Supplementary Materials (I and 2)

Value chain data was collected from fuelwood harvesters, transporters, retailers, wholesalers, and non-licensed actors using structured questionnaires **(supplementary Material 1)** administered through face-to-face interviews, as well as organizing Focus Group Discussion (FGD) (**supplementary Materials)**. The questionnaires contained both open-ended and close-ended questions that sought information on the following: (i) socio-demographic characteristics of the respondents, (ii) cost and sales information, (iii) preferred fuelwood tree species (iv) abundant and scarcely preferred tree species for fuelwood, (v) average monthly quantity of fuelwood handled, (vi) means of transporting fuelwood, (vii), method of sales of fuelwood and (viii) forms of fuelwood handled (e.g., logs, stumps cleaved, twigs, and scrap wood). The questionnaires were developed based on adapted questions from a previous study (Ndegwa, 2010) and information gathered during the preliminary study carried out in 2018. Prior to the actual survey, a pilot study was conducted to test the questionnaire to test the clarity of the question and other issues that were overlooked during the questionnaire development. In addition, the questionnaire was reviewed and endorsed by the Universiti Putra Malaysia's Research Ethics Committee in terms of ethical standards. The questionnaires used in this study are provided in the supplementary materials of this article.

Questionnaire for Fuelwood Harvesters

We are researchers from University Putra Malaysia (UPM) currently undertaking a study titled 'Analysis of fuelwood value chain in Yobe, Nigeria. Thus, we are soliciting for your time to respond to the attached questionnaire. The content of the questionnaire is centred on the below sub-themes:

_____ A: Background

_____ B: Structure and characteristics of fuelwood value chain

_____ C: Cost (expenses)

_____ D: Environmental aspects of fuelwood value chain

_____ E: Problem faced, expected changes and interventions for sustainable fuelwood value chain practices

(1) All information given will be treated confidential

(2)This interview is planned to last no longer than 40 minutes. During this time, you will be asked questions on subject matter that relates to your node in fuelwood value chain.

(3) Your participation in this research is voluntary and you may wish to withdraw at any time if you feel to do so.

Location: _____

Name: _____ _____

Sign: _____Date……/…../2019

Thanks for your responses to our survey

I am a PhD. Student from University Putra Malaysia (UPM) currently undertaking a study titled 'ANALYSIS OF FUELWOOD VALUE CHAIN IN YOBE STATE, NIGERIA'

. Therefore, soliciting for your support and time to respond to the attached questionnaire. The content of the questionnaire is centred on the below sub-themes:

_____ A Socio-demographic Background

_____ B: Structure and characteristics of fuelwood value chain

_____ C: Market analysis/cost

_____ D: Environmental aspects of fuelwood

_____ E: Problem faced, change expectations and interventions in fuelwood value chain

I therefore assure you that:

(1) All information given will be treated confidential

SECTION A: SOCIO-DEMOGRAPHIC PROFILE:

Name (Optional) _____

1. Gender: Male ☐ Female ☐

2. Marital status: Single ☐ Married ☐

3. Age: _____ years

4. Highest Education Level:

1. Tertiary (Dip/NCE/HND/Degree/Masters/PhD) ☐
2. Secondary (JCE/SSCE) ☐
3. Primary ☐
4. Non formal education ☐

5. Household size: _____ person(s)

6. Are you currently registered with any fuelwood association?

Yes ☐ No ☐

7. What is your status in your fuelwood business?

1. Self-employed ☐
2. Employee ☐

8. What is the status of your employment?

Full time ☐ Part time ☐ Seasonal ☐

9. If your status is a part time or seasonal, what is your main occupation? _____

10. How long have you been working as fuelwood collector/harvester? _____

11. Where do you currently live? _____ (name

of the village and city)

12. On average, how much investment capital do you start with ₦ _____ and how much do you earn from this (fuelwood collection/harvesting) job?
₦ _____/month

SECTION B: STRUCTURE AND NODES OF FUELWOOD VALUE CHAIN

13. From the following sources of fuelwood, please indicate your source of fuelwood

Urban forest (Trees within the town) ☐

Bushes ☐

Agroforestry farm ☐

Buffer zones of forest Sanctuary ☐

Communal forest or woodland ☐

Forest reserve ☐

Riverbanks ☐

Hilly areas, ☐

Valleys ☐

Farmlands ☐

Others, (Please specify) _____

14. Of the above sources, which source do you prefer for fuelwood collection _____and why?

_____

15. What quantity of fuelwood do you typically collect/harvest? _____ (Kg/ton/month)

16. Do you obtain a license/permit before harvesting trees for fuelwood?

Yes ☐ How much is the permit fee ₦_____ **per month** and from who? _____

No ☐ Why? _____

17. Please indicate the types of your fuelwood business ownership

Sole owner ☐ Family business ☐ Partnership ☐

Cooperative ☐

Other(s), please specify _____

18. Do you employ worker/s? Yes ☐ No ☐

19. If yes what is the total number of permanent worker you have? _____

20. Describe how do you sell the extracted fuelwood? (e.g., roadside, village, city)

_____

21. How much do you sell?

Sold at roadside ₦ _____

Sold at market ₦ _____ please state the location of the market_____

Sold at other place (Specify the amount and place) ₦ _____

22. If you do not sell your fuelwood (e.g. at roadside or forest compartment), how do you transport the extracted fuelwood to the market?

Own transport ☐

Hired transport ☐

Contracted transport ☐

Others, (Please specify) _____

23. What type of transport do you own or usually hire/contract?

Small size trucks (Pick up and Beijing Van) ☐

Medium size truck (Toyota Van and Mitsubishi) ☐

Big truck/Lorry ☐

Rickshaw (Tricycle) ☐

Camel ☐

Ox-Cart ☐

Wheelbarrow ☐

Bicycle ☐

Headload ☐

Others (Please specify_____

24. Do you vary fuelwood prices in terms of buyers?

Yes ☐ No ☐

25. Who sets the price for fuelwood?

Harvesters ☐

Wholesaler ☐

Transporters ☐

Retailers ☐

Consumers ☐

Others, (Please specify) ☐

26. In what form do you sell the extracted fuelwood?

Bundles of twigs ☐

Stere of twigs ☐

Stere of cleaved woods ☐

Bundles of cleaved woods ☐

Stere of short Logs ☐

Others (Please specify) _____

27. Which period is fuelwood more demanded?

Dry season (November to March) ☐

Wet season (April to October) ☐

28. Which period reflects a high price of fuelwood?

Dry season (November to March) ☐

Wet season (April to October) ☐

29. Who is/are your primary customer(s)?

Households ☐

Institutions/small scale industries ☐

Transporters ☐

Retailers ☐

Wholesalers ☐

All ☐

Others, (Please specify_____

SECTION C: COST INFORMATION

30. List average monthly expenses related to your business?

Types of Cost (please detail out each related cost)	**₦**	**Per month/year**	**Purchase price ₦**	**Year bought**
Variable cost				
Rope				
Royalty				
Fees				
Fuel				
Illegal charges (if any)				
Maintenance and repair				
Self-Transport fee				
Fuelwood Transport fee				
Labor)				
Food				
Others, (Please specify)				
Fixed cost				
Rent				
Tax				
Interest expense				
Building lease expense				
Ax				
Digger				
Mat				
Leather				
Dishes and Pots				
Others, (Please specify)				

31. What is the selling price per truck/stere etc.? ₦ _____

SECTION D: ENVIRONMENTAL ASPECTS OF FUELWOOD VALUE CHAIN (30-38)

32. How do you extract fuelwood?

Manually (Hand collection method, Machete, Ax, Digger) ☐

Mechanically (Chainsaw) ☐

Others, (Please specify_____

33. What type of felling method do you employ in extracting/collecting fuelwood?

Marking and felling selected whole trees ☐

Indiscriminate felling of whole trees ☐

Pruning (stem harvesting) ☐

Stump lifting ☐

Residual collection of (e.g. Construction, ☐

Agricultural activities) ☐

Coppicing ☐

Others, (Please specify) _____

34. What form of trees do you harvest for fuelwood?

Dead standing trees ☐

Diseased tree ☐

Dead fallen trees ☐

Others, (Please specify_____

35. What parts of the tree do you primarily collect/harvest as fuelwood?

Logs ☐

Branch ☐

Stump ☐

Others, (Please specify) _____

36. Is there any restriction on the type of tree species for fuelwood by the forest department?

Yes ☐

No ☐

If yes, what are the names of those species_____?

37. Is there any restriction on the method of harvesting tree species for fuelwood by the forest department?

Yes ☐

No ☐

If yes, what are the names of those methods_____?

38. What are your feelings about the availability of fuelwood from its source?

_____

_____

Use the below abbreviations to complete column D of Table 1

Plantation (P)	Roadside (RS)	Farmland (FL)	Shelter belt Tree (SBT)	Forest reserve (AFT)	Communal forest area (CFA)

Table 1:

39. Please fill the information in the three columns of the table where applicable

S/n	A	B	C	D	E
	Common/Local name (Hausa)	**Botanical Name**	**Types of Woods (Hard Wood or Soft Wood)**	**Mark (X) the preferred tree species for commercial fuelwood**	**Common place where tree species is found**
i.	*Dakwara*	*Acacia Senegal*			
ii.	*Farar kaya*	*Acacia seyal*			
iii.	*Bagaruwa*	*Acacia nilotica*			
iv.	*Gawo*	*Faidherbia albida*			
v.	*Kandili*	*Acacia tortilis*			
vi.	*Marke*	*Anogeissus leiocarpa*			
vii.	*Matsagi*	*Bauhinia rufescens*			
viii.	*Aduwa*	*Balanites aegyptiaca*			
ix.	*Kurya*	*Bombax costatum*			
x.	*Kadanya*	*Vitelaria paradoxa*			
xi.	*Rimi*	*Ceiba pentandra*			
xii.	*Maje*	*Daniellia oliveri*			
xiii.	*Taura*	*Deuterium microcarpum*			
xiv.	*Kanya*	*Diospyros*			

		mespiliformis			
xv.	*Baure*	*Ficus syscomorus*			
xvi.	*Dorowa*	*Parkia biglo bosa*			
xvii.	*Kalgo*	*Piliostigma recticulatum*			
xviii.	*Kirya*	*Prosopis africana*			
xix.	*Sanya*	*Securidaca longepedunculata*			
xx.	*Danya*	*Sclerocarya birrea*			
xxi.	*Tsamiya*	*Tamarindus indica*			
xxii.	*Dinya*	*Vitex doniana*			
xxiii.	*Tsada*	*Xmenia americana*			
xxiv.	*Magarya*	*Ziziphus mauritiana*			
xxv.	*Kurna*	*Ziziphus mucronata*			
xxvi.	**Any other (Please specify)**				

40. Have you noticed any species that is difficult to obtain now compared to the previous period?

Yes ☐

No ☐

If yes, name the species _____and why do you think this happen_____

41. Is the fuelwood supply from the source uniform over the years

Yes ☐

No ☐

If No; please why? _____e.g. seasonality or demanded)

42. Do you make any tree-planting efforts in the forest, rural areas, or urban area?

Yes ☐

No ☐

If yes, Where? _____

If no, Why_____

SECTION E: CHALLENGES AND INTERVENTION STRATEGIES(39-42)

43. What are your main challenges while undertaking your fuelwood business?

i. _____

ii._____

iii._____

44. What do you think should be done to improve the situation stated above?

i. _____

ii._____

iii._____

45. Do you get any support from the government?

Yes ☐

No ☐

i. **If yes, state the type of support?**

_____

ii **If no, why?**

_____

46. Do you get any support from any organization or institution?

Yes ☐

No ☐

If yes, which organization/institution?

i_____

ii. What type of support? _____

47. Are you willing to plant?_____

48. If yes, what assistance do you require if you are willing to plant a tree?

_____

Questionnaire for Fuelwood Transporters

I am a PhD. Student from University Putra Malaysia (UPM) currently undertaking a study titled **'ANALYSIS OF FUELWOOD VALUE CHAIN IN YOBE STATE, NIGERIA'**

. Therefore, soliciting for your support and time to respond to the attached questionnaire. The content of the questionnaire is centred on the below sub-themes:

_____ A Socio-demographic Background

_____ B: Structure and characteristics of fuelwood value chain

_____ C: Market analysis/cost

_____ D: Environmental aspects of fuelwood

_____ E: Problem faced, change expectations and interventions in fuelwood value chain

I therefore assure you that:

(1) All information given will be treated confidential

SECTION A: SOCIO-DEMOGRAPHIC PROFILE:

Name (Optional) _____

1. Gender: Male ☐ Female ☐

2. Marital status: Single ☐ Married ☐

3. Age: _____ years

4. Highest Education Level:

1. Tertiary (Dip/NCE/HND/Degree/Masters/PhD) ☐
2. Secondary (JCE/SSCE) ☐
3. Primary ☐
4. No formal education ☐

5. Household size: _____ person(s)

6. Are you currently registered with any fuelwood association?

Yes ☐ No ☐

7. What is your status in the Transport node?

1. Hired/contracted Driver ☐
2. Owner of truck ☐

8. What is the status of your employment? Full time ☐

Part time ☐ Seasonal ☐

9. If your status is a part time or seasonal, what is your main occupation? _____

10. How long have you been working as a transporter? _____

11. Where do you currently live? _____(name of village and city)

12. On average, how much investment capital do you start with ₦ _____ and how much do you earn from this (fuelwood collection/harvesting) job?

₦ _____/month

SECTION B: STRUCTURE AND NODES OF FUELWOOD VALUE CHAIN

12. **From the following sources of fuelwood, please indicate the fuelwood harvest/collection often source fuelwood or being contracted to haul fuelwood?**

Urban forest (Trees within the town) ☐

Bushes ☐

Agroforestry farm ☐

Buffer zones of forest national park ☐

Gum Arabic plantation ☐

Communal forest or woodland ☐

Forest reserve ☐

Others, (Please specify) _____

13. **Of the above sources, which source do you prefer most to haul fuelwood** _____ and **why?** _____

14. **Do you obtain a license/permit before harvesting trees for fuelwood?**

Yes ☐ how much is the permit fee ₦_____ an from who? _____

No ☐ Why? _____

15. **What quantity do you typically Transport?** _____ (Kg/ton/Truck/month) and **how many trips do you take per month?** _____ (trip)

16. **Please indicate the types of your fuelwood business ownership**

Sole owner ☐ Family business ☐

Partnership ☐ Cooperative ☐

Other(s), please specify _____

17. **Do you employ worker/s?** Yes ☐ No ☐

18. **If yes what is the total number of permanent worker you have?** _____

19. **Describe how you transport fuelwood? (e.g., roadside, village, city)**

_____

20. **How much is the average Transport fee for fuelwood?**

From forest to Market ₦ _____

During mobile Trading ₦ _____ please state any other location of collection fuelwood and its destination _____

21. What is your status as a fuelwood transporter?

Own transport ☐

Hired transport ☐

Contracted transport ☐

Others, (Please specify) _____

22. What type of transport do you own/drive/ride?

Small size trucks (Pick up and Beijing Van) ☐

Medium size truck (Toyota Van and Bedford) ☐

Big truck/Lorry ☐

Rickshaw (Tricycle) ☐

Camel ☐

Ox-Cart ☐

Wheelbarrow ☐

Bicycle ☐

Headload ☐

Others (Please specify) _____

23. What is the average hauling cost per truck or any fuelwood transporting means you are using~~N~~

_____

24. Do you vary the cost of fuelwood transportation in terms of categories of customers?

Yes ☐ No ☐

25. Who sets the hauling price for fuelwood?

Transporters (self) ☐

Harvesters ☐

Wholesaler ☐

Retailers ☐

Others, (Please specify) _____

26. Which form of fuelwood do you frequently transport?

Bundles of twigs ☐

Stere of twigs ☐

Stere of cleaved woods ☐

Bundles of cleaved woods ☐

Stere of short Logs ☐

Others (Please specify) _____

27. Which period is fuelwood more demanded?

Dry season (November to March) ☐

Wet season (April to October) ☐

28. Which period reflects a high price of fuelwood?

Dry season (November to March) ☐

Wet season (April to October) ☐

29. Who is/are your primary customer(s)?

Households ☐

Institutions/small scale industries ☐

Harvesters ☐

Wholesaler ☐

Retailers ☐

Others, (Please specify) _____

SECTION C: COST INFORMATION

30. List average monthly expenses related to your fuelwood transport activities.

Types of Cost (please detail out each related cost)	**Units (Litters)**	**₦**	**Per month/year**	**Purchase price ₦**	**Year bought**
Variable cost					
Fuel					
Maintenance					
Labor.					
Tax					
Labor					
Others, (Please specify)					
Fixed cost					
Insurance					
Tax					
Interest expense					
Big truck/Lorry					
Medium size truck (Toyota Van and Bedford)					
Rickshaw (Tricycle)					
Camel					
Ox-Cart					
Wheelbarrow					
Bicycle					
Others, (Please specify)					

31. What is the cost for contracting truck by harvesters (per truck/stere) ₦ __

SECTION D: ENVIRONMENTAL ASPECTS

32. How do you load fuelwood into the Truck?

Manually (Hand carrying) ☐

Mechanically (Loader Truck) ☐

Others, (Please specify_____

33. How do you off-load the fuelwood from Truck?

Manually (Hand carrying) ☐

Mechanically (Loader Truck) ☐

Others, (Please specify_____

.

34. What form of trees do you Transport as fuelwood?

Only dead trees ☐

Any types of trees ☐

Others, (Please specify_____

35. What form of fuelwood do you frequently Transport?

Log s ☐

Branches ☐

Stumps ☐

Others, (Please specify) _____

36. Is there any restriction by the forest department on the type of tree species you use to transport for fuelwood?

Yes ☐

No ☐

If yes, what are the names of those species_____?

37. Is there any restriction by any other institution/organization on the type of tree species you use to transport as fuelwood?

Yes ☐

No ☐

If yes, what are the names of those methods_____?

38. What are your feelings about the availability of fuelwood from its source?

_____

_____

_____

Use the below abbreviations to complete column D of Table 1

Plantation (P)	Roadside (RS)	Farmland (FL)	Shelter belt Tree (SBT)	Forest reserve (AFT)	Communal forest area (CFA)

Table 1:

39. Please fill the information in the three columns of the table where applicable

S/n	**A**	**B**	**D**	**E**
	Common/Local name (Hausa)	**Botanical Name**	**Mark (X) the preferred tree species for commercial fuelwood**	**Common place where tree species is found**
i.	*Dakwara*	*Acacia Senegal*		
ii.	*Farar kaya*	*Acacia seyal*		
iii.	*Bagaruwa*	*Acacia nilotica*		
iv.	*Gawo*	*Faidherbia albida*		
v.	*Kandili*	*Acacia tortilis*		
vi.	*Marke*	*Anogeissus leiocarpa*		
vii.	*Matsagi*	*Bauhinia rufescens*		
viii.	*Aduwa*	*Balanites aegyptiaca*		
ix.	*Kurya*	*Bombax costatum*		
x.	*Kadanyar Rafi*	*Breonadia salicina*		
xi.	*Kadanya*	*Vitelaria paradoxa*		
xii.	*Rimi*	*Ceiba pentandra*		
xiii.	*Maje*	*Daniellia oliveri*		
xiv.	*Taura*	*Deuterium microcarpum*		
xv.	*Kanya*	*Diospyros mespiliformis*		

xvi.	*Baure*	*Ficus syscomorus*		
xvii.	*Goruba*	*Hyphaene thebaica (big)*		
xviii.	*Dorowa*	*Parkia biglobosa*		
	Kalgo	*Piliostigma recticulatum*		
xix.	*Kirya*	*Prosopis africana*		
xx.	*Sanya*	*Securidaca longepedunculata*		
xxi.	*Danya*	*Sclerocarya birrea*		
xxii.	*Tsamiya*	*Tamarindus indica*		
xxiii.	*Dinya*	*Vitex doniana*		
xxiv.	*Tsada*	*Xmenia americana*		
xxv.	*Magarya*	*Ziziphus mauritiana*		
xxvi.	*Kurna*	*Ziziphus mucronata*		

40. Have you noticed any species that is difficult to obtain now compared to the previous period?

Yes ☐

No ☐

If yes, name the species _____and why do you think this happen_____

41. Is the fuelwood supply from the source uniform over the years

Yes ☐

No ☐

If No; please why? _____ (e.g. seasonality)

42. Do you make any tree-planting efforts in the forest, rural areas, or urban area?

Yes ☐

No ☐

If yes, Where? _____

If no, Why_____

SECTION E: CHALLENGES AND INTERVENTION STRATEGIES

43. What are your main challenges while undertaking your fuelwood operation?

i. _____

ii._____

iii._____

44. What do you think should be done to improve the situation stated above?

i. _____

ii._____

iii._____

45. Do you get any support from the government?

Yes ☐

No ☐

If yes, state the type of support?

i. _____

If no, why?

i. _____

46. Do you get any support from any organization or institution?

Yes ☐

No ☐

If yes, which organization/institution?

i. _____

ii. What type of support?

_____

47. Are you willing to plant?

_____

48. If yes, what assistance do you require if you are willing to plant a tree?

_____

Questionnaire of Fuelwood Vendors (Wholesalers and Retailers)

I am a PhD. Student from University Putra Malaysia (UPM) currently undertaking a study titled '**ANALYSIS OF FUELWOOD VALUE CHAIN IN YOBE STATE, NIGERIA'**

. Therefore, soliciting for your support and time to respond to the attached questionnaire. The content of the questionnaire is centred on the below sub-themes:

_____ A Socio-demographic Background

_____ B: Structure and characteristics of fuelwood value chain

_____ C: Market analysis/cost

_____ D: Environmental aspects of fuelwood

_____ E: Problem faced, change expectations and interventions in fuelwood value chain

SECTION A: SOCIO-DEMOGRAPHIC PROFILE

Name (Optional) _____

1. Gender: Male ☐ Female ☐

2. Marital status: Single ☐ Married ☐

3. Age: _____ years

4. Highest Education Level:

1. Tertiary (Dip/NCE/HND/Degree/Masters/PhD) ☐
2. Secondary (JCE/SSCE) ☐
3. Primary ☐
4. Non-formal education ☐

5. Household size: _____ person(s)

6. Are you currently registered with any fuelwood association?

Yes ☐ No ☐

7. What is your status in your fuelwood business?

3. Self-employed ☐
4. Employee ☐

8. What is the status of your employment?

Full time ☐ Part time ☐ Seasonal ☐

9. If your status is a part time or seasonal, what is your main occupation? _____

10. How long have you been working as fuelwood collector/harvester? _____

11. Where do you currently live? _____ (name of village and city)

12. On average, how much investment capital do you start with ₦ _____ and how much do you earn from this (fuelwood collection/harvesting) job?

₦ _____/month

SECTION B: STRUCTURE AND NODES OF FUELWOOD VALUE CHAIN

13. **From the following sources of fuelwood, please indicate the fuelwood harvest/collection often source fuelwood or being contracted to haul fuelwood?**

Urban forest (Trees within the town) ☐

Bushes ☐

Agroforestry farm ☐

Buffer zones of forest national park ☐

Gum Arabic plantation ☐

Communal forest or woodland ☐

Forest reserve ☐

Others, (Please specify) _____

14. **Of the above sources, which source do you mostly order/buy your fuelwood and why?**
_____

15. **Do you obtain a license/permit for fuelwood trading?**
Yes ☐ How much do you pay per month and From who? _____

No ☐ Why? _____

16. **What volume/quantity of fuelwood do you typically sell?** _____ (Tonne or Kg/month)

17. **Please indicate the types of your fuelwood business ownership**
Sole owner ☐ Family business ☐
Partnership ☐ Cooperative ☐ Group or organization ☐
Other(s), please specify _____

18. **Do you employ a worker?** Yes ☐ o ☐

19. **If yes what is the total number of permanent worker you have?**_____

20. **Describe how you sell your fuelwood? (e.g., roadside, village, city)**
_____

21. How much do you sell?

Sold at roadside ₦ _____

Sold at market ₦ _____ please state the location of the market_____

Sold at other place (Specify the amount and place) ₦ _____

22. How is your fuelwood being convey to the fuelwood market?

Own transport ☐

☐

Hired transport

☐

Contracted transport

Others, (Please specify) _____

23. What type of transport do you use to convey your fuelwood?

Small size truck (Pick-up, Hilux, etc.) ☐

Medium size (Canter) ☐

Big truck/Lorry ☐

Rickshaw (Tricycle) ☐

Camel ☐

Ox-Cart ☐

Wheelbarrow ☐

Bicycle ☐

Headload ☐

Others (Please specify_____

24. Do you vary fuelwood prices in terms of categories of buyers?

Yes ☐ No ☐

25. Who sets the price for fuelwood?

Wholesaler ☐

Retailers ☐

Transporters ☐

Harvesters ☐

Consumers ☐

Others, (Please specify) ☐

26. In what form do you sell the extracted fuelwood?

Bundles of twigs ☐

Stere of twigs ☐

Stere of cleaved woods ☐

Bundles of cleaved woods ☐

Stere of short Logs ☐

Others (Please specify) _____

27. Which period is fuelwood more demanded?

Dry season (November to March) ☐

Wet season (April to October) ☐

28. Which period reflects a high price of fuelwood?

Dry season (November to March) ☐

Wet season (April to October) ☐

29. Who is/are your primary customer(s)?

Households ☐

Institutions/small scale industries ☐

Transporters ☐

Retailers ☐

Wholesalers ☐

All ☐

Others, (Please specify_____

SECTION C: COST INFORMATION

30. Average monthly expenses, please mark where applicable and add if necessary

	S/n **Variables**	**Units** **[Litters, Kilograms/Naira (₦)]**	**Cost/unit (₦)**	**Total costs (₦)**
	Fuel			
	Maintenance			
	Labor			
	Forest royalty			
	Illegal charges (if any)			
	Fuelwood cost			
	Local government tax			
	State government tax			
	Forest community council fee			
	Rent			
	Security			
	Others (Please specify)			

31. At what price do you buy the above selected transport/conveying means loaded with fuelwood?

₦ _____

SECTION D: ENVIRONMENTAL ASPECTS OF FUELWOOD VALUE CHAIN (30-38)

32. How do you carryout fuelwood trading related activities (Weighing, Bundling, loading etc.)?

Manually (Hand collection method, Machete, Ax, Digger) ☐

Mechanically (weighing balance, machine) ☐

Others, (Please specify_____

.

33. What type of trees do you sell as fuelwood?

Fuelwood obtained from dead standing trees ☐

Fuelwood obtained from diseased and forked trees ☐

Fuelwood obtained from dead fallen trees ☐

Others, (Please specify_____

34. What type of trees is supplied to you as fuelwood?

Parts of dead trees only ☐

Combination of dry and non-dried parts of trees ☐

Any Others, (Please specify)_____

35. What form of tree do you primarily sell as fuelwood?

Logs ☐

Twigs ☐

Stumps ☐

Others, (Please specify) _____

36. Is there any restriction by the forest department on the type of tree species to be supplied as fuelwood to vendors?

Yes ☐

No ☐

If yes, what are thoses species? _____

37. Is there any restriction by the forest department on the forms of fuelwood allowed to be supplied and sold of Tree species?

Yes ☐

No ☐

If yes, what are those form of trees? _____

38. What are your feelings about the availability of fuelwood from its source?

Use the below abbreviations to complete column D of Table 1

Plantation (P)	Roadside (RS)	Farmland (FL)	Shelter belt Tree (SBT)	Forest reserve (AFT)	Communal forest area (CFA)

Table 1:

39. Please fill the information in the three columns of the table where applicable

S/n	A	B	C	D	E
	Common/Local name (Hausa)	**Botanical Name**	**Types of Woods (Hard Wood or Soft Wood)**	**Mark (X) the preferred tree species for commercial fuelwood**	**Common place where tree species is found**
i.	Dakwara	*Acacia Senegal*			
ii.	Farar kaya	*Acacia seyal*			
iii.	Bagaruwa	*Acacia nilotica*			
iv.	Gawo	*Faidherbia albida*			
v.	Kandili	*Acacia tortilis*			
vi.	Marke	*Anogeissus leiocarpa*			
vii.	Matsagi	*Bauhinia rufescens*			
viii.	Aduwa	*Balanites aegyptiaca*			
ix.	Kurya	*Bombax costatum*			
x.	Kadanya	*Vitellaria paradoxa*			
xi.	Rimi	*Ceiba pentandra*			
xii.	Maje	*Daniellia oliveri*			
xiii.	Taura	*Deuterium microcarpum*			
xiv.	Kanya	*Diospyros mespiliformis*			
xv.	Baure	*Ficus syscomorus*			
xvi.	Dorowa	*Parkia biglobosa*			
xvii.	Kalgo	*Piliostigma recticulatum*			
xviii.	Kirya	*Prosopis africana*			
xix.	Sanya	*Securidaca longepedunculata*			
xx.	Danya	*Sclerocarya birrea*			

xxi.	Tsamiya	*Tamarindus indica*			
xxii.	Dinya	*Vitex doniana*			
xxiii.	Tsada	*Xmenia americana*			
xxiv.	Magarya	*Ziziphus mauritiana*			
xxv.	Kurna	*Ziziphus mucronata*			
Others, (Specify please) _____					

40. Have you noticed any species that is difficult to obtain now compared to the previous period?

Yes ☐

No ☐

If yes, name the species _____and why do you think this happen_____

41. Is the fuelwood supply from the source uniform over the years

Yes ☐

No ☐

If No; please why? _____ (e.g. seasonality or demanded)

42. Do you make any tree-planting efforts in the forest, rural areas, or urban area?

Yes ☐

No ☐

If yes, Where? _____

If no, Why_____

SECTION E: CHALLENGES AND INTERVENTION STRATEGIES

43. What are your main challenges while undertaking your fuelwood operation?

i. _____

ii._____

iii._____

44. What do you think should be done to improve the situation stated above?

i. _____

ii._____

iii._____

45. Do you get any support from the government?

Yes ☐

No ☐

If yes, state the type of support?

i. _____

If no, why?

i._____

46. Do you get any support from any organization or institution?

Yes ☐

No ☐

If yes, which organization/institution?

i_____

ii. What type of support? _____

47. Are you willing to plant?

_____

48. If yes, what assistance do you require if you are willing to plant trees?

_____

Supplementary Materials 2

Focus Group Discussions Guide

I am a PhD. Student from University Putra Malaysia (UPM), undertaking a study titled ''Analysis of fuelwood value chain in Yobe state. Nigeria. Therefore, soliciting for your support and time to participate in the organized focus group discussion on the theme '***Social aspects of fuelwood value chain***'

I therefore assure you that:

(1) All information given will be treated confidential

(2)This discussion is planned for a day in a scheduled venue and time (9:00am-3:30pm). During this time, we are to discuss on the subject matter with representatives of other relevant organizations, while the investigator remaining as moderator.

(3) Your participation in this research is voluntary.

Location_____

Date_____

I want to explore and understand the issues that lie behind the social aspects of the fuelwood value chain and recommend developmental initiatives and actions that can create or improve a more excellent gender balance, control child labor and generally improve the social aspects of the fuelwood value chain.

QUESTIONS

1. PARTICIPATION AND PRACTICES IN FUELWOOD COMMERCIALIZATION (GENDER AND AGE GROUPS)

i. What is your perception of women's participation and representation in the fuelwood value chain?
_____

ii. Which of the income-generating activities in fuelwood value chain are typically performed by men?
_____and Why?
_____

iii. Which of the income-generating activities in fuelwood value chain are mainly performed by women?
_____and why?
_____

iv. What are your experiences on the obstacles to female participation/representation in all nodes of fuelwood value chain?
_____

2. LAWS, POLICIES AND REGULATORY INSTITUTIONS

i. To what extent do society's laws and values prevent discrimination of women in the commercialization of forest products such as fuelwood?
_____

3. PROBLEMS/CHALLENGES AND INTERVENTIONS

A). PROBLEMS/CHALLENGES

i. What do you think are the major problems that affect the social sustainability of the fuelwood value chain?

_____

B). SUPPORT

i. To what extent does the government provide Educational/awareness support to key actors in the fuelwood industry?
_____

ii. To what extent does the government provide financial support to key actors in the fuelwood industry?
_____

iii. To what extent does the government provide entrepreneurial support to key actors in the fuelwood industry?

_____

iv. To what extent do NGOs or other institutions provide Educational/awareness support to key actors in the fuelwood industry?

_____

v. To what extent do NGOs, and institutions provide entrepreneurial support to key actors in the fuelwood industry?

_____

vi. To what extent does g NGOs, and other institutions provide financial support?

_____

vii. What Strategies/programs/support have any organization among these groups (government, private, public institutions, or NGO) rendered to any node of the fuelwood value chain?

_____

C). FUTURE INTERVENTIONS

What do you like the government to do differently to support the participation of women across all supply chain and along all nodes of the fuelwood value chain (Please prioritize)?

_____