Community Forestry
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VARIOUS ASPECTS OF WOOD USE IN THE PITA - LABÉ REGION OF MIDDLE GUINEA

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I. Introduction

The following study was carried out by agents of the USAID-funded Community Forestry Project, the headquarters of which are at Pita. As originally conceived, the project was to begin activities in the sous-préfectures of Timbi Madina and Bantignel concerning the development of a technical package of sylvicultural methods easily accessible to villagers. Firewood production, through nurseries and plantations, was the primary objective. The project has since expanded its scope of activities as well as the number of areas affected.

The survey was performed by four Guinean Water and Forest Service (WFS) agents, each familiar with one of the four sites concerned; Timbi Madina, Bantignel, Pita, and Labé. The latter two, although not strictly involved with the forestry project, except administratively, were chosen to observe the contrasts or comparisons between urban and rural settings. Each agent was given twenty questionnaire forms and instructed to cover as many different districts of his domain as possible, thus obtaining a general view over each area.

Some statistics of the areas concerned are as follows:

The Pita-Labé section of the Fouta Djallon is mainly a plateau area at an elevation of 1000 m. The population density here is roughly twice that of Guinea as a whole. Rainfall is 1200 - 1400 mm/year, falling from May to November. Soils are generally acidic and only marginally productive. Fonio is the main crop.

The Préfecture of Pita covers 4320 Km^2 and is composed of 10 sous-préfectures, having a total population of 175,000. The Préfecture of Labé, covering 3014 Km^2, has a population of 170,745.

The Sous-préfecture of Timbi Madina, composed of 11 districts, is primarily made up of extensive pastures and a generally flat terrain. The population is 26,530.

Bantignel (pop. 14,256), a sous-préfecture composed of 9 districts, is a more rugged, hilly terrain, sections of which are still well-wooded although vast pastures are found at the center.

This report is offered to demonstrate the fact that fuelwood production, although it need not necessarily be of primary importance in a forestry project, should continue to be an important factor to consider in any managemental/developmental project design.

II.A.

Nom: _____, Ville de _____

1. En moyenne, vous préparez pour combien de personnes par jour? ____

2. Vous préparez combien de fois par jour? _____

3. Vous dépensez combien par jour pour le bois de chauffe? _____

4. En général, le bois est-il bien sec? _____

5. Le prix d'un fagot (3-4 pièces)? _____ Sylis

6. Le prix a-t-il augmenté depuis:
   - un an? _____
   - deux ans? _____

7. Utilisez-vous le charbon? _____ Si oui, estimez quel pourcentage par rapport au bois: _____

Observations générales: _____

_____

_____

_____

_____

Name: _____, City of _____

1. On the average, you cook for how many people per day? _____

2. How many times a day do you cook a meal? _____

3. How much do you spend daily for firewood? _____ Sylis

4. Is the wood generally dry? _____

5. How much is a bundle of wood (3 - 4 pieces)? _____ Sylis

6. Has the price risen since:
   - one year ago? _____
   - two years ago? _____

7. Do you use charcoal? _____ If yes, estimate the percentage compared to wood use: _____

Observations: _____

_____

_____

_____

II.A.1. Survey Response Data

- Pita -

	Question number							
	1.	2.	3. (Sy)	4.	5. (Sy)	6		7.
						1 yr	2yrs	
1.	12	3	50-100	yes	50-150	no	yes	rarely+
2.	6	3	50	yes	50-150	no	yes	no
3.	5	1	50	yes	50-150	no	yes	no
4.	13	3	100	yes	50-150	yes	yes	yes - 15%
5.	9	3	180	d.s.°	75-100	no	yes	no
6.	11	2	100	d.s.	50-100	no	yes	rarely
7.	17	3	100	yes	50-150	yes	yes	no
8.	7	1	50	yes	50-100	yes	yes	no
9.	9	2	100	yes	80-150	yes	yes	no
10.	6	3	50-100	yes	50-150	yes	yes	rarely
11.	3	3	30	yes	50-150	yes	yes	yes - 10%
12.	12	3	100	yes	50-200	yes	yes	yes - 10%
13.	22	3	200	yes	50-150	yes	yes	yes - 10%
14.	8	3	50	yes	50-150	no	yes	no
15.	14	2	50	yes	50	-	-	no
16.	5	1	20	yes	50-100	no	yes	no
17.	37	2	200-500	yes	50-150	no	yes	no
18.	10	2	50-100	yes	50-100	no	yes	rarely
19.	30	2	150	yes	50-150	no	yes	yes - 15%
20.	18	3	100	yes	50-150	yes	yes	yes - 10%
Tot.	254	48	2005§		1877.5			

+taken to mean a charcoal usage of less than 10%.

°d.s. = dry season only.

§where a post range was given, the average was taken in calculating the sum total (ex: 50-100 = 75).

Survey Response Data

- Labé -

	Question number							
	1.	2.	3.	4.	5.	6. 1 yr	6. 2 yrs	7.
1.	5	2	50	yes	50	no	yes	no
2.	6	3	40	yes	50	no	yes	no
3.	11	2	75	yes	25	no	yes	no
4.	19	2	100	yes	30	no	yes	no
5.	5	2	50	yes	25	no	yes	no
6.	10	3	160	yes	80	yes	yes	no
7.	7	2	80	yes	80	yes	yes	yes - 40%
8.	5	1	160	yes	80	yes	yes	yes - 33%
9.	7	2	25	yes	25	yes	yes	no
10.	14	2	50	yes	25	yes	yes	yes - 25%
11.	9	2	50	yes	25	yes	yes	yes - 75%
12.	6	3	50	yes	25	no	yes	no
13.	13	3	60	yes	20	no	yes	no
14.	8	3	60	yes	20	no	yes	yes - 13%
15.	13	3	80	yes	20	no	yes	no
16.	9	2	100	yes	25	yes	yes	no
17.	25	2	200	yes	25	yes	yes	no
18.	12	2	125	yes	25	yes	yes	no
19.	14	2	100	yes	30	no	no	no
20.	2	1	-	-	-	-	-	yes - 100%
Tot.	200	44	1615		685			

II.A.2. Calculations

Question no.	Site	
	Pita	Labé
1. Average size of family	12.70	10.00
2. Number of cooked meals/day	1 = 15%	1 = 10%
	2 = 30%	2 = 60%
	3 = 55%	3 = 30%
Average number of meals/day	2.40	2.20
3. Average daily expenditure/ family for firewood (Sylis)	100.25	85.00
4. Generally, is the wood dry?	yes = 90%	yes = 100%
during dry season only = 10%		
5. Average price of a bundle (Sylis)	93.88	36.05
6. Has the price increased since		
a) one year ago?	yes=47.37%	yes=47.37%
	no=52.63%	no=52.63%
b) two years ago?	yes=100.00%	yes=94.74%
		no = 5.26%
7. Percentage of families using charcoal		
a) less than 10% of the time	20	0
b) 10 - 15% of the time	30	5
c) 16 - 50% of the time	0	15
d) 50 - 100% of the time	0	10
Total	50	30

Note: Questions 3 to 6 for Labé and question 6 for Pita are based on 19 responses.

	Site			
	Pita	/	Labé	
A. Person-meals/day/family	29.75	:	22.45	
B. Cost/person-meal (Sylis)	3.94	:	4.99	
C. Firewood cost of average family				
eating; 1 time a day	50.04	:	49.90	Sylis
2 times a day	100.08	:	99.80	"
3 times a day	150.11	:	149.70	"
average number meals/day	120.09	:	109.78	"
D. Annual firewood expenditure for				
average family eating;				
1 time a day	18,264.60	:	18,213.50	Sylis
2 times a day	36,529.20	:	36,427.00	"
3 times a day	54,790.15	:	54,640.50	"
average number meals/day	43,833.29	:	40,069.70	"
E. Average annual firewood				
consumption (m^3)/family	13.70	:	12.52	
F. Per capita firewood consumption/				
year (in m^3)	1.08	:	1.25	

Formulae:

Given: 365 days/year; 32 100-Syli bundles = 1 $m.^3$

$$A = \frac{\sum_{i=1}^{20} (q1 \times q2)i}{20}$$

(q means "the ith response to question number -")

$$B = \frac{\sum_{i=1}^{20} (q3 \div a)i}{20}$$

$a = (q1 \times q2)i$

$C = Q1 \times B \times m$

(Q means "the average of question number -")

m = the number of cooked meals/day

$D = C \times 365$ $\quad E = D_{(av.)} \div 3200$ $\quad F = E \div Q1$

Nom _____

Village de _____, Sous-préfecture de _____

_____

1. Quelles espèces sont préférées pour le bois de chauffe?
   a) _____
   b) _____
   c) _____

2. Le bois de chauffe est-il coupé vivant ou mort? _____

3. En moyenne, vous préparez pour combien de personnes par jour? _____

4. Vous préparez combien de fois par jour? _____

5. Un fagot* suffit pour combien de jours? _____

6. Vous allez chercher le bois à quelle distance du village? _____

7. Combien de temps faut-il pour aller chercher un fagot? _____

8. Est-il plus difficile de trouver le bois maintenant que:
   - il y a deux ans? _____
   - il y a cinq ans? _____

9. Quelles espèces sont préférées pour la construction des cases?
   a) _____
   b) _____
   c) _____

10. Quelles espèces sont préférées par les animaux?
    a) _____
    b) _____
    c) _____

Observations générales : _____

_____

_____

* quantité qu'un adulte transporte sur la tête.

Name: _____

Village of _____, Sous-préfecture of _____

_____

1. Which species are preferred for firewood?
   a) _____
   b) _____
   c) _____

2. Is the firewood cut live or dead? _____

3. On the average, you cook for how many people per day? _____

4. How many times a day do you cook a meal? _____

5. A bundle lasts how many days? _____

6. How far from the village do you search for firewood? _____

7. How much time does it take to acquire a bundle? _____

8. Is it more difficult to find firewood now than:
   - two years ago? _____
   - five years ago? _____

9. Which species are preferred for traditional construction?
   a) _____
   b) _____
   c) _____

10. Which species do the animals prefer?
    a) _____
    b) _____
    c) _____

Observations: _____

_____

II.B.1. Survey Response Data

- Timbi Madina -

	Question number						
	2.°	3.(pers.)	4.	5.(days)	6.(Km)	7.(hrs)	8.(2 yrs)
1.	l+d	3	3	4	4	4	yes
2.	l+d	3	3	4	4	4	yes
3.	l+d	3	3	4	4	4	yes
4.	l+d	3	3	4	3	3	yes
5.	l+d	3	3	4	3	3	yes
6.	l+d	3	3	4	3	3	yes
7.	l+d	3	3	4	1	1	yes
8.	l+d	3	3	4	0.8	1	yes
9.	l+d	3	3	4	1	1	yes
10.	l+d	4	3	4	4	4	yes
11.	l+d	4	3	4	4	4	yes
12.	l+d	4	3	4	4	4	yes
13.	l+d	7	3	2	5	8	yes
14.	l+d	3	3	4	3	4	yes
15.	l+d	3	3	4	3	4	yes
16.	l+d	3	3	4	3	4	yes
17.	l+d	3	3	4	2	2	yes
18.	l+d	3	3	4	4	5	yes
19.	l+d	3	3	4	4	5	yes
20.	l+d	3	3	4	0.5	1	yes
Total		67	60	78	60.3	69	

° l=live wood, d=dead wood.

Survey Response Data

- Bantignel -

	Question number							
	2.°	3.(pers.)	4.	5.(days)	6.(Km)	7.(hrs)	8 2yrs	8 5yrs
1.	d	5	1	2	3	1	no	yes
2.	d	5	1	2	5	3	no	yes
3.	d	10	2	1	2	1	yes	-
4.	d	14	3	1	1	1	no	no
5.	d	2	3	1.5	1	2	yes	-
6.	d	7	2	2	1	1	no	yes
7.	d	15	2	1	3	1.5	yes	-
8.	d	5	2	2	3	1	yes	-
9.	d	7	2	1	5	2	yes	-
10.	d	10	3	2	6	3	yes	-
11.	d	8	2	2	1	2	no	yes
12.	d	11	2	1	8	3	yes	-
13.	d	2	1	2	1	1	no	yes
14.	d	7	2	1	3	1	yes	-
15.	d	3	3	2	1	2	no	yes
16.	l+d	1	2	3.5	4	4	no	no
17.	d	5	1	5	1	2	no	no
18.	d	10	3	1	6	3	yes	-
19.	d	10	2	1	5	1.5	yes	-
20.	d	10	2	1	5	3	yes	-
Total		147	41	35	65	39		

° l=live wood, d=dead wood.

The following are the responses to questions no. 1, 9, and 10 of the village questionnaire concerning the species preferred for firewood, construction, and forage. Percentages represent the amount relative to the total number of responses for that sous-prefecture and category. The broken line signifies the cut-off point at which 75% of the responses is exceeded.

Timbi Madina	%	/	Bantignel	%
		--Firewood species--		
Hymenocardia acida	15.62	:	Harungana madagascariensis	17.91
Parinari curatellifolia	15.62	:	Parinari curatellifolia	16.42
Holarrhena floribunda	10.93	:	Uvaria chamae	13.43
Uapaca togoensis	10.93	:	Dichrostachys cinerea	11.94
Cassia sieberana	9.38	:	Cassia siamea	7.46
Dialium guineense	7.82	:	Dialium guineense	5.97
Eugenia sp.	7.04	:	Parkia biglobosa	5.97
Pterocarpus erinaceus	6.26	:	Hymenocardia acida	4.48
Harungana madagascariensis	3.91	:	Saba comorensis	2.99
Terminalia glaucescens	3.91	:	Syzygium guineense	2.99
Canthium venosum	2.34	:	Uapaca togoensis	2.99
Dombeya sp.	1.56	:	Pterocarpus erinaceus	1.49
Eucalyptus sp.	1.56	:	Cassia sieberana	1.49
Alchornia cordifolia	0.78	:	Holarrhena floribunda	1.49
Allophyllus cobbe	0.78	:	Sataga°	1.49
Combretum micranthum	0.78	:	Sira ghongo°	1.49
Erythrophleum africanum	0.78			
Total	17 species = 100.00	:	16 species = 100.00	
	128 responses		67 responses	

° Indicates unidentified species.

Cut-off point=	77.34	:	79.10

Timbi Madina	%	/	Bantignel	%
--Construction wood species--				
Afzelia africana	13.57	:	Uvaria chamae	36.11
Chlorophoria excelsa	13.57	:	Cassia sieberana	19.44
Albizia zygia	12.85	:	Syzygium guineense	16.66
Mitragyna sp.	12.85	:	Oxytenanthera abyssinica	8.33
Khaya senegalensis	12.14	:	Anisophyllea laurina	5.56
Pterocarpus erinaceus	12.14	:	Raphia sp.	5.56
Syzygium guineense		:	Alchornia cordifolia	2.78
var. macrocarpa	10.72	:	Parinari curatellifolia	2.78
Carapa procera	4.28	:	Ximenia americana	2.78
Syzygium guineense	4.28			
Anisophyllea laurina	0.72			
Ficus sp.	0.72			
Harungana madagascariensis	0.72			
Oxytenanthera abyssinica	0.72			
Uvaria chamae	0.72			
Total	14 species = 100.00: 140 responses		9 species = 100.00 36 responses	
Cut-off point=	77.12	:		80.55

Timbi Madina	%	/	Bantignel	%
	-- Forage species--			
Ficus polita	29.85	:	Ficus polita	27.42
Albizia zygia	29.85	:	Pterocarpus erinaceus	16.13
Oxytenanthera abyssinica	28.36	:	Albizia zygia	14.52
Pterocarpus erinaceus	8.96	:	Chlorophora excelsa	14.52
Chlorophora excelsa	1.49	:	Dichrostachys cinerea	11.29
Holarrhena floribunda	1.49	:	Oxytenanthera abyssinica	9.68
		:	Ficus sp.	3.22
		:	Bridelia ferruguinea	1.61
		:	Parkia biglobosa	1.61
Total	6 species = 100.00	:	9 species = 100.00	
	67 responses		62 responses	
Cut-off point=	80.06	:		83.88

II.B.2. Calculations

Question no.	Site	
	Timbi Madina	Bantignel
2. Percentage of wood cut, live and dead.	l+d = 100	dead = 95 live = 5
3. Average size of family	3.35	7.35
4. Number of cooked meals/day	3 = 100%	1 = 20% 2 = 55% 3 = 25%
Average number of meals/day	3.00	2.05
5. Number of days/bundle of wood	2 = 5% 4 = 95%	1-2 = 90% 3+ = 10%
Average no. days/bundle	3.90	1.75
6. Average distance to gather wood	3.02 Km	3.25 Km
7. Average amount of time spent gathering one bundle (hrs)	3.45	1.95
8. More difficult to find wood now than		
a) two years ago?	yes = 100%	yes = 55% no = 45%
b) five years ago?	yes = 100%	yes = 85% no = 15%

	Site		
	Timbi Madina	/	Bantignel
A. Person-meals/day/family	18.05	:	15.07
B. Person-meals/bundle	39.20	:	26.37
C. Person-days/year/family spent gathering wood	40.25	:	50.70
D. Per capita firewood consumption/ year (in $m.^3$)	1.11	:	1.13

Formulae:

Given: 7 days/week; 52 weeks/year; 8 hours/person-day; 25 bundles° = 1 $m.^3$

A=Q3 x Q4 (Q means "the average of question number -")

B=Q5 x A

$$C = \frac{52\left[\left(\frac{7}{Q5}\right) Q7\right]}{8}$$

$$D = \left[\frac{52\left(\frac{7}{Q5}\right)}{25}\right] \div Q3$$

° in the village questionnaire, a bundle means a headload.

The following shows the combined results to give an overall species preference for each category. Only the most commonly cited species (i.e. those found above the 75% cut-off point) have been considered. Response occurence has been appropriately weighted as to the percentage relative to all responses in that category. Total percentage is given as a percent of the entire survey response by category.

Species Use

-Firewood-	%	-Construction-	%	- Forage-	%
Parinari curatellifolia	15.90	Afzelia africana	10.80	Ficus polita	28.68
Hymenocardia acida	11.79	Chlorophora excelsa	10.80	Albizia zygia	22.48
Harungana madagascariensis	8.72	Uvaria chamae	10.80	Oxytenanthera abyssinica	19.38
Uapaca togoensis	8.21	Albizia zygia	10.23	Pterocarpus erinaceus	12.40
Holarrhena floribunda	7.69	Mitragyna sp.	10.23	Chlorophora excelsa	7.75
Dialium guineense	7.18	Khaya senegalensis	9.66		
Cassia sieberana	6.67	Pterocarpus erinaceus	9.66		
Eugenia sp.	4.62	Syzygium guineense	6.82		
Uvaria chamae	4.62	Cassia sieberana	3.98		
Dichrostachys cinerea	4.10				
Cassia siamea	2.56				
Parkia biglobosa	2.05				
Total	84.11		82.98		90.69

III. Discussion

III.A. Urban Questionnaire

Questions 1 and 2 are self-explanatory and the averages show a close correlation which continues into Q3. The average daily expenditure for fuelwood is naturally slightly higher for Pita due to a greater size of the average family.

Pertaining to question 4, we may assume that the wood is generally well seasoned. From experience it has been found that the wetness of the wood during the rainy season is due more to being left unprotected in the rain rather than to being "green".

The difference between answers to question 5 is due to the difference in bundle sizes considered. For Pita, the specification of "3 - 4 pieces" was not respected and price reference is to the larger bundle size more commonly purchased. Since these averages do not figure in any further calculations, the discrepancy is of little importance.

Question 6 shows an almost exact correlation indicating a definite price increase for fuelwood over the past two years (only one Labé family responded otherwise). As to an increase in the past year, there is some debate with the respondants being split roughly in half.

From the survey response data to question 7 it is seen that although charcoal is used, it is to a very limited extent. Split cordwood is by and large the primary source of fuel for cooking, even in urban centers. Satisfying this demand puts a great strain on the surrounding forest resources.

Calculation C gives an idea of the cost of supporting the firewood needs of the average family. It is clear that the family, eating two cooked meals per day, spends an average of 100 Sylis daily <u>for wood alone</u>. Considering some government salaries (i.e. a schoolteacher receives 3000-5000 Sy/month depending on grade, a WFS engineer makes 6000 Sy/month) the firewood costs

can amount to 50-100% of the total monthly salary, and there is no government subsidy for firewood needs. Fortunately, a family of 10-12 persons usually has more than one source of income.

III.B. Village Questionnaire

From the responses to question 2 it is evident that a fuelwood crisis is beginning in Timbi Madina. The cutting of live wood is a sure indication of this.

Question 5, showing the average number of days per bundle, indicates a more economic use of wood in Timbi Madina where there is a greater scarcity than in Bantignel. However, this alone could also be attributed to the smaller average family size in Timbi Madina. Although people search to a slightly lesser distance for wood in Timbi Madina (question 6), the fact that they must cut live wood almost doubles the amount of time required to procure a headload. This difficulty no doubt also adds to the greater economy of use in Timbi Madina, as is demonstrated by calculation B.

The data for question 8 supports the findings of a steadily increasing firewood shortage in Timbi Madina, as well as a much more slowly, but just as steadily, approaching fuelwood shortage for Bantignel.

Concerning the species preferences for construction wood purposes, the responses were biased in two regards. The total number of responses for Bantignel is low because the agent who administered the survey was not a native Peular speaker and the most common response, "Korcolé", meaning any long, straight pole, had to be discounted as non-specific. Also, in Timbi Madina, wood for all building purposes was considered rather than only for the construction of traditional housing, as was the original intent of the survey.

III.C. General

It is interesting to note that the annual per capita firewood consumption is closely correlated for both the urban and rural sectors. If all four findings are taken together, we obtain an average consumption of 1.14 m^3/person/year for the entire Pita - Labé area. This is slightly higher than Cerny's (1983) finding of 1m^3/person/year for this same area.

Let it be noted that we are speaking of <u>averages</u>. Surely, the argument can be made, a child will not use nearly that much wood, but on the other hand, the matron of the household may use more. There is also evidence (see Appendix I) that the larger the family, the greater the resulting efficiency of wood use. Nonetheless, the close correlation of the findings tends to support the average.

One initially surprising fact of a sociological aspect brought out by the study is the seemingly smaller size of the average village family compared to the urban one. This would seem to contradict generally accepted knowledge.

The discrepancy here is due to the commonly accepted interpretation of the word "family". When taken in the context of food preparation, it would be more appropriate to think of a family in terms of "meal-units". In a village setting it is much more common to find a man with multiple wives. In such circumstances, the wife habitually prepares a meal for herself and her children. Therefore, although the rural extended family may be very large, the meal unit is generally much smaller than that found in an urban setting, where polygamy is less common due to social and economic factors.

The responses generated by the general observations section at the bottom of each survey sheet demonstrate an awareness among the population of an approaching wood-supply crisis. Among urban dwellers this awareness is indicated by repeated references to the rise in cost of fuelwood and to its seasonal

unavailability. Villagers complain of the increasing difficulty of obtaining wood, and forage for their animals.

Both sectors cite a need for increased control of cutting and use. Technical assistance in wood production, from both the WFS and external sources, is also demanded.

IV. Conclusion

There are no accurate figures available concerning the growth rate of the natural forest but it has been stated that the yield of wood from native Savanna ranges from 0.07 to 0.7 m^3/hectare (per year, Kowal and Kassan, 1978). Even assuming that the Soudano-Guinean woodland could produce twice that maximum annual growth increment per hectare, the amount of protected forest area is grossly inadequate. For example, for the entire Préfecture of Pita, there is only 6633 ha of classified forest. If through management a sustained yield of 1.4 m^3/ha/year could be attained, this would account for the firewood needs of only 4.65% of the population. Labé is in a worse situation with only 5658.75 ha of classified forest which, according to the same calculations, could produce enough firewood annually to satisfy 4.07% of the population. And fuelwood is only one of many uses for forest products.

Granted that there is much unclassified wooded land, but this is rapidly succumbing to the demands of a growing population. The low productivity of the soil, as regards to food crops, compounds the problem in that lower yields/ha means that ever more land must be cleared for cultivation and fallow periods shortened.

Given the importance of the Fouta Djallon region as a major watershed for sub-Saharan West Africa, it is clear that immediate action must be taken to protect and manage the remaining

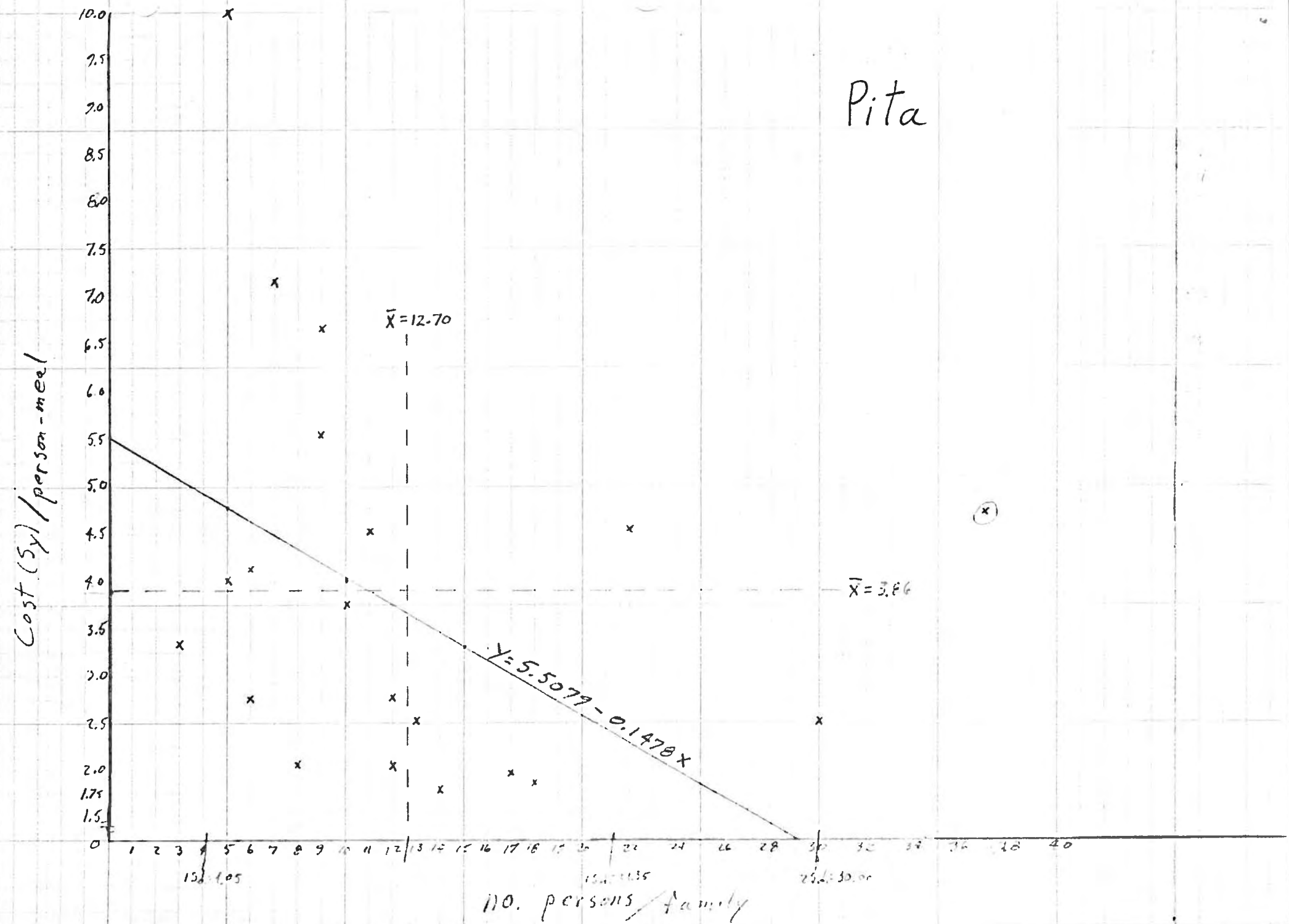
forested areas. But management of the existing forest resources alone will not be sufficient to meet the demand for wood and to arrest the degradation of the environment.

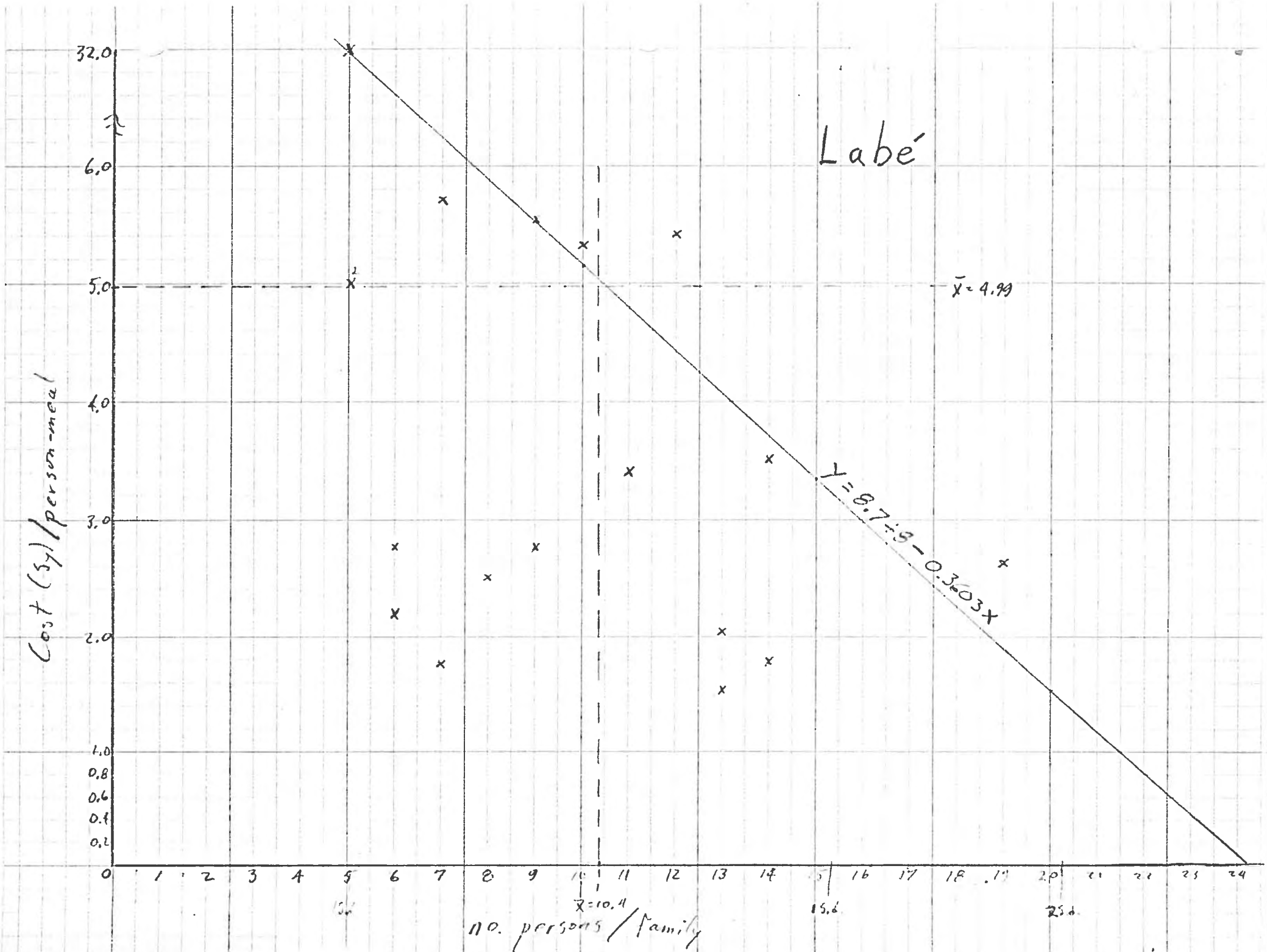
A combined management/agro-forestry approach is recommended to arrest environmental deterioration, while at the same time satisfying the demands of a growing population, through the protection of existing resources, an increase in wood production by the planting of fast-growing species, soil amelioration through intercropping with leguminous species, and soil conservation through the use of windbreaks, lateral dikes, etc. All of the abovementioned technologies must be made readily available to the villager so that he may adapt it to his own environmental, social, and economic constraints.

It is also recommended that the WFS be given all possible aid and encouragement to enforce existing laws, such as a limit on cutting and control of brush fires, and develop a suitable management plan. The production capabilities of state-owned nurseries should be increased and a means made available to extension agents to allow for increased contact with and education of the rural population.

APPENDIX I

Linear regression demonstrating the relationship between family size and the efficiency of firewood use, as shown by cost per person-meal, for Pita and Labé.


Pita
Cost (Sy) / person-meal
no. persons / family
X̄ = 12.70
X̄ = 3.86
Y = 5.5079 - 0.1478X



Labé
Cost (Sy)/person-meal
no. persons / family
$\bar{x}$ = 4.99
$\bar{x}$ = 10.4
Y = 8.7 ÷ 9 − 0.3603 X
32.0
6.0
5.0
4.0
3.0
2.0
1.0
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
15.6
25.6

APPENDIX II

Most responses to questions 1, 9, and 10 in the village questionnaire were given in the local language, Peular. Through research and field identification I was able to translate most species' names from the vernacular to the scientific. Below is a list of the species mentioned in this report along with their Peular synonyms.

Afzelia africana - Lingué
Albizia zygia - Maronaye, Maroidumi, Maronayi dani
Alchornia cordifolia - Garcassaki, Kathipelé
Allophyllus cobbe - Coyelé ala, Condéyala
Anisophyllea laurina - Kansi

Bridelia ferruguinea - Dafi

Canthium venosum - N'daka, Doko
Carapa procera - Kobi, Gobi
Cassia siamea - Cassia
Cassia sieberana - Sindion, Sindya
Chlorophora excelsa - Thiemé, Simmé, Kimen
Combretum micranthum - Kinkeliba

Dialium guineense - Méko
Dichrostachys cinerea - Boulé, Boulé beté
Dombeya sp. - Fouyoufaya, Foyofélou

Erythrophleum africanum - Téli
Eucalyptus sp. - Eucalyptus
Eugenia sp. - N'dologo

Ficus polita - Nonko, Nonco
Ficus sp. - Niénié, Gnégné, Tibi

Harungana madagascariensis - Soumbala, Soungala
Holarrhena floribunda - Indamma
Hymenocardia acida - Pelitoro

Khaya senegalensis - Cahi, Kahiy

Mitragyna stipulosa - Popo

Oxytenanthera abyssinica (bambou) - Kewé

Parinari curatellifolia - Koura
Parkia biglobosa - Neré, Soumbara
Pterocarpus erinaceus - Bani, Baami

Raphia sp. - Lebé

Saba comorensis - Pooré, Toti
Syzygium guineense - Kadio, Kadio thiangol
S. guineense var. macrocarpa - Sömöe

Terminalia glaucescens - Booridaré, Boori

Uapaca togoensis - Ialagué, Yalagé
Uvaria chamae - Boylé, Bésébésé (wood), Boko boelé (bark)

Ximenia americana - Thiaboulé

Korcolé means any long and straight wood.
Thiangol signifies something growing along river banks.

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