5. INVENTORY OUTPUT: SAWTIMBER

SAWN PLANKS AND VOLUME (m3) per HA (NCNRMA)

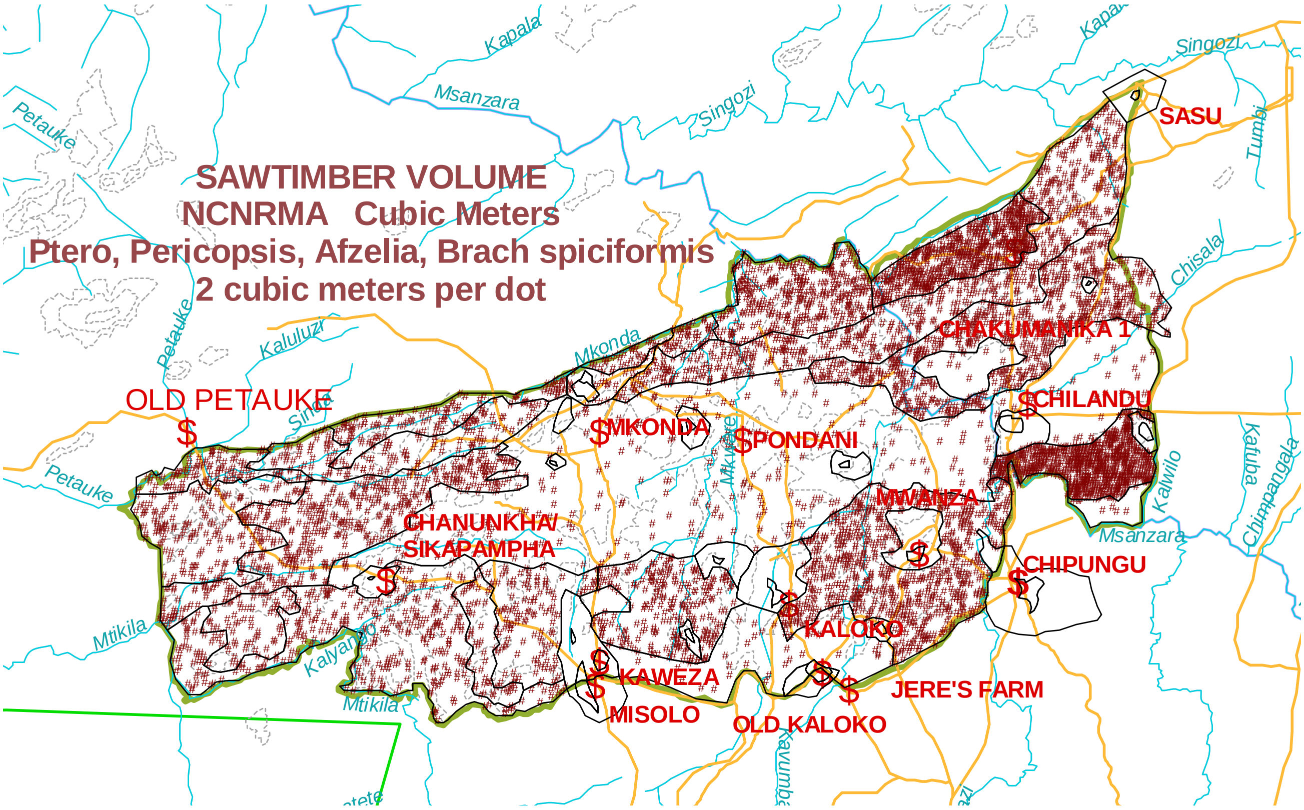
STAND NAME	Avg CUBIC METERS/HA	Avg. Planks/ HA	Coeffic. of variation Planks/HA	Planx 95% confide.	Volume 95% confide. (m3)	PLANKS EST. TOTAL
Chakumanika PCF *(437 ha)*						
	2.67	206.9	141%	61.4 to 352.4	-0.1 to 5.4	**90,345**
Chilandu PCF *(349 ha)*						
	4.40	353.7	105%	90.3 to 617.2	1.0 to 7.8	**123,589**
10-year Fallow East *(3,513 ha)*						
	0.00	0.0	0%	0.0 to 0.0	0.0 to 0.0	0
10-yearFallow West *(2,281 ha)*						
	0.00	0.0	0%	0.0 to 0.0	0.0 to 0.0	0
20-yr Fallow East *(1,818ha)*						
	0.42	38.0	143%	-3.0 to 79.0	0.0 to 0.8	**69,082**
20-yr Fallow West *(1,211 ha)*						
	0.00	0.0	0%	0.0 to 0.0	0.0 to 0.0	0
Miombo East *(1,755 ha)*						
	0.84	35.8	180%	-3.0 to 74.7	-0.1 to 1.8	**62,916**
Miombo West *(3,054 ha)*						
	0.54	43.1	263%	-3.2 to 89.4	0.0 to 1.1	**131,488**
Sawtimber East *(2,776 ha)*						
	1.15	97.6	188%	25.4 to 169.8	0.3 to 1.9	**270,935**
Sawtimber West *(995 ha)*						
	1.29	70.6	207%	-26.9 to 168.0	-0.3 to 2.9	**70,211**

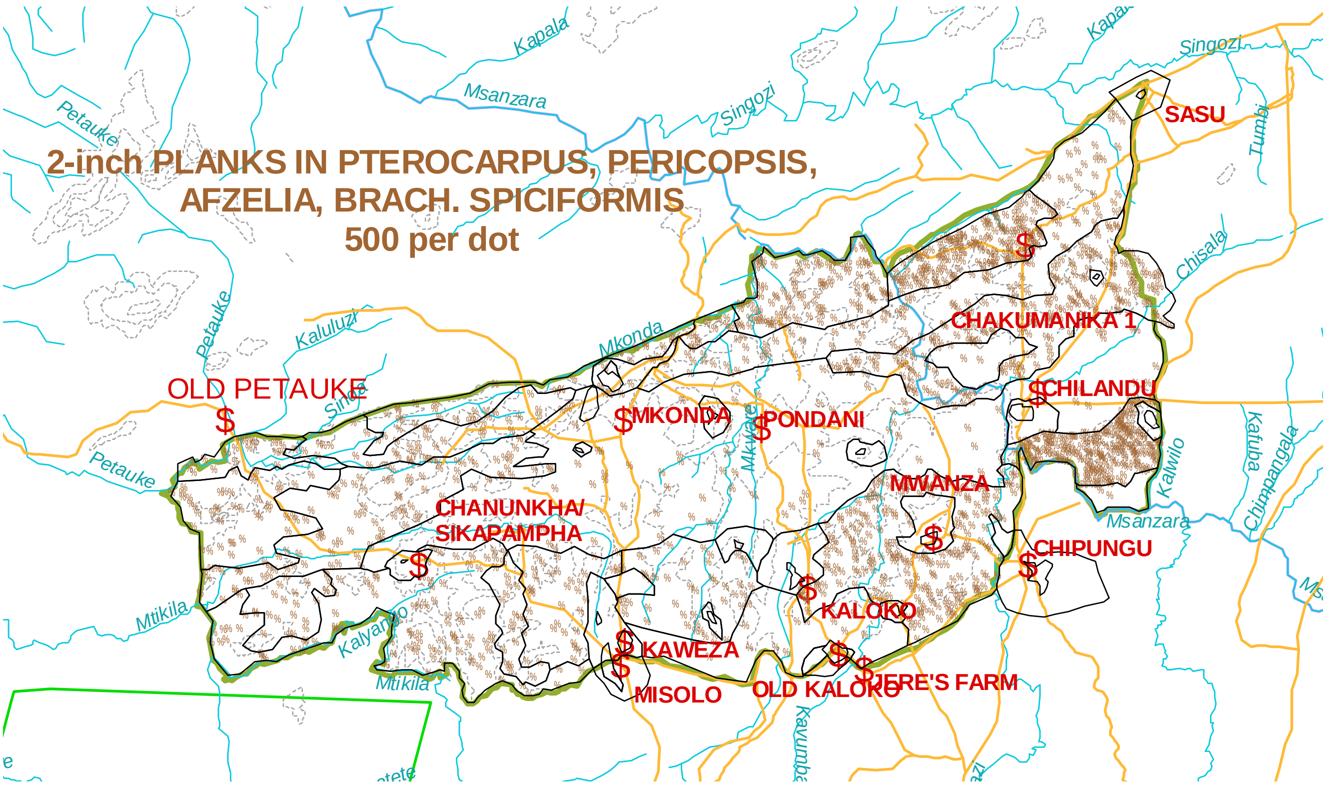
TOTAL VOLUME, ALL STANDS (m3):

11,052

TOTAL PLANKS, ALL STANDS:

818,566


SAWTIMBER VOLUME
NCNRMA Cubic Meters
Ptero, Pericopsis, Afzelia, Brach spiciformis
2 cubic meters per dot
SASU
CHAKUMANIKA 1
CHILANDU
OLD PETAUKE
MKONDA
PONDANI
MWANZA
CHANUNKHA/
SIKAPAMPHA
CHIPUNGU
KALOKO
KAWEZA
JERE'S FARM
MISOLO
OLD KALOKO
Kapala
Msanzara
Singozi
Petauke
Kaluluzi
Mkonda
Chisala
Tumbi
Kafuba
Chimpangala
Kawilo
Mtikila
Kalyango

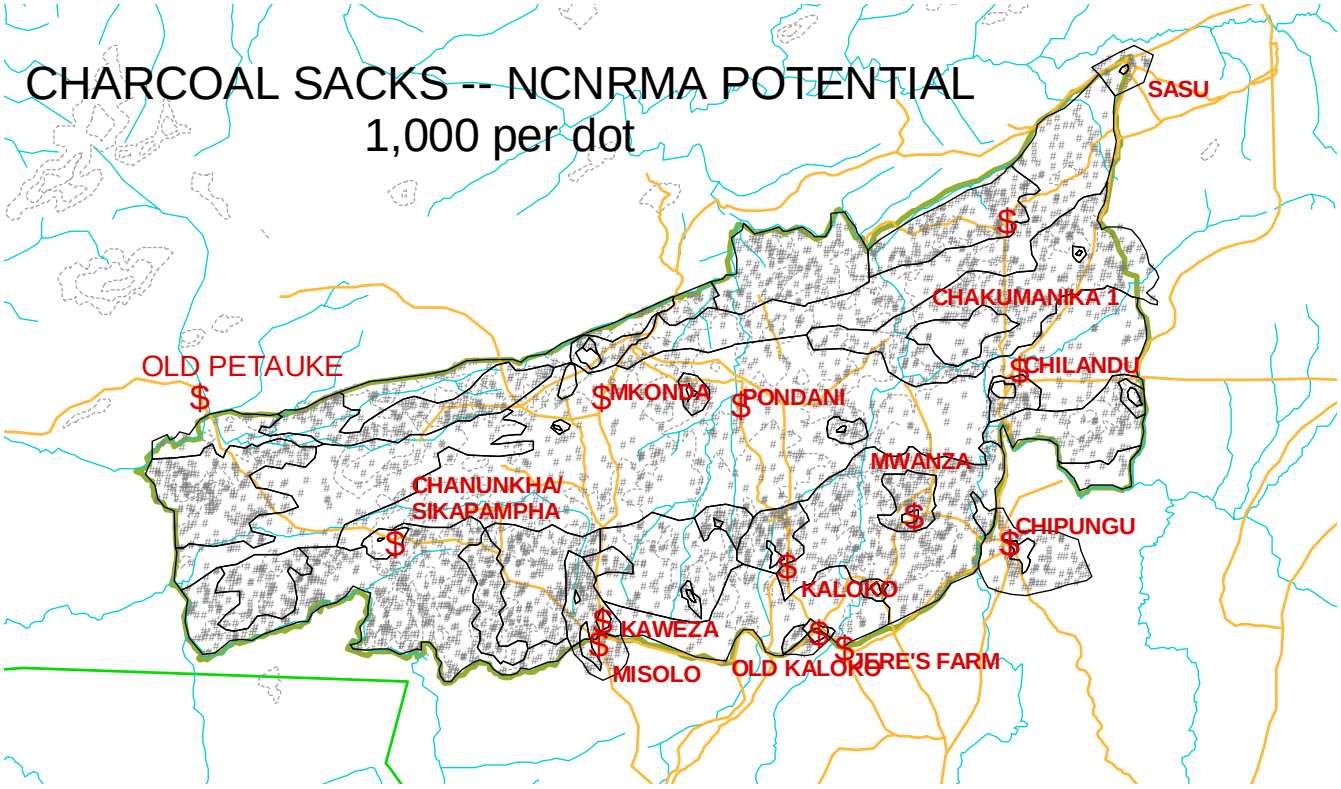

2-inch PLANKS IN PTEROCARPUS, PERICOPSIS,
AFZELIA, BRACH. SPICIFORMIS
500 per dot
SASU
CHAKUMANIKA 1
CHILANDU
OLD PETAUKE
MKONDA
PONDANI
MWANZA
CHANUNKHA/
SIKAPAMPHA
CHIPUNGU
KALOKO
KAWEZA
JERE'S FARM
MISOLO
OLD KALOKO
Kapala
Msanzara
Singozi
Petauke
Kaluluzi
Mkonda
Chisala
Tumbi
Kafuba
Chimpangala
Kawilo
Mtikila
Kalyango

6. INVENTORY OUTPUT: CHARCOAL

Charcoal Sacks per HA

STAND NAME		Avg No. of Charcoal Sax/HA	Coefficient of variation	Lower Bound 95% conf.	Upper Bound 95% conf.	Lower Bound 80% conf.	Upper Bound 80% conf.
Chakumanika	Plots:16	306	67%	204 to 408		235	378
437ha **Total Est. Sacks in Stand (predicted yield from charcoal trees):**						**133,600**	
Chilandu	Plots: 8	143	138%	4 to 282		46	240
349ha **Total Est. Sacks in Stand (predicted yield from charcoal trees):**						**49,964**	
Fallow10 E	Plots: 2	194	141%	-194 to 582		-78 to 466	
3,513ha **Total Est. Sacks in Stand (predicted yield from charcoal trees):**						**681,541**	
Fallow10 W	Plots: 7	7	265%	-7 to 21		-3 to 16	
2,281ha **Total Est. Sacks in Stand (predicted yield from charcoal trees):**						**15,966**	
Fallow20 E	Plots: 7	11	171%	-3 to 26		1 to 22	
1,818ha **Total Est. Sacks in Stand (predicted yield from charcoal trees):**						**19,997**	
Fallow20 W	Plots: 3	0	0%	0	0	0	0
1,211ha **Total Est. Sacks in Stand (predicted yield from charcoal trees):**						**0**	
MiomboE	Plots:11	120	144%	16 to 225		47 to 194	
1,755ha **Total Est. Sacks in Stand (predicted yield from charcoal trees):**						**210,600**	
MiomboW	Plots:24	321	57%	246 to 396		269 to 374	
3,054ha **Total Est. Sacks in Stand (predicted yield from charcoal trees):**						**980,206**	
SawtimberE	Plots:26	190	138%	87 to 293		118 to 262	
2,776ha **Total Est. Sacks in Stand (predicted yield from charcoal trees):**						**527,364**	
SawtimberW	Plots:9	115	116%	26 to 204		53 to 178	
995ha **Total Est. Sacks in Stand (predicted yield from charcoal trees):**						**114,391**	

Total HA in NCNRMA: 19,675 **TOTAL SACKS, ALL STANDS: 2,733,628**

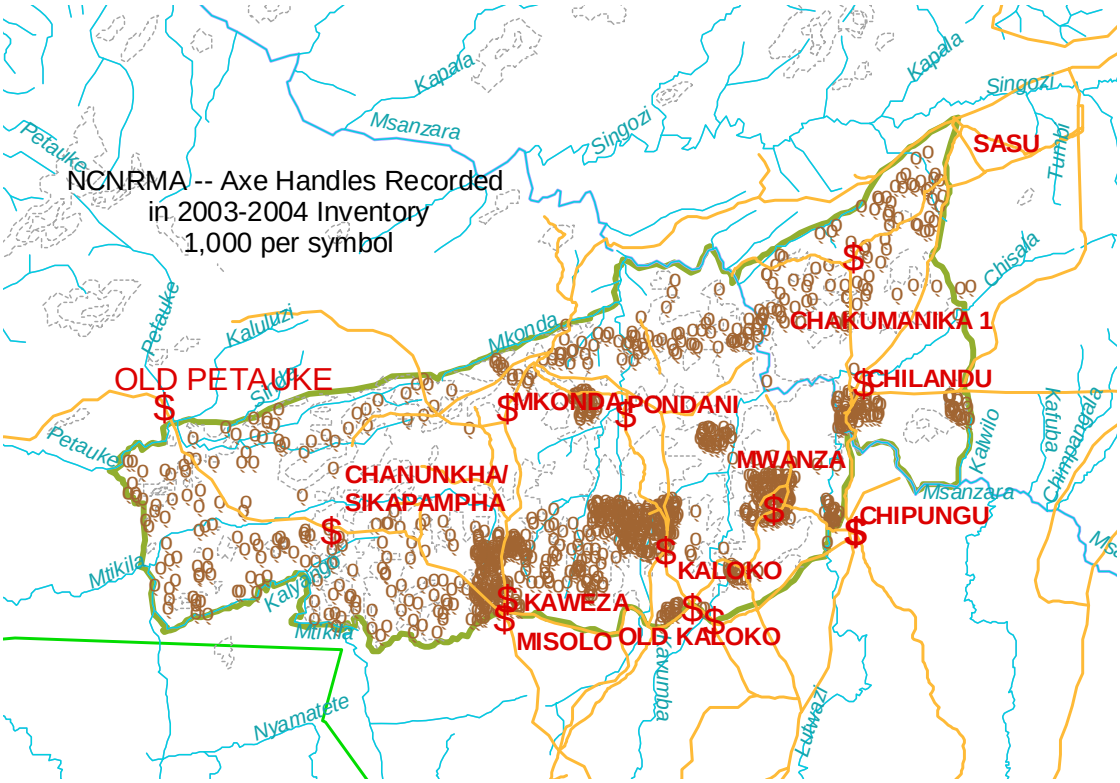

CHARCOAL SACKS -- NCNRMA POTENTIAL
1,000 per dot
SASU
CHAKUMANIKA 1
CHILANDU
OLD PETAUKE
MKONDA
PONDANI
MWANZA
CHANUNKHA/
SIKAPAMPHA
CHIPUNGU
KALOKO
KAWEZA
MISOLO
OLD KALOKO
JERE'S FARM

7. INVENTORY OUTPUT: NON-TIMBER FOREST PRODUCTS

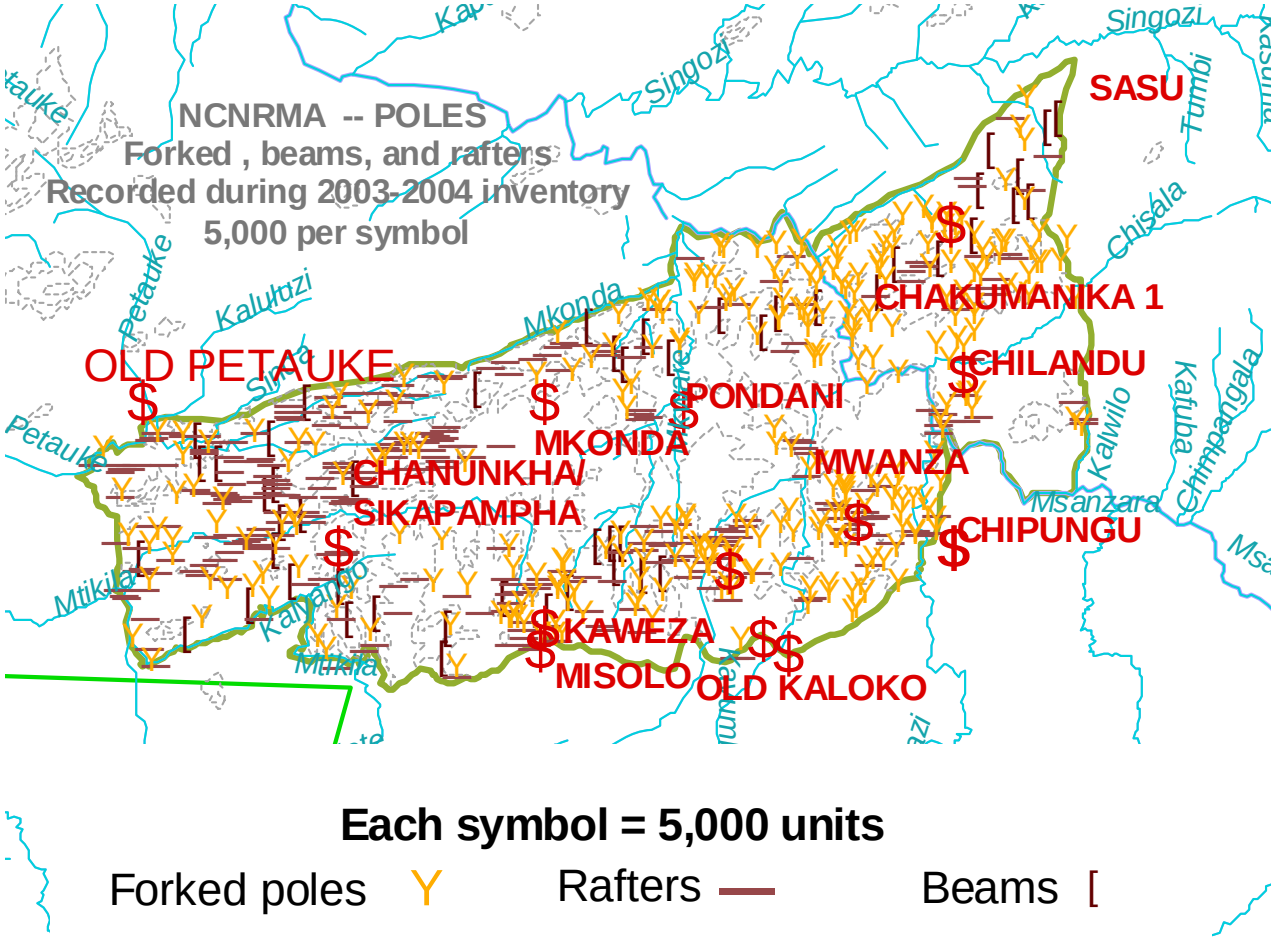
Higher-value products

NOTE: "Higher-value" includes both products with individually higher market prices and products which can bring in more profit because of their sheer abundance.

PRODUCT NAME	Stand Name	Product per HA		*Product worth/HA*	PRODUCTS IN STAND	TOTAL PRODUCT WORTH per STAND
Axe handles						
	Fallow10E	3,513	658	*657,999*	**2,311,614**	*2,311,615,000 ZK*
	Fallow10W	2,281	70	*70,210*	**160,134**	*160,134,300 ZK*
	Fallow20E	1,818	65	*64,610*	**117,454**	*117,453,700 ZK*
	Fallow20W	1,211	404	*403,955*	**489,270**	*489,270,300 ZK*
	MiomboE	1,755	102	*102,452*	**179,802**	*179,802,500 ZK*
	MiomboW	3,054	56	*55,934*	**170,799**	*170,798,800 ZK*
	SawtimberE	2,776	13	*13,175*	**36,569**	*36,568,960 ZK*
	SawtimberW	995	12	*11,632*	**11,571**	*11,570,680 ZK*
	Chakumanika	437	36	*35,730*	**15,604**	*15,599,750 ZK*
Sum for NCNRMA product = ***Axe handles***					*3,492,818* *Total units*	***3,492,813,708 ZK*** *Gross to producers*



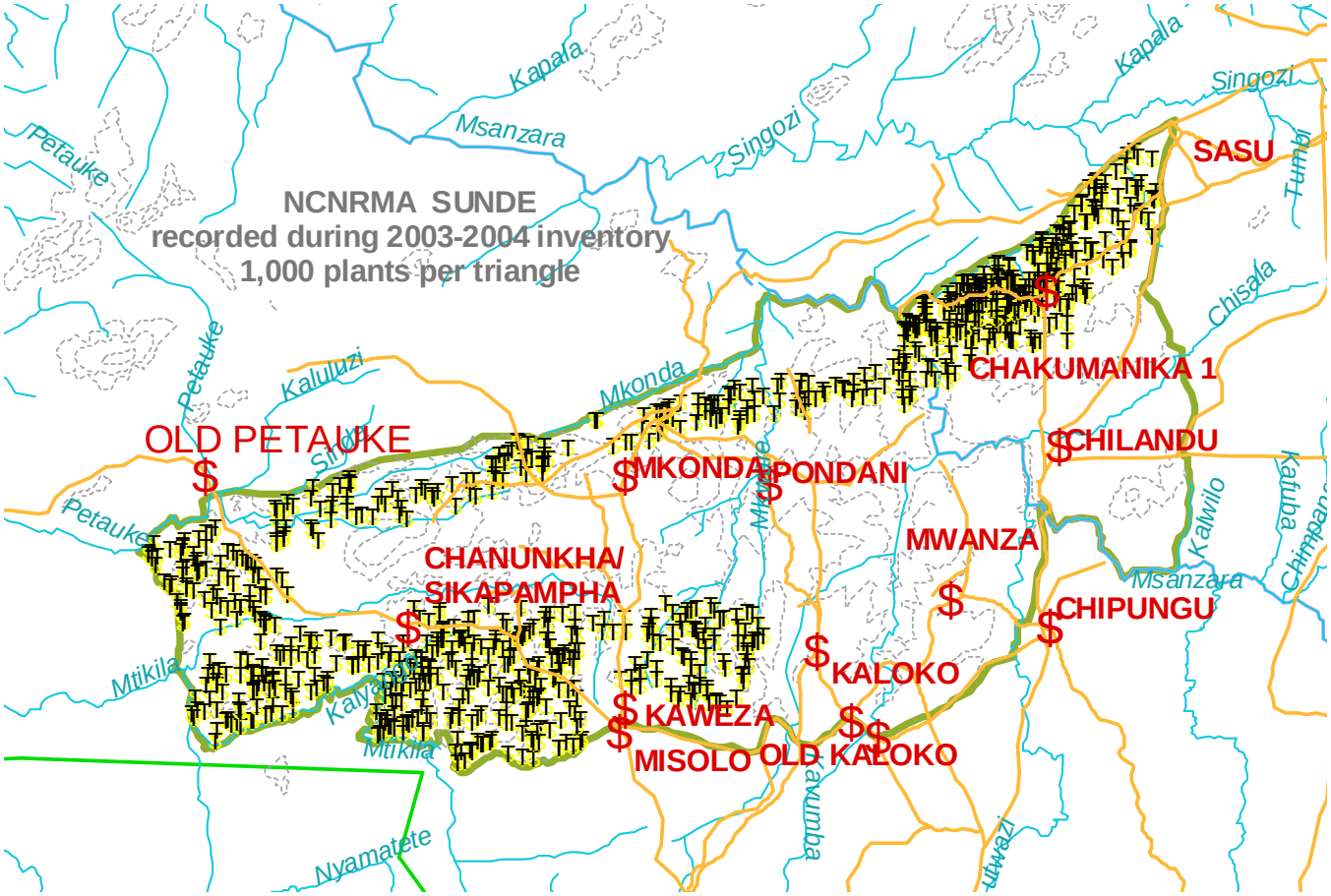
PRODUCT NAME	Stand Name	Product per HA	HA	*Product worth/HA*	PRODUCTS IN STAND	TOTAL PRODUCT WORTH per STAND
Construction beam						
	MiomboW	3,054	24	*48,741*	**74,417**	*148,834,400 ZK*
	SawtimberW	995	44	*88,464*	**43,998**	*87,995,360 ZK*
	MiomboE	1,755	78	*156,973*	**137,744**	*275,487,100 ZK*
Sum for NCNRMA product = ***Construction beam***					*256,158* Total units	***512,316,880 ZK*** Gross to producers
Construction Poles - forked						
	Chilandu	349	10	*9,861*	**3,445**	*3,445,477 ZK*
	Fallow10E	3,513	314	*314,254*	**1,104,005**	*1,104,006,000 ZK*
	Fallow20E	1,818	108	*107,523*	**195,466**	*195,466,300 ZK*
	Fallow20W	1,211	77	*76,757*	**92,968**	*92,968,480 ZK*
	MiomboE	1,755	128	*127,782*	**224,257**	*224,257,100 ZK*
	MiomboW	3,054	55	*54,698*	**167,027**	*167,027,000 ZK*
	SawtimberE	2,776	194	*194,309*	**539,325**	*539,324,400 ZK*
	SawtimberW	995	144	*143,962*	**143,200**	*143,199,400 ZK*
	Chakumanika	437	239	*233,743*	**104,232**	*102,052,300 ZK*
Sum for NCNRMA product = ***Construction Poles - forked***					*2,573,925* Total units	***2,571,746,221 ZK*** Gross to producers
Construction post						
	MiomboE	1,755	108	*107,564*	**188,775**	*188,774,800 ZK*
	Chakumanika	437	128	*128,230*	**55,962**	*55,985,160 ZK*
	Chilandu	349	2,353	*2,353,359*	**822,264**	*822,263,600 ZK*
	Fallow10W	2,281	197	*196,845*	**448,965**	*448,965,100 ZK*
	Fallow20W	1,211	145	*144,725*	**175,291**	*175,291,300 ZK*
	MiomboW	3,054	216	*213,483*	**659,859**	*651,893,100 ZK*
	SawtimberE	2,776	124	*124,278*	**344,947**	*344,946,600 ZK*
	SawtimberW	995	310	*310,023*	**308,380**	*308,380,300 ZK*
	Fallow20E	1,818	66	*65,987*	**119,957**	*119,957,500 ZK*
Sum for NCNRMA product = ***Construction post***					*3,124,400* Total units	***3,116,457,412 ZK*** Gross to producers
Construction rafter						
	MiomboW	3,054	51	*51,117*	**156,090**	*156,090,500 ZK*
	SawtimberE	2,776	48	*47,603*	**132,127**	*132,127,000 ZK*
	MiomboE	1,755	71	*71,423*	**125,347**	*125,347,000 ZK*
	Fallow20W	1,211	651	*650,570*	**787,970**	*787,969,900 ZK*
	Fallow20E	1,818	277	*276,690*	**502,995**	*502,995,000 ZK*
	Fallow10W	2,281	281	*280,839*	**640,537**	*640,537,300 ZK*
	Fallow10E	3,513	407	*407,156*	**1,430,379**	*1,430,380,000 ZK*
	SawtimberW	995	684	*684,414*	**680,787**	*680,786,900 ZK*
Sum for NCNRMA product = ***Construction rafter***					*4,456,233* Total units	***4,456,233,472 ZK*** Gross to producers



NOTE: Over 10 Billion Kwachas' worth of poles of different types were calculated (extrapolated) from products named by village users for trees which fell inside plot samples.

This was based on an average price of ZK 1,000 per pole, and a sample leading to the calculation of 10 million poles available today.

PRODUCT NAME	Stand Name	HA	Product per HA	*Product worth/HA*	PRODUCTS IN STAND	TOTAL PRODUCT WORTH per STAND
Sunde 1-hand tall (BROOM-MAKING GRASS)						
	MiomboE	1,755	161	*160,727*	**282,076**	*282,076,400 ZK*
	Chakumanika01	437	376	*375,813*	**164,080**	*164,079,700 ZK*
Sum for NCNRMA product = ***Sunde 1-hand tall***					*446,156* Total units	***446,156,096 ZK*** Gross to producers



NOTE: Sunde were not recorded uniformly throughout the inventory; many areas were probably omitted.

However, by way of comparison, sunde in Nyamphande area are less abundant than what was found in the Local Forest of Chiulukire in Katete District in their year 2000 inventory. Where sunde were found in Nyamphande, they were generally shorter and more confined in area. (Shorter sunde make fewer brooms.)

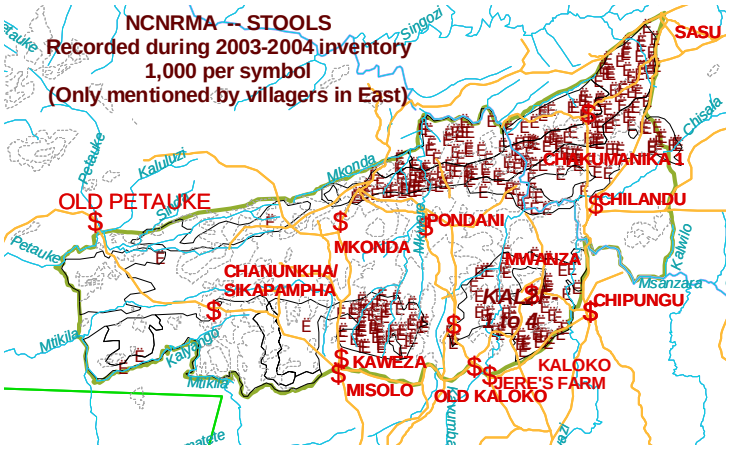
Other carved products

NOTES: Carved products were inconsistently mentioned across NCNRMA local inventory team members. In the event of a NTFP commercialization scheme, the ideal practice would be to run regressions on specific products related to tree species and diameters, then re-estimate the quantities of products available throughout the NCNRMA.

The last example below shows explicitly how only the eastern residents were likely to think of trees as having value for carving into commercialisable stools.

PRODUCT NAME	Stand Name	Product per HA		*Product worth/HA*	PRODUCTS IN STAND	TOTAL PRODUCT WORTH per STAND
Canoes (carved)						
	Chilandu	349	0	*3,651*	**128**	*1,275,572 ZK*
Sum for NCNRMA product = ***Canoes (carved)***					*128* Total units	***1,275,572 ZK*** Gross to producers
Coffins (carved)						
	Chilandu	349	14	*69,818*	**4,879**	*24,394,450 ZK*
	Fallow10W	2,281	46	*229,748*	**104,802**	*524,009,900 ZK*
	MiomboE	1,755	1	*5,238*	**1,838**	*9,191,892 ZK*
	SawtimberE	2,776	0	*1,911*	**1,061**	*5,304,386 ZK*
	SawtimberW	995	1	*6,086*	**1,211**	*6,053,966 ZK*
Sum for NCNRMA product = ***Coffins (carved)***					*113,791*	***568,954,583 ZK***
Drums (carved)						
	SawtimberE	2,776	1	*3,237*	**1,797**	*8,983,443 ZK*
Sum for NCNRMA product = ***Drums (carved)***					*1,797* Total units	***8,983,443 ZK*** Gross to producers
Mortars (carved)						
	Chakumanika	437	2	*18,558*	**1,010**	*8,102,369 ZK*
	Fallow20E	1,818	7	*53,900*	**12,248**	*97,985,330 ZK*
	Fallow20W	1,211	20	*161,731*	**24,486**	*195,888,600 ZK*
	MiomboE	1,755	3	*26,074*	**5,720**	*45,759,550 ZK*
	SawtimberE	2,776	2	*13,248*	**4,596**	*36,770,190 ZK*
Sum for NCNRMA product = ***Mortars (carved)***					*48,060* Total units	***384,506,013 ZK*** Gross to producers
Cooking sticks						
	Chakumanika	437	208	*311,282*	**90,598**	*135,905,700 ZK*
	Fallow20E	1,818	150	*224,339*	**271,884**	*407,825,300 ZK*
	SawtimberE	2,776	7	*10,153*	**18,787**	*28,180,880 ZK*
					381,269 Total units	***571,911,954 ZK*** Gross to producers

PRODUCT NAME	Stand Name	Product per HA	HA	*Product worth/HA*	PRODUCTS IN STAND	TOTAL PRODUCT WORTH per STAND
					Total units	*Gross to producers*
Stools (carved)						
	Chakumanika	437	37	*73,163*	**15,976**	*31,943,130 ZK*
	Fallow20E	1,818	25	*49,910*	**45,365**	*90,730,610 ZK*
	MiomboE	1,755	90	*180,924*	**158,761**	*317,521,800 ZK*
	MiomboW	3,054	2	*3,921*	**5,986**	*11,972,660 ZK*
	SawtimberE	2,776	44	*87,541*	**121,490**	*242,980,000 ZK*
					347,579	***695,148,171 ZK***
					Total units	*Gross to producers*



Products supporting commercialization of other NTFP

PRODUCT NAME	Stand Name	Product per HA	HA	*Product worth/HA*	PRODUCTS IN STAND	TOTAL PRODUCT WORTH per STAND
					Total units	*Gross to producers*
Bark hives						
	Chakumanika	437	13	*25,756*	**5,618**	*11,244,880 ZK*
	SawtimberW	995	35	*69,520*	**34,576**	*69,151,660 ZK*
	SawtimberE	2,776	33	*66,238*	**91,925**	*183,850,700 ZK*
	MiomboW	3,054	68	*135,266*	**206,525**	*413,049,200 ZK*
	Fallow20E	1,818	10	*19,812*	**18,008**	*36,017,020 ZK*
	MiomboE	1,755	30	*59,140*	**51,895**	*103,790,900 ZK*
Sum for NCNRMA product =	***Bark hives***				*408,548*	***817,104,295 ZK***
					Total units	*Gross to producers*
Barkrope bundles						
	MiomboE	1,755	74	*36,883*	**129,459**	*64,729,660 ZK*
	Chilandu	349	33	*16,640*	**11,628**	*5,814,103 ZK*
	SawtimberW	995	57	*28,501*	**56,700**	*28,349,950 ZK*
	SawtimberE	2,776	86	*42,953*	**238,443**	*119,221,300 ZK*
	MiomboW	3,054	92	*45,908*	**280,368**	*140,184,300 ZK*
	Fallow20E	1,818	3	*1,651*	**6,003**	*3,001,353 ZK*
	Fallow10E	3,513	155	*77,283*	**543,004**	*271,502,900 ZK*
	Chakumanika	437	9	*4,279*	**3,738**	*1,868,375 ZK*
	Fallow10W	2,281	34	*17,231*	**78,601**	*39,300,790 ZK*
Sum for NCNRMA product =	***Barkrope bundles***				*1,347,945*	***673,972,745 ZK***
					Total units	*Gross to producers*

Food- and medicine- producing trees

PRODUCT NAME	Stand Name	Product per HA	HA	*Product worth/HA*	PRODUCTS IN STAND	TOTAL PRODUCT WORTH per STAND
Fruit – (Note: a minimum of one 20L bucket is assumed from each tree)						
	SawtimberE	2,776	20	*100,986*	**56,060**	*280,297,600 ZK*
	Chakumanika	437	5	*24,108*	**2,099**	*10,525,420 ZK*
	MiomboW	3,054	4	*19,735*	**12,052**	*60,262,040 ZK*
					70,211	***351,085,053 ZK***
					Total units	*Gross to producers*
Caterpillar host – (Note: a minimum of one basket is assumed from each tree)						
	SawtimberE	2,776	15	*29,147*	**40,450**	*80,899,560 ZK*
					40,450	***80,899,560 ZK***
					Total units	*Gross to producers*
Glue – (Note: a mention of glue is recorded; eventually should be translated to heaps)						
	Chakumanika	437	14	*7,000*	**6,085**	*3,059,000 ZK*
Sum for NCNRMA product = ***Glue - heaps***					*6,085*	***3,059,000 ZK***
					Total units	*Gross to producers*
Gum - (Note: a mention of gum is recorded; eventually should be translated to heaps)						
	SawtimberE	2,776	15	*7,287*	**40,450**	*20,224,840 ZK*
Sum for NCNRMA product = ***Gum - heaps***					*40,450*	***20,224,838 ZK***
					Total units	*Gross to producers*
Medicine: cough - doses						
	SawtimberE	2,776	29	*14,565*	**80,851**	*40,425,760 ZK*
	SawtimberW	995	8	*4,181*	**8,317**	*4,158,620 ZK*
Sum for NCNRMA product = ***Medicine: cough - doses***					*89,169*	***44,584,380 ZK***
					Total units	*Gross to producers*
Medicine: digestive - doses						
	Fallow20E	1,818	3	*1,651*	**6,003**	*3,001,353 ZK*
Sum for NCNRMA product = ***Medicine: digestive - doses***					*6,003*	***3,001,353 ZK***
					Total units	*Gross to producers*
Medicine: pain - doses						
	SawtimberW	995	11	*5,393*	**10,730**	*5,364,749 ZK*
Sum for NCNRMA product = ***Medicine: pain - doses***					*10,730*	***5,364,749 ZK***
					Total units	*Gross to producers*
Medicine: skin - doses						
	SawtimberW	995	28	*13,818*	**27,489**	*13,744,770 ZK*
Sum for NCNRMA product = ***Medicine: skin - doses***					*27,489*	***13,744,765 ZK***
					Total units	*Gross to producers*

Summary of all products' worth per stand

StandName	Total avg worth per ha	HA in Stand	All PRODUCTS worth in Stand
10-year Fallow, west	1,425,637	2,281	3,251,592,000
20-year Fallow, west	1,510,965	1,211	1,830,081,000
20-year Fallow, east	1,853,441	1,818	3,369,370,000
Miombo East	2,967,035	1,755	5,207,147,000
Sawtimber East	3,695,211	2,776	10,256,430,000
Sawtimber West	4,268,179	995	4,245,558,000
Miombo West	4,381,975	3,054	13,380,800,000
10-year Fallow, east	4,431,304	3,513	15,567,610,000
Chakumanika PCF	6,119,451	437	2,671,752,000
Chilandu PCF	10,193,120	349	3,561,476,000
	Sum of all products:		***63,341,815,680 ZK***
			($US 13,200,000)

CAVEATS:

- Stands with a lot of sawtimber will have highest worth per hectare today. But these stands are most likely to be cleared for agriculture.
- These are conservative values – many products were recorded as one only per tree, while the tree would in practice yield many units.
- Average worth per hectare is a function of which tree species are in the forest , how many products they contain, how much the products are worth, and whether inventory team members remembered to mention them. Therefore, there could be much more than mentioned here.
- A better way to calculate potential market supply will be to run regressions of products as a function of tree species, diameter, and height. Then the Trees Per Hectare tables may be converted to Products Per Hectare according to each product's regression.
- The purpose of this table is to illustrate the potential income being lost when trees are cleared and simply burned for agriculture, rather than exploited for their maximum worth.