agriculture Organization of the United Nations
FRA	Global Forest Resources Assessment
FREL	Forest Reference Emission Level
IFESCU	Institute of Forestry and Environmental Sciences, Chittagong University
KU	Khulna University
LCC	Land Classification System
NFI	National Forest Inventory
NLRS	National Land Reference System
RIMS	Resources Information Management System
SE	Socioeconomic
SLMS	Satellite Land Monitoring System
SRF	Sundarban Reserved Forests
SUST	Shahjalal University of Science and Technology, Sylhet
UMD	University of Maryland
USAID	United States Agency for International Development
USFS	United States Forest Service



## **Executive Summary**

A one day workshop was held for BFD officials to further support the development and finalization of the BFI report. Previously, in December 2018, a zero draft was sent to the FD for comments and 2 days' workshop was held on 9-10 January 2019 where FD officials and other experts gave crucial feedback. The working group was comprised of foresters from around the country who gave expert opinions about region specific results. Since the January workshop, a 1<sup>st</sup> draft was shared with FD which incorporated the comments of the FD working group. In addition, several consultations have been held with RIMS for further improving the report. Now a 2<sup>nd</sup> draft is ready for a review by the FD working groups again. This will lead to the finalization of the publication by 16 April.

A complete list of the comments and responses is included in Annexure 3.

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## 1. Introduction

In Bangladesh, the state and trends of the forestry resources are not fully known. The existing information is not dated. It is mainly constrained by the lack of institutional capacity and financial inadequacy in carrying out the National Forest Inventory (NFI) and Satellite Land Monitoring System (SLMS). The Forest Department (FD) has identified a national forestry inventory and satellite forest monitoring system as the priority activities for the Forest Department under the Ministry of Environment and Forests.

With the technical support of FAO and financial support of USAID Bangladesh Forest Department has initiated first cycle of national forest inventory in 2015 under the project titled “Strengthening National Forest Inventory and Satellite Land Monitoring System in support of REDD+ in Bangladesh GCP/BGD/058/USA”.

## 2. Targeted participants:

Experts from different forest divisions and university covering all the BFI zones are listed below for working for five BFI zones. They are:

### Hill Zone:

1. Mr. Md. Zaglul Hossain Ph.D, Conservator of Forests, Chittagong Circle, Chittagong
2. Mr. Md. Sanaullah Patwary, Conservator of Forests, Rangamati Circle, Rangamati
3. Mr. Md. Towfiqul Islam, Divisional Forest Officer, CHT South Division
4. Mr. Md. Baktiar Nur Siddiqui, Divisional Forest Officer, Chittagong (N) Division, Chittagong
5. Mr. Abu Naser Md. Yasin Newaz, Divisional Forest Officer, Wildlife Management & Nature Conservation Division, Ctg.
6. Mr. Md. Zaheer Iqbal, Deputy Conservator of Forests, RIMS unit, Dhaka
7. Dr. Al Amin, Professor, Chittagong University

### Sal and Village Zone

1. Mr. Md. Rakibul Hasan Mukul, Conservator of Forests, Social Forest Circle, Bana Bhaban, Mohakhali, Dhaka
2. Mr. Mohammad Abdul Awal Sarker, Conservator of Forests, Social Forest Circle, Bogra
3. Mr. Hossain Mohammad Nishad, Assistant Chief Conservator of Forests, Establishment Unit, Bana Bhaban, Agargaon, Dhaka
4. Mr. Md. Ariful Hoque Belal Assistant Chief Conservator of Forests Management Plan Unit, Bana Bhaban, Agargaon, Dhaka
5. Mr. A.S.M. Jahir Uddin Akon, Divisional Forest Officer, Wildlife Management & Nature Conservation Division, Dhaka
6. Mr. Motlubur Rahman, Director, Botanical Garden and Eco Park, Chottogram
7. Mr. Shorf Uddin Ahmed Chowdhury, Deputy Conservator of Forests Ahmed Chowdhury Forest Management Wing, Bana Bhaban, Agargaon, Dhaka
8. Dr. Mariam Akhter, Asst. Conservator of Forests, Bana Bhaban, Agargaon, Dhaka

## **Sundarban and Coastal Zone**

1. Mr. Md. Amir Hosain Chowdhury, Conservator of Forests, Khulna Circle, Khulna
2. Mr. Gobinda Roy, Conservator of Forests, Coastal Circle, Barisal
3. Mr. Imran Ahmed Asst. Chief Conservator of Forests, Development Planning Unit, Bana Bhaban, Agargaon
4. Dr. Mohammad Zahirul Haque, Asst. Chief Conservator of Forests, Social Forestry & Extension, Bana Bhaban, Agargaon, Dhaka
5. Mr. Md. Bashirul-Al-Mamun, Divisional Forest Officer, Sundarban West Division, Khulna
6. Mr. Tarik Aziz, RO, RIMS Unit, Dhaka
7. Dr. Golam Rakkibu, Professor, Khulna University
8. Dr. Mahmood Hossain, Professor, Khulna University

### **3. Inaugural Session:**

Mr Md. Zaheer Iqbal, National Project Coordinator, NFI project, BFD welcomed all the participants attending the workshop and explained the objective of the workshop. Kristofer Johnson, FAO explained about the progress and changes of the report after the feedback from the 1<sup>st</sup> workshop. He also cleared the confusion regarding Sundarban zone, which is named, as Sundarban Periphery for the Socio-economic survey. Kr. Kris added that there will be two separate documents for Allometric equation and the Socio-economic data. Ms Mariam Akter, ACF, RIMS reviewing the objectives provided brief comments on the draft BFI report. Ms Mariam Akter mentioned that input from both national and international expert is required to make it a complete report for Bangladesh Forest Department. She mentioned that through the workshop section-wise comments will be provided to update the report.

### **4. Group work assignments:**

Initially seven groups will work on separate sections of the report, and will review specific sections in detail. Comments were provided in soft copy of the draft report. The recommendations were then presented to the whole group. The final comments include the minutes of the meeting which are included in Section 3 of these proceedings and also several soft copy draft reports.



Large Group	Small Group	Names	Sections for reading and comment
1	1	Dr. Golam Rakkibul Dr. Mahmood Hossain Dr. Mariam Akhter	Section 1 – 2.2 (19 pages) Intro, Section 2.2 – 2.4 (22 pages) Intro
1	2	Mr. Md. Rakibul Hasan Mukul Md. Bashirul-Al-Mamun,	Section 3 - 4.4 (27 pages) Forest extent and change, Plant diversity
2	3	Mr Md. Baktiar Nur Siddiqui Md. Zaheer Iqbal	Section 4.4 – 5.1 (27 pages) Plant diversity, Growing stocks
2	4	Mr Md. Sanauallah Patwary Dr. Mohammad Zahirul Haque	Section 5.2 - 5.4 (22 pages) Growing stock, biomass, carbon
2	5	Dr. Zaglul Hossain, Tarik Aziz Mr. R.S.M. Munirul Islam	Section 6 – Section 8 (16 pages) Management and Ownership Disturbances, Support for sust. management
3	6	Mr. Abu Naser Md. Yasin Newaz, Ms. Afroza Begum	Section 9.1 (16 pages) Socio-economic
3	7	Mr Md. Towfiqul Islam, Mr. Motlubur Rahman	Section 9.2 – 9.6 (11 pages) Socio-economic

Below is a summary of the points raised by the experts to consider in the report. FAO will take the comments and respond to each of them.

#### 5. Major Remarks and Decisions:

1. Biomass carbon table data are presented on forest division level. As it is the National level report, it should not be narrowed down to district or division. It can put it in the appendix.  
Decision: It will be put in the annex.
2. The soil carbon graph may not be put in the report as it is a technical part. Decision: If the graph is properly explained in the text it can be kept in the report. The error type should be mention to make more clear understanding.
3. Overall, there are inconsistency in the text and the table. The text data is not updated with the updated table data. These needs to be solve.
4. Soil carbon can not be found in the river and khals, village. No data was collected from khal and river. When it is rivers and khals the plot become inaccessible. People will ask questions. So proper explanations is needed for River and khals, Village. Rural Settlement can be in every zone. This is the type of land cover where Zone is selected by dividing the total country in five zones. Please double check this issue.
5. Use the actual figure, no rounding. For example, if it is 2.9 times do not use 3 times.
6. In section 5, recommended that there should be 20 species. Which are the preferred species in zone level.
7. Jack fruit is in the exotic list. It should put it in indigenous species list. This is need to check from the book “Trees of Bangladesh by Das and Alam”

## 6. Concluding Remarks and Next Steps

In conclusion, Mr. Md. Zaheer Iqbal requested to send all comments in the soft copy the drafts report so that the comments can be taken care of. And if anyone have any other comments, he requested them to contact.

- To finalize the text of the report, each of the comments from this meeting should be addressed.
- The final report should be presented to CCF/DCCF and they will decide what to do next, if needed they may suggest some other changes.

## Annexure-1 Time Schedule

Tuesday 23 April 2019	
Timeline	Program
09.00 am - 09.30 am	Registration
09.30 am - 09.40 am	Welcome: <b>Zaheer Iqbal</b> (FD)
09.40 am - 09.50 am	Overview of workshop agenda (10 min) <b>Dr. Mariam Akhter</b> (FD)
09.50 am - 10.00 am	Progress on BFI report (10 min): DR. <b>Kristofer Johnson</b> (FAO)
10.00 am - 10:30 am	Question and Answer
10.30 am - 10.45 am	Refreshment Break
10.45 am - 1:00 pm	7 Small Working Group Sessions (comments in hard copy)
01.00 pm - 02.00 pm	Lunch
02.00 pm - 04:00 pm	3 Large Working Group Sessions (combined comments in soft copy)
04.00 pm – 05.00 pm	Major comments and recommendations from each large group
05.00 pm – 05:15 pm	Closure

## Annexure-2 Participants Details of the Workshop

SL	Name	Gender	Designation	E-mail	Phone
1.	Mr. Md. Motlubur Rahman	M	Director, Botanical Garden and Eco Park, Sitakunda, Chittagong	<a href="mailto:Mrahman10169@gmail.com">Mrahman10169@gmail.com</a>	01712627900
2.	Mr. Md. Zaheer Iqbal	M	DCF, RIMS	<a href="mailto:z.iqbal60@gmail.com">z.iqbal60@gmail.com</a>	01711443750
3.	Mr. Md. Rakibul Hasan Mukul	M	CF, BFD	<a href="mailto:lalpiprey@gmail.com">lalpiprey@gmail.com</a>	01711438032
4.	Mr. Md. Tariq Aziz	M	Research Officer, BFD	<a href="mailto:tqriqaziz9718@gmail.com">tqriqaziz9718@gmail.com</a>	01790284328
5.	Mr. Md. Basirul-Al-Mamun	MM	DFO, BFD	<a href="mailto:mamun98sust@yahoo.com">mamun98sust@yahoo.com</a>	01999005891

6.	Mr. Dr. Md. Golam Rakkibu	M	Professor, Khulna University	<a href="mailto:golamrakkibu@yahoo.co.uk">golamrakkibu@yahoo.co.uk</a>	01711260342
7.	Dr. Mohammad Zahirul Haque	M	ACCF (CF&E), BFD	<a href="mailto:zahirfd@yahoo.co.uk">zahirfd@yahoo.co.uk</a>	01747767651
8.	Mr. Md. Baktiar Nur Siddiqui	M	DFO, BFD	<a href="mailto:baktiar1971@gmial.com">baktiar1971@gmial.com</a>	01711819670
9.	Mr. ANM Yasin Newaz	M	DFO. BFD	<a href="mailto:newaz.yasin@gmail.com">newaz.yasin@gmail.com</a>	01711447161
10.	Abdullah-Al-Mamun Chowdhury	M	FAO	<a href="mailto:abdullah.chowdhury@fao.org">abdullah.chowdhury@fao.org</a>	01711943614
11.	Afroza Begum	F	RO, RIMS Unit, BFD	<a href="mailto:b.afroza@yahoo.com">b.afroza@yahoo.com</a>	01711-283846
12.	Mr. Ariful Hoque Belal	M	ACCF, BFD	<a href="mailto:arifulhoquebelal@gmail.com">arifulhoquebelal@gmail.com</a>	01712-115625
13.	Mr. Tauhidur Rahman	M	Forester, BFD	<a href="mailto:tauhidor.rahman@yahoo.com">tauhidor.rahman@yahoo.com</a>	01712-643117
14.	Mr. Md. Sanaullah Patwary	M	CF, BFD	<a href="mailto:dcfsanaullah@gmail.com">dcfsanaullah@gmail.com</a>	01816301439
15.	Dr. Md. Zaglul Hossain	M	CF, BFD	<a href="mailto:cfctgbfd@gmail.com">cfctgbfd@gmail.com</a>	01711279529
16.	Mr. Md. Towfiqul Islam	M	DFO. BFD	<a href="mailto:islambfd@yahoo.com">islambfd@yahoo.com</a>	01761494702
17.	Dr. Mahmood Hossain	M	Professor, Khulna University	<a href="mailto:mahmoodhossain@hotmail.com">mahmoodhossain@hotmail.com</a>	01711-959580
18.	DR. Mariam Akter	F	ACF, BFD	<a href="mailto:mariamakter2002@gmail.com">mariamakter2002@gmail.com</a>	01711170697
19.	Dr. Kristofer Johnson	M	FAO		
20.	Dr. Laskar Muqsudur Rahman	M	FAO	<a href="mailto:laskar.rahman@fao.org">laskar.rahman@fao.org</a>	01732998449
21.	Md. Akhter Hossain	M	FAO	<a href="mailto:akhter.hossain@cu.ac.bd">akhter.hossain@cu.ac.bd</a>	01827501435
22.	Purnata Chakma	F	FAO		
23.	Mr. Nikhil Chakma	M	FAO	<a href="mailto:nikhil.chakma@fao.org">nikhil.chakma@fao.org</a>	01556-371965
24.	Omar Awabdch	M	FAO		
25.	Myila MAC Deun Cadma	M	FAO		
26.	Mr. Rashed Jalal	M	FAO	<a href="mailto:rashed.jalal@fao.org">rashed.jalal@fao.org</a>	01723383854

## Annexure-3 Responses to BFD review comments of Second Draft BFI report

### General Comments

1. Biomass carbon table data are presented on forest division level. As it is the National level report we should not narrow down to district or division. We can put it in the appendix. Decision: It will be put in the annex.

Ok, we moved it to the appendix.

2. In general, try to re-write the results more positively

Ok. Some results regarding social forestry, support for sustainable forest management, etc were re-worded. The same data are presented, but are used to show potential for improvement in the indicator.

3. Consider taking out carbon stock changes

Yes, the decision was finally made to remove these results from the report. The results may be used in FRL updates or another document in the future when the uncertainties are better understood.

4. Deduct area from shrub dominated in change estimates to be consistent with FRA

Not relevant anymore as change estimates were removed.

5. Regarding the pictures. Change pictures on pages 168, 140. Try to include pictures from all the field teams. Better to zoom out of pictures.

OK, we will try to make these changes. Please understand that access to our photos is limited due to mass storage issues.

6. Add appendix tables about the comparison with the NFA

The following table was added to the Appendix tables.

Variable	Domain	NFA, 2007	BFI, 2019	BFI, using NFA Eq <sup>1</sup>
Area, ha	Forest	1443000	1884019	
	Total	14757000	14757000	
Volume, m3/ha	Forest	48	52	59
	Total	14	23	26
Volume, million m3	Forest	70	97	140
	Total	212	343	377
Biomass, t/ha	Forest	193	64	203
	Total	57	28	88
Biomass, million m3	Forest	278	149	477
	Total	846	415	1294
Avg DBH, cm	Total	20.1	24.1	
Avg Height, m	Total	9.0	11.9	



Number of species	Forest	129	265	
	Total	258	379	

<sup>1</sup>These estimates are derived from the same NFA equations for volume and biomass expansion factor. They are included for a more direct comparison with the BFI which uses multiple allometric equations.

7. Need sentences to reference all Appendix tables

Ok, we added references to Appendix tables in all the relevant sections.

8. The soil carbon graph may not be put in the report as it is a technical part. If the graph is properly explained in the text it can be kept in the report. The error type should be mention to make more clear understanding.

Ok, the error bars were explained in the figure caption.

9. Overall, there are inconsistency in the text and the table. The text data is not updated with the updated table data. These needs to be solve.

Ok, all of the tables and text are now updated with the correct numbering.

10. Soil carbon cannot be found in the river and khals, village. No data was collected from khal and river. When it is rivers and khals the plot become inaccessible. People will ask questions. So proper explanations is needed for River and khals, Village. Rural Settlement can be in every zone. This is the type of land cover where Zone is selected by dividing the total country in five zones. Please double check this issue.

We understand that the decision to keep estimates for even unlikely situations should still be included. In other words, no changes have been made. In the case of River and Khals, when the water is low sometimes field teams were able to take soil samples in those locations, which then were later covered with water and classified as River. In the case of Rural Settlement, some will be confused how Rural Settlement occurs in all zones. In fact, nearly every land cover may occur in all zones. From our discussion, we understand that although it will cause some confusion, FD still wishes to leave land cover level estimates in the report because this information is useful.

11. Use the actual figure, no rounding. For example, if it is 2.9 times do not use 3 times.

Ok, these were changed throughout the report.

12. Section 5, recommended that there should be 20 species. Which are the preferred species in zone level.

Ok, this whole Section 5.2 was revised to include the top five species by zone, for a total of 20 species.

13. Jack fruit is in the exotic list. We should put it in indigenous species list. This is need to check from the book “Trees of Bangladesh by Das and Alam”

In Das and Alam (2001) it is said that jackfruit is wild in the forest of Western Ghat of India and largely cultivated throughout Bangladesh for edible fruits.

## **Specific Comments**

### Section 1

14. (1.1) Not clear may be not necessary -> *“The impacts of deforestation and forest degradation in Bangladesh often interact with natural disturbances. For example, despite a moratorium on logging lasting from 1989 until 2020, in the naturally growing forests of Bangladesh, in the Chittagong Hill Tracts the exploitation of trees has resulted in a substantial loss of soil protecting forest cover.”*

Ok, this was revised:

*“For example, despite a moratorium on logging lasting from 1989 until 2020, in the Chittagong Hill Tracts the exploitation of trees has resulted in a substantial loss of soil protecting forest cover.”*

15. (1.1) Delete -> *“Sundri, the flagship tree species of the Sundarban, suffers from top dying - a disease resulting from increased water salinity, high rates of siltration, and pathogenic causes (Roy 2011).”*

OK, it was deleted.

16. (1.2) describe the padadigm shift in NFI objectives and methods compare to past NFI's

Ok, added: *“Only later did inventories begin to include more forest variables for understanding biological diversity and carbon storage.”*

17. (1.3) may be skipped – *“Although GPS coordinates were available, they were not sufficiently accurate and the metal pipes used to reference the plots could not be found. Additionally, very few of the original NFA staff were available and no paper field forms were available to help find the plots.”*

Ok, it was removed.

18. (1.4) synchronise the highlighted sentences: *“targets to increase productive forest coverage to 20 percent with 70 percent tree density.”* And *“The target remains to raise productive forest coverage from 13% to 15% by 2021.”*

Ok, the second sentence was simply removed.

19. remove the picture and add an appropriate picture

Ok, a different picture was used.

### Section 2

20. (2.1) delete, describe clearly the specific objectives in bullet form

Ok, it was changed.

21. (2.3) why part of headings are italic, please refer the indicator table in the figure text

Ok it was fixed and referred to in the text.

### Section 3

22. (3.3) Revise the description

Ok, this was revised to include the net national change and more details.

### Section 4

23. Revise the Introduction

Ok, this was revised to be more concise and better describe this criterion.

24. (4.1.1) please write clear sentence

Ok, this sentence was fixed.

25. (4.1.1) please check the values

Ok, this was checked and it is correct.

26. (4.1.1) low basal area (0.53 m<sup>2</sup>/ha) (check the value).

Hi, ok the value was corrected to 0.58

27. (4.1.1) Rewrite – “Similarly, the Permanent Cultivation land cover had very low stem density yet high number of species which may reflect agro-forestry practices”

Ok, it now reads “Permanent Crop had very low stem density yet high number of species which may reflect agro-forestry practices.”

28. (4.1.2) Table 4.3 (table should be added according to zone)

Ok, all species tables will be updated to show top 5 species by zone

29. (4.2.2) From where?: “Seedling density in the Mangrove Forest was more than 4 times higher than in Mangrove Plantation”

(Mangrove Forest, 21293 seedling/ha) / (Mangrove Plantation, 4946 seedling/ha) = 4.3

### Section 5

30. (5.1.1) Please check the value 42.07 t/ha H fomes in the Sundarban zone

Ok we check and the number is correct. It is difficult to compare this number to the NFA as only commercial volume of the species was reported at national scale (5.8 m<sup>3</sup>/ha). Total volume of H. fomes is 19.2% of the total commercial volume and more than 4.5% of total gross volume in

NFA whereas it is about 7.7% of total gross volume in BFI. We will check with the regional inventory reports from RIMS for Sundarbans specific volume.

31. (5.1.2) Please check – “55% of the country’s total gross tree volume (m3) occurred in the Village zone followed by 14% in the Hill zones.”

These numbers were checked. The percentages are correct according to the current estimates in the table.

32. (5.1.4) Rearrange the table mentioning districts & Forest divisions

Ok, the table was rearranged. Also, the estimates are now presented by plot owned by FD

33. Change from 70% to 65%

Ok, thanks for catching it. The revised number is actually 63% after some minor corrections. The new table is not as follows:

	AGB (t/ha)	Total AGB (million t)	Sampling Error (±%)	Distribution of AGB in Zones (t/ha)				
				CZ	HZ	SZ	SuZ	VZ
Forest	63.00	152.68	6.92	73.61	38.96	96.22	100.97	37.07
Trees Outside Forest	21.31	262.79	9.00	28.14	17.92	43.39	0.00	20.30

34. (5.2.4) Biomass estimates by Forest Division table should be revised according to plots fall in designated forest land and in trees outside forest.

Ok, a table with volume in BFD land was prepared.

35. (5.4.1) Total highlights should be check

Ok, the totals mentioned in the highlights were checked and found to be consistent with the tables.

36. (5.4.1) Add explanation for why Village zone had the highest carbon stock

Ok, the reason was added that it is because of its larger spatial extent compared to other zones.

37. (5.4.2) Please check the highlights and the table.

Ok, they were checked. The figure of 40% of the total carbon in Khulna and Chittagong was revised to 43%

38. (5.4.4) Check the Highlights

The highlights are correct. The confusion may come because positive values indicate carbon loss and negative values carbon gain. This explanation has been added to both the description and table title.

39. (5.4.5) Is it relevant with report ( Soil carbon changes with depth and by zone).

The result seems relevant to understanding soil carbon stocks in the country. For now it is left in the report but please advise if it should be removed.

## Section 6

40. (6.1) Homestead Forest management type should have some figure in the Hill zone

The management area was checked again. Some corrections were made in designation of vegetation management type for homestead forest and village common forest. Some Homestead forest now occurs in the Hill zones. The table was updated.

41. (6.1) \*\* Why urban parkland is found in hill zone only? Rather it should be more in the village zone!!

Urban Parkland was only observed in one plot in Sreemangal, which was in the Hill zone. Therefore it was a rare occurrence. A footnote was added for explanation.

42. (6.1) Village Common Forest figure seemed very high!!! Need to be checked

VCF was actually uncommon occurring on 0.17% of the country and only in the Hill zone.

43. (6.1) Why there is not woodlot plantation in Coastal?

We checked and can confirm that woodlot plantation was never observed by field teams in the Coastal zone

44. (6.1) Choose better wording for None observed (it can be “No specified management”)

It might not be wise to use different nomenclature from what is given in the BFI manual and data collection. Instead an explanation was given as a footnote: “None observed refers to the field team not finding evident for any type of specific forest management on the plot”

45. (6.2) Describe the ownership categories indicating which type land (i.e. USF) belongs to which ownership. \*\*\* Unknown category should be checked and specified

These tables were updated. The unknown class was checked, but no additional information is available as field teams were not required to specify these cases.

46. (6.3) \*\*\*Only 0.3% material collection from forest?? Check data.

This value was checked and it is correct. Very few people benefitted from services on FD lands.

## Section 7

47. (Intro) The value for cyclone disturbance observed by respondents seems very high. Check with other references

Unfortunately there are no other studies which collected data in a comparable way for us to make comparisons to. The data were checked and the 80% figure is correct. Recall that they were



asked what were the major disturbances they observed over the past 10 years, so perhaps the number is not so high.

48. (Intro) “The main drivers of tree cover loss in the Hill and Sal zones were human-caused such as urbanization and poor management of forests.” This is not acceptable in terms of reality. Because in Hill and Sal zone land use change, encroachment, agri infestation, lack of political will etc. are the main reason of forest cover loss.

We chose to use “poor management” to summarize the responses which included “overharvesting, no new trees planted after harvesting”. These examples were added to the text to make it more clear. Recall that these are the responses from those interviewed, i.e. it is their opinion. New text was added to make this clear.

49. (7.1) waterlogging seemed exaggerated. Natural water logging should be treated as disturbance. Check the estimation and data. \*\* Fire is a great hazard to forest. It can be highlighted.

Field teams were not required to distinguish natural vs. human cause waterlogging, so we cannot separate them.

We checked and the estimate for fire is correct. It is possible that field teams underestimated fire occurrence.

50. (7.1) Mention some of the other reasons for disturbances

Ok, other reasons included cultivation from rice paddy field or jhum.

51. (7.1) Better wording for None Observed. It can be “No disturbance”. None Observed row should be shifted to end of the table

The wording was kept the same to avoid inconsistency with the BFI manual. The ordering was changed so that None observed is at the last row.

52. (7.2) Public opinions are not authentic/reliable in true sense in most of the cases. This figures are not seemed realistic. The table seems not useful

This section is being heavily revised. It will highlight better the consistency between biophysical and socio-economic results to improve the interpretation of drivers of change.

53. Tree cover increase in village zone should be more or less similar to coastal.

Tree cover increase is from Landsat data. We do not know how we could change it so the estimate remains.

54. The reasons of forest loss in Hill Zone are not realistic. Please follow the previous comments about the reasons.

The high rates (>20%) may seem high if they are assumed to be % of area. However as these are the percentages observed by respondents, they are valid on their own merit if the sample is high enough. As we have only included the major reasons, we assume the sample is high enough. For example, the 24% infrastructure development observed in the Hill zone represent 312

households. It is hard to argue that an estimate of so many is a biased reflection of their opinions. Without this information, FD will have no information about the reasons for tree cover loss except the experience/opinion of only a few.

### Section 8

55. (8.1) Justify the message as it was already said that in Hill zone rate of forest loss is very high.

This section is about support for forest management, not forest loss. We need more clarification

56. (8.1) DELETE - The Sal zone received the lowest support, perhaps due to restrictions on forest use in that area and also more urbanized population compared to other zones. The private sector is an important contributor to supporting communities in managing their tree and forest resources.

After consulting further with FD, this was not deleted.

57. (8.1) Contribution of BFD seemed very low which is not realistic.

These are the opinions of the respondents. If it is desirable to change it, please provide a stronger source of information which shows a more realistic values. Remember that hundreds of respondents provided the current information in the tables.

58. (8.2) The information presented in the table not reflecting the real situation.

Same as above response.

59. (8.3) Mention the total number of respondent per zone.

The percentage is shown along with the number. Adding the total number seems redundant?

### Section 9

60. In some places it is mentioned as firewood whereas some other place it is written fuel wood. Need to choose one.

Ok, consistency about this and other issues will be ensured in the next version.

61. Need clarification of Fish resources

Fish products/resources include all types of fisheries resources except shrimp, shrimp fry and crab. During the survey HHs were asked specific questions about these four categories (please refer to section - Primary tree and forest products (i.e. traditionally collected from tree and forest resources i.e., provisioning ecosystem services). Fisheries products includes all these four categories.

62. Table and Figure number need to be consistent with section

Ok, these issues will be seriously taken care of during the final version.

63. Rewrite Third Para and Avoid word like May, Perhaps, Likely

Ok, these along with other grammatical issues will be seriously taken care of during the final version.

64. (9.1.2) The total value of primary tree and forest products collected in Bangladesh is 3.07% of the 2017-18's national GDP measured in current price. The contribution becomes 2.87% when value of fisheries products is not considered.

(Need clarification of fisheries products definition?? Whether it is for SRF or Forest area or Entire country)

Fisheries product includes all types of fish, shrimp, shrimp fry and crab. Information about ONLY the fisheries products that the hhs collect from forest areas were collected. This implies, the quantities, value and income from fisheries products do not represent whole country, rather only those related to forest areas.

65. (9.1.4) Among all the zones, a household in the Sundarbans periphery earns (28,639 BDT/HH/year) more than their counterparts living in other zones, contributed mainly by shrimp and crab, whereas total income is highest in the Village zone (170,975 million BDT/year) (Table 9.7). Is it relevant ??

We included this para to show a comparison across zones, particularly the importance of tree and tree products in the Sundarbans periphery. We also wanted to highlight the contribution of fisheries products in the zone.

If you do not find this interesting, please provide some reasons so that we better understand and can address your concern.

66. (9.1.4) In the Hill and Sal zones, households in the higher tree cover classes have relatively higher average income than their counterparts belonging to the relatively lower tree cover classes. In other three zones, no such correlations were observed. Is it relevant ??

This part comes from appendix. We can refer the relevant table number in the text. This can also be removed as it comes from the appendix.

67. (9.2.1) Need Clarification of “But average household level production is highest in Sundarbans periphery for wooden furniture and handicrafts”.

Please consider, whether this rephrasing makes better sense - A household in the Sundarbans periphery produces higher quantity of wooden furniture and handicrafts than its counterparts living in other zones.

68. (9.2.1) Need more Clarification “Production of wooden furniture is highest in the Village zone, followed by Sundarbans periphery, Sal, Hill and Coastal zone”

May be rephased as – Though average production is highest in the Sundarbans periphery, total production is highest in the Village zone due to relatively higher concentration of households, followed by Sundarbans periphery, Sal, Hill and Coastal zone.

69. (1.2.1) Need tourism statistics to defend this line “zone may reflect the higher demand due to tourism in the zone”

Coastal zone includes Chittagong and Cox’s Bazar – the two major tourist attraction in the country and tourists can be easily assumed to have higher demand for handicrafts. Unfortunately, we are unaware of any such statistical source where zone wise number of tourists is mentioned. But if you can provide some such source, we will certainly mention it.

70. (Table 9.10. Quantity of the processed tree & forest products supplied to the market by the HHs) verify figure with Ash

Thanks for pointing this. We have crossed checked with the original database and verified by calling the hhs. We will update this in the next version.

71. (1.4) How it is justified “Very few”

Nationally only 0.04% of the hhs responded to co-managed forestry. We may use the specific figure in the text.

72. (Table 10.5 & Figure 10) Make visible zone data in graph 0.10. Also can be refer to Strata table to clearly understand

Ok.

73. Add Footnote for (-) sign in bellow table.

OK. The footnote is in the appendix, but missing in the main text. We will mention in the main report also. Minus sign means collection is greater than consumption, i.e. there are surplus.

74. Table 10.6. Firewood value in Hill zone.

We checked the data and the estimate is correct..

75. Make parameter name visible in Figure 9.11

Ok.