2. MAPPING AND INVENTORY ISSUES IDENTIFIED

The following universal mapping and inventory issues were identified for the NCNRMA case in particular.

MAPPING ISSUES IN CB FOREST MANAGEMENT

- Need for broad coverage of potential work area, to choose sites and convince villagers of the extent of the problem (the SPOT image covers 360,000 ha; everyone recognizes village, road, field, and forest features on it)

- Need to update topo map and get more accurate info on boundaries of forestry concessions (GPS training goes along with using the maps and images)

- Need to control unorganized/unauthorized tree-cutting by organizing communities based on *proximity* to resources

- No one knows how many hectares are left; maps and images are a basis for discussion and mutual understanding

Broad coverage of Nyamphande work area, and potential future area

The year 2000 SPOT image which covers a 60-kilometer swath north and east of Petauke boma facilitated pinpointing potential project work areas and participating villages. Nyamphande was chosen as the priority area; and Chief Sandwe's area, adjacent to Nyamphande to the east, would have been an expansion site if forestry funding had continued.

Images of both work sites are still available at Eastern Province Forestry Department.

The CLUSA-NRM facilitator and Forestry Department use the SPOT image in the village to "put everyone on the same page", pointing out the white-colored fields growing in number from the boma toward the bush.

### Updating topographic maps made in the 1970s from 1960s photos

The GPS was used to update roads, villages, and forest types from the 1960s version. By recording "tracks", "points", and "routes" in the Garmin 12XL, then downloading data into files readable in ArcView. Forestry Department and the CLUSA-NRM facilitators assisted with the recording of data and mapping at the office.

GPS was used to update and simplify the 1967 data on topo maps published in the 1970s.
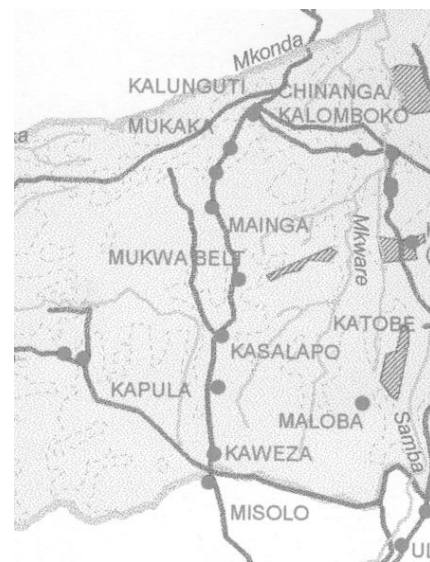
Nyamphande area, seen in its entirety, associates villages with mgmt areas

Seeing the entire management area helps Chief, village headmen, and FD to visualize who should be responsible for which areas, and which villages can be grouped together.
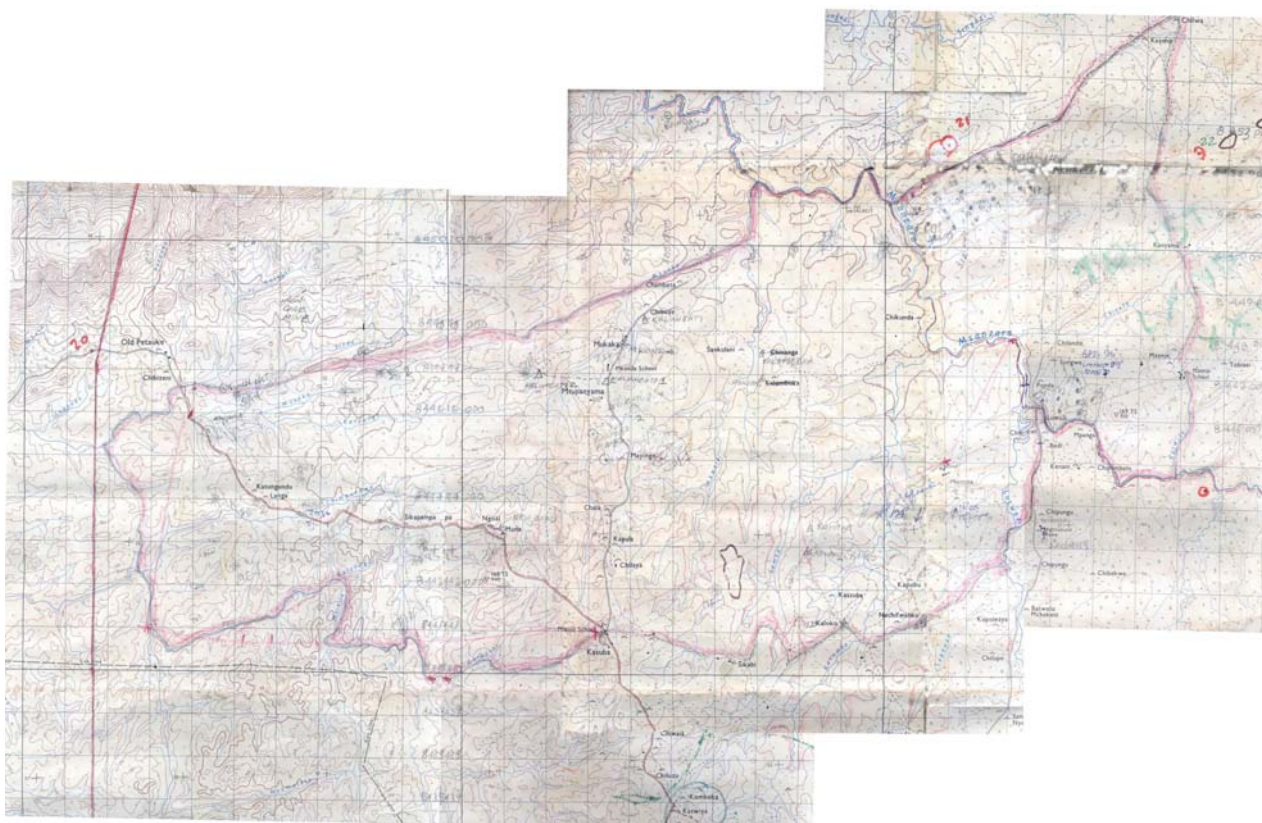

1970s Topographic Map covering Nyamphande area, from 1960s photos – width is about 25 km.

Forested hectares remaining in the NCNRMA: 10,000 ha

The mapping of forest stand types sheds light on the number of hectares to which inventory data will apply, and gives an idea of how many hectares may yet be converted to agriculture. About **10,000 hectares** are in forest types with trees larger than pole-size.

Hectares in the different stand types were calculated in ArcView as follows:
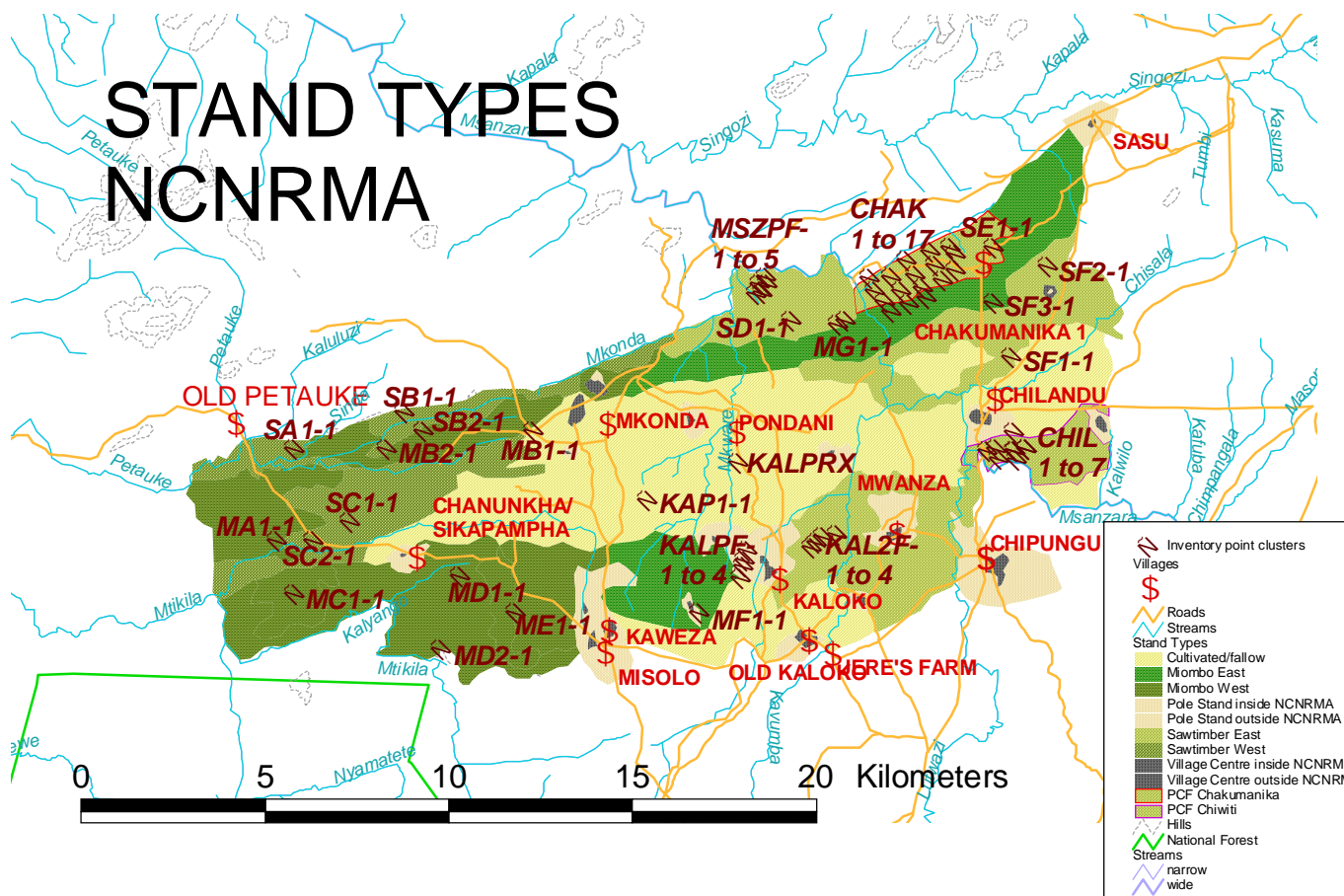
Stand Type	GIS Poly-gon HA	HA in forest type	% in 10-yr fallow	% in 20-yr fallow	HA in 10yr fallow	HA in 20yr fallow	Type_description	Local Name
Cultivated/fallow	6306	**1,261**	50	30	3153	1892	80% of area in crop rotation	Chisala
Miombo East	2194	**1,755**	10	10	219	219	Smaller & non-timber spp E of Msolo-Mkonda Rd	Msenga
Miombo West	3817	**3,054**	10	10	382	382	Smaller & non-timber spp W of Msolo-Mkonda Rd	Msenga
Pole Stand in	1096	**0**	100	0	1096	0	Zone around vg for poles – inside NCNRMA	Chisala
Pole Stand out	621	**0**	100	0	621	0	Zone around vg for poles – outside NCNRMA	Chisala
Sawtimber East	4304	**3,228**	20	5	861	215	Larger trees incl sawtimber E of Msolo-Mkonda Rd	Mputu
Sawtimber West	1790	**995**	33	11	597	199	Larger trees incl sawtimber W of Msolo-Mkonda Rd	Mputu
Village Centre in	168	**0**	0	0	0	0	Concentration of vg homes in NCNRMA bound	Mudzi
Village Centre out	38	**0**	0	0	0	0	Concentration of vg homes outside NCNRMA bound	Mudzi
TOTAL HA	**20,334**	**10,293**			**6,939**	**2,927**		

INVENTORY ISSUES IN CB FOREST MANAGEMENT

- No one knows or admits how many high-value trees are left

- Participation of village forest users as informants is required for fieldwork

- Need to control tree-cutting: can't count trees as while they are being cut (therefore, need to give communities authority to patrol resources and retain exclusive rights so that inventory is for the COMMUNITY members, not for outside "investors")

- Need more info on current quantities and commercial potential of forest products

- Need for info on **regeneration** of valuable species, for future planning

The purpose of the NCNRMA inventory was to estimate averages per hectare of trees and products for use in planning how to harvest them sustainably – for the longest period of time possible. For the moment, a harvest horizon of 10 years was foreseen to go along with the management plan.

How to figure how many trees are left

Everyone wants to know how many trees are available for licenses, and how much money timber producers in the area could potentially earn. In the interests of sustainability and a community orientation, this inventory targeted ALL user groups, not just timber producers. After all, most valuable timber in the area has been removed in the last 20 years, and little is left of size or value. However, there are plenty of "lesser" products and plenty of "lesser-known" sawtimber species that could be promoted for the benefit of locals.

In order to calculate the number of trees of all species, the following steps were taken:

(1) Stratify the forest into large, homogenous-looking stands from the SPOT image

(2) Lay a grid with numbered intersections over the image; choose about a hundred plot centers for the inventory team to sample – more plots chosen in larger, more forested stands

(3) Transfer selected plot locations to the topographic map by comparing land features and measuring distances; get the UTM readings of the plot locations by the topo map grid

(4) Enter the plot location UTM info into the GPS so that the inventory team can use the "Go to" function to find them in the field

(5) The trained team of 4 (1 FD extension, 1 CLUSA-NRM facilitator, two village informants) then executes the inventory, visiting up to 6 plots per day

-> Data collected include land use (current/future), tree diameter/height/products, regeneration

(6) Filled in sheets are delivered to the inventory programmer; data are entered into the database and averaged as Trees Per Hectare and Product Per Hectare by stand, by species, and by diameter class (classes from 5cm to 85cm+, in increments of 10cm)

(7) Averaged trees and products per hectare are multiplied by the number of hectares in each stand; hectares have been calculated by mapping the forest in ArcView off the maps and image

The following sections on specific products will present tabled and mapped results for the NCNRMA inventory sites.

Participation of village forest users as informants is required for fieldwork

This inventory was set up for local users to name products in each tree counted on the plot. (Product per tree) X (Trees Per Hectare) was used to estimate the product per hectare on each plot. All the plot values were then averaged across all the plots in the stand.

The only way to get this information is from village informants, so each day of fieldwork required two informants to be picked up from the villages nearest the inventory site for that day. Villagers learned quickly the use of a bamboo pole to estimate heights and a tape to measure diameters at the appropriate place on the tree.

But: measuring was only a formality. The best value of the inventory was as a forum for discussing how each tree could be used, and what its value is on the market and in the home. Frequent discussions took place on such topics as what people would do if outsiders came to take this tree or if all the trees of this kind were gone; whether some areas for trees only (not fields) should be reserved, where, and how big; and how has fire affected this tree's ability to regenerate. Village headmen were frequently on the crews, so the sensitization aspect was amplified.