

24. PHYSICAL PROPERTIES OF MAJOR SPECIES IN CAPIIBARY AREA

(Data) NATIONAL INSTITUTE OF TECHNICAL STANDARDS,
abbreviated as INTN

(1) Names of Major Species in Capiibary Area

Local name	Botanical name	Family name
Amores secos	<i>Heliocarpus americanus</i> L.	Tiliaceae
Ingá	<i>Inga</i> sp.	Leguminosae
Ingá pytá	<i>Inga</i> sp.	Leguminosae
Kupa'y	<i>Copaifera langsdorfii</i> Desf.	Leguminosae
Kurupa'y	<i>Piptadenia</i> sp.	Leguminosae
Kurupa'y rá	<i>Piptadenia rigida</i> Benth.	Leguminosae
Lapacho amarillo	<i>Tabebuia</i> sp.	Bignoniaceae
Lapacho pirurú	<i>Tabebuia</i> sp.	Bignoniaceae
Lapacho negro	<i>Tabebuia</i> sp.	Bignoniaceae
Laurelaju'y	<i>Nectandra</i> sp.	Lauraceae
Laurel canela	<i>Nectandra</i> sp.	Lauraceae
Laurel guaicá	<i>Ocotea puberula</i> Nees.	Lauraceae
Laurel negro	<i>Nectandra megapotamica</i> (Sprengl.) Hassl.	Lauraceae
Loro blanco	<i>Bastardiopsis densiflora</i> (Hook.et Arn.) Hassl.	Malvaceae
Para para'yguasú	<i>Pentapanax warmingianus</i> (L.March.) Harms.	Araliaceae
Peroba	<i>Aspidosperma polyneuron</i> M. Arg.	Apocynaceae
Taperyváguasú	<i>Ferreirea</i> sp.	Leguminosae
Timbó	<i>Enterolobium contortisiliquum</i> (Vell.)Morong.	Leguminosae
Urunde'y pará	<i>Astronium</i> sp.	Anacardiaceae
Yvá ró	<i>Prunus sellowii</i> Koehne.	Rosaceae
Yvyrá pytá	<i>Peltophorum dubium</i> (Sprengl.) Taub.	Leguminosae

(2) Physical Properties of Major Species in Capiibary Area

1) Specific gravity (g/cm^3)

Local name	Green wood		Specific gravity at 12% moisture content	Specific gravity in one day	Bulk density
	Specific gravity	Moisture content %			
Laurel negro	0.908	60.0	0.691	0.651	0.606
Laurel Ajuy	1.139	87.8	0.734	0.700	0.606
Yvaró	1.040	85.1	0.688	0.647	0.563
Ingá	1.158	107.0	0.697	0.659	0.564
Taperyvá guazú	1.280	50.0	1.005	0.969	0.854
Urundey pará	1.185	41.8	0.966	0.900	0.836
Timbó	1.040	178.0	0.432	0.400	0.375
Lapacho pirurú	1.200	47.9	0.975	0.943	0.814
Guaicá	0.644	82.7	0.421	0.394	0.352
Amores secos	0.829	304.6	0.256	0.236	0.205
Yvyrá pytá	1.258	66.4	0.900	0.851	0.757
Lapacho negro	1.116	35.3	0.942	0.900	0.820
Kurupayrá	1.192	57.5	0.923	0.861	0.757
Laurel canela	1.049	72.8	0.724	0.685	0.609
Pará paray guazú	1.014	123.5	0.556	0.525	0.454
Peroba	1.139	59.8	0.878	0.847	0.713
Lapacho amarillo	1.096	44.0	0.901	0.862	0.761
Loro blanco	1.047	90.9	0.673	0.638	0.550
Kupay	1.162	66.8	0.848	0.800	0.710
Kurupay	1.290	45.7	1.053	1.021	0.896

2) Shrinkage percentage (%)

Local name	Moisture content 12%		Oven dry	
	Radial direction	Tangen- tial direction	Radial direction	Tangen- tial direction
Laurel negro	1.4	4.2	3.5	8.1
Laurel Ajuy	1.1	5.6	2.8	9.7
Yvaró	0.9	6.5	2.6	10.2
Ingá	1.6	6.2	3.6	10.4
Taperyvá guazú	1.4	2.9	4.2	7.1
Urundey pará	0.7	1.8	2.0	4.1
Timbó	0.8	1.7	1.7	3.5
Lapacho pirurú	2.5	4.5	4.8	8.2
Guacá	1.0	4.7	2.3	7.6
Amores secos	1.3	8.0	2.0	10.3
Yvyrá pytá	1.4	2.8	4.1	6.4
Lapacho negro	1.2	2.0	3.0	4.8
Kurupayrá	1.3	6.4	2.5	8.9
Laurel canela	1.2	4.7	2.8	8.5
Pará paray guazú	1.7	5.2	4.2	8.5
Lapacho amarillo	1.7	3.6	3.8	7.0
Peroba	2.6	5.1	5.7	10.0
Loro blanco	1.8	4.7	4.4	9.0
Kupay	1.3	3.0	3.2	7.4
Kurupay	1.2	3.2	3.4	7.8

3)

Local name	Moisture content	Specific gravity	Bending strength (kg/cm ²)			Compressive strength (kg/cm ²)		
			Proportional limit stress	Breaking stress	Elastic modulus	Proportional stress resistance	Maximum unit resistance	Maximum unit stress
Amores secos	1 3.0	0.30	1 60.- 1 68.-*	3 28.- 3 41.1*	46, 976 47, 915.5*	8 0.- 8 4.-*	1 89.- 2 00.3*	56, 525 59, 351.3*
Guaicá	1 2.3	0.44	3 31.-	6 80.-	90, 124	1 65.-	3 45.-	111, 929
Ingá	1 4.3	0.68	3 63.- 3 99.3*	9 77.- 1,0 55.2*	107, 711 112, 019.4*	1 91.- 2 10.1*	4 16.- 4 65.9*	125, 366 137, 902.6*
Kupay	1 5.3	0.86	3 82.- 4 39.3*	1,0 50.- 1,1 76.-*	118, 873 126, 005.4*	2 90.- 3 33.5*	4 96.- 4 06.7*	150, 220 152, 473.3*
Kurupay	1 4.0	1.00	7 52.- 8 27.2*	1,4 36.- 1,5 50.9*	162, 626 168, 626*	2 42.- 2 66.2*	6 52.- 7 30.2*	194, 178 213, 595.8
Kurupayrá	1 3.6	0.91	4 57.- 5 02.7*	1,2 55.- 1,3 55.4	128, 339 133, 472.6*	2 54.- 2 79.4*	5 67.- 6 35.-*	138, 533 145, 459.7*
Lapacho amarillo	1 3.0	0.92	5 44.- 5 71.2*	1,3 10.- 1,3 62.4*	131, 200 133, 824*	2 56.- 2 68.8*	6 65.- 7 04.9*	162, 702 170, 837.1*
Lapacho negro	1 2.5	0.92	7 29.-	1,5 54.-	158, 285	4 00.-	7 32.-	171, 794
Lapacho pirurú	1 2.3	0.98	4 41.-	1,4 44.-	139, 252	3 30.-	7 17.-	173, 276
Laurel ayuy	1 3.1	0.76	5 91.- 6 20.5*	1,2 50.- 1,3 00.-*	157, 613 160, 765.3*	2 93.- 3 07.6*	5 00.- 5 30.-*	156, 255 164, 067.8*
Laurel canela	1 3.7	0.76	4 26.- 4 68.6*	1,0 11.- 1,0 91.9*	95, 064 98, 866.6*	1 82.- 2 00.2*	4 31.- 4 82.7*	119, 220
Laurel negro	1 4.0	0.67	3 71.- 4 08.1*	9 71.- 1,0 48.7*	107, 575 111, 878*	2 30.- 2 53.-*	4 57.- 5 11.8*	137, 540 151, 294*
Loro blanco	1 3.8	0.66	4 20.- 4 62.-*	9 22.- 9 95.8*	97, 749 101, 559*	1 97.- 2 16.7*	4 07.- 4 55.8*	121, 577 133, 734.7*

3) (concluded)

Pará paray guasú	1 3.6	0.53	3 76.- 4 13.6 *	8 64.- 9 33.1 *	111, 475 115, 934*	1 56.- 1 71.6 *	3 28.- 3 67.4 *	91, 342 100, 476.2*
Taperyva guasú	1 3.3	0.95	6 10.- 6 40.5 *	1 41 9.- 1 47 5.8 *	140, 255 143, 060.1*	2 84.- 2 98.2 *	6 41.- 6 79.5 *	174, 120 182, 826*
Timbó	1 1.2	0.43	2 94.-	6 09.-	81, 370	1 65.-	3 10.-	79, 883
Urundey pará	1 3.8	0.97	5 19.- 5 70.9 *	1.4 86.- 1.6 04.9 *	132, 664 137, 970.6*	2 95.- 3 24.5 *	7 03.- 7 87.4 *	160, 826 176, 908.6*
Yvaró	1 2.6	0.68	2 88.- 3 02.4 *	9 27.- 9 64.1 *	101, 586 103, 617.7*	1 82.- 1 91.1 *	4 08.- 4 32.5 *	102, 020 107, 121*
Yvyrapytá	1 6.4	0.86	3 93.- 4 71.6 *	9 07.- 1.0 52.1 *	110, 568 119, 413.4	2 27.- 2 72.4 *	4 55.- 5 64.2 *	123, 923 148, 707.6*
Yvyraromi	1 3.3	0.84	4 73.- 4 96.6 *	1 30 2.- 1.3 54.1 *	124, 340 126, 826.8*	2 49.- 2 61.4 *	6 33.- 6 71.- *	132, 815 139, 455.6*

4)

Local name	Moisture content	Specific gravity	Normal stress (kg/cm ²)		Shearing stress (kg/cm ²)	Hardness (kg)			Toughness (cm.kg)
			Proportional limit resistance	Maximum unit resistance		Cross section	Vertical grain	Flat grain	
Amores secos	1 3.0	0.3 0	8.-	2 1.-	3 6.- 3 7.1 *	1 5 0.- 1 5 6.- *	9 2.- 9 4.3 *	9 0.- 9 2.3 *	9 4.- 9 4.5 *
			8.4 *						
Guaicá	1 2.3	0.4 4	3 3.-	6 5.-	8 4.-	3 0 3.-	2 3 2.-	2 3 4.-	1 4 0.-
Ingá	1 4.3	0.6 8	4 6.-	1 2 2.-	1 2 3.- 1 3 0.4 *	6 9 5.- 7 5 0.6 *	5 8 0.- 6 0 9.- *	5 7 1.- 5 9 9.6 *	2 1 7.- 2 1 9.2 *
			6 1.1 *						
Kupay	1 5.0	0.8 6	1 0 0.-	2 3 7.-	1 3 9.- 1 5 1.5 *	1 0 3 6.- 1 1 6 0.3 *	9 5 2.- 1 0 2 3.4 *	9 6 0.- 1 0 3 2.- *	4 4 3.- 4 4 9.6 *
			1 1 6.5 *						
Kurupay	1 4.0	1.0 0	1 4 6.-	3 5 0.-	1 8 4.- 1 9 5.- *	1 4 5 2.- 1 5 6 8.2 *	1 4 0 3.- 1 4 7 3.2 *	1 3 3 0.- 1 3 9 6.5 *	6 7 4.- 6 8 0.7 *
			1 7 0.1 *						
Kurupayrá	1 3.6	0.9 1	9 1.-	2 1 5.-	1 6 2.- 1 7 1.7 *	1 0 5 2.- 1 1 3 6.2 *	9 1 2.- 9 5 7.6 *	9 0 7.- 9 5 2.4 *	3 4 4.- 3 4 7.4 *
			1 0 1.- *						
Lap. amarillo	1 3.0	0.9 2	1 1 6.-	2 6 9.-	1 6 8.- 1 7 3.- *	1 0 7 6.- 1 1 1 9.- *	1 1 4 6.- 1 1 7 4.7 *	1 1 7 4.- 1 2 0 3.4 *	6 5 6.- 6 5 9.3 *
			1 2.4						
Lap. negro	1 2.5	0.9 2	1 0 7.-	2 8 4.-	1 5 9.-	1 1 3 7.-	1 1 2 7.-	1 1 6 4.-	6 3 6.-
Lap. pirurú	1 2.3	0.9 8	1 5 1.-	3 5 7.-	1 9 3.-	1 4 6 5.-	1 3 6 3.-	1 5 1 0.-	5 8 5.-
Laurel ayuy	1 3.1	0.7 6	6 4.-	1 5 3.-	1 4 4.- 1 4 8.3 *	7 4 9.- 7 7 9.- *	7 3 7.- 7 5 7.4 *	7 4 2.- 7 6 0.6 *	3 3 5.- 3 3 6.7 *
			6 7.5 *						
Laurel canela	1 3.7	0.7 6	8 9.-	1 9 5.-	1 3 0.- 1 3 7.8 *	7 9 3.- 8 5 6.4 *	6 8 9.- 7 2 3.5 *	7 0 2.- 7 3 7.1 *	2 0 2.- 2 0 4.- *
			9 8.8 *						

4) (concluded)

Laurel negro	1 4.0	0.67	6 0.- 6 6.6 *	1 4 0.-	1 2 8.- 1 3 5.7 *	6 7 0.- 7 2 3.6 *	6 2 7.- 6 5 8.4 *	6 4 5.- 6 7 7.3 *	3 6 5.- 3 6 8.7 *
Loro blanco	1 3.8	0.66	7 5.- 8 3.3 *	1 5 0.-	1 1 5.- 1 2 1.9 *	6 7 1.- 7 2 4.7 *	5 2 2.- 5 4 8.4 *	5 2 8.- 5 5 4.4 *	2 1 2.- 2 1 4.1 *
Para paray guasú	1 3.6	0.53	3 8.- 4 2.2 *	7 8.-	8 6.- 9 1.2 *	3 7 6.- 4 0 6.1 *	2 4 0.- 2 5 2.- *	2 2 8.- 2 3 9.4 *	9 5.- 9 5.- *
Taperyva guasú	1 3.3	0.95	1 4 2.- 1 4 9.8-*	3 2 2.-	1 4 2.- 1 4 6.3 *	1 0 4 7.- 1 0 8 8.9 *	9 8 8.- 1 0 1 2.7 *	1 0 7 6.- 1 1 0 2.9 *	4 4 6.- 4 4 8.2 *
Timbó	1 1.2	0.43	3 0.-	6 1.-	8 0.-	3 2 2.-	2 4 8.-	2 5 4.-	1 8 4.-
Urunday pará	1 3.8	0.97	1 4 7.- 1 6 3.2 *	3 2 5.-	1 9 4.- 2 0 5.6 *	1 3 5 7.- 1 4 6 5.6 *	1 2 8 3.- 1 3 4 7.2 *	1 1 7 4.- 1 2 3 2.7 *	2 7 7.- 2 7 9.8 *
Yvaró	1 2.6	0.68	5 6.- 5 9.1 *	1 3 5.-	1 2 4.- 1 2 7.7 *	7 1 9.- 7 4 7.8 *	5 7 2.- 5 8 6.3 *	6 3 7.- 6 5 2.9 *	2 2 7 2 2 8.1 *
Yvyrapytá	1 6.4	0.86	8 4.- 1 0 2.5 *	2 1 4.-	1 4 8.- 1 6 5.8 *	9 2 6.- 1 0 7 4.2 *	7 9 7.- 8 7 6.3 *	8 0 9.- 8 8 9.9 *	2 1 0.- 2 1 4.2 *
Yvyraromi	1 3.3	0.84	1 0 7.- 1 1 2.9 *	2 4 0.-	1 7 4.- 1 7 9.2 *	1 0 6 7.- 1 1 0 9.7 *	9 2 2.- 9 4 5.1 *	9 9 3.- 1 0 1 7.8 *	4 2 7.- 4 2 9.1 *

* Moisture content 12%

25. PRICE OF CRUDE WOOD

Followings are hearing from major makers of crude wood.

- (1) Timber cooperative association
(Members are timber processing makers, forest owners,
timber products sellers)

- Purchase price of log (ex. factory in Asuncion)

Species	Gs/APm ³
LAPACHO	1,100
CEDRO	1,200 ~ 1,300
GUATAMBÚ	600
IVYRARO	1,200 ~ 1,300
PETEREBY	1,200 ~ 1,300
YPYRAPYTÁ	600
KURUPAY	700
GUAICÁ	600
TIMBÓ	600
GRAPIA	650 ~ 700
INCIENSO	1,200 ~ 1,300

- (2) Crude wood maker

- In case of buying standing trees directory from forest owner

First class mean Gs 150/APm³

Second class mean Gs 50/APm³

- In case of buying logs in wood yard

Adding up 40 Gs to above price

◦ Cost of transport

Mbutuy ~ Colonel Oviedo Gs 150/APm³

Capiibary ~ Colonel Oviedo Gs 200/APm³

Mbutuy ~ Asuncion Gs 300/APm³

◦ Selling price of log (ex. factory in C. Oviedo)

1) More than 5 m length and more than 88 inch of trunk girth

First class LAPACHO Gs 800/APm³

CEDRO Gs 1,000/APm³

First and second class

PETEREBY Gs 600/APm³

2) More than 3 m length and less than 88 inch of trunk girth

LAPACHO Gs 500 ~ 600/APm³

CEDRO Gs 600 ~ 700/APm³

(3) Development plan of farm land of H. PETERSEN Company
(Dep. CANENDIYU, Outskirts of IGATIMI)

◦ Price of stumpage

First class Gs 5,000/m³

Second class Gs 1,500/m³

Charcoal wood Gs 200/m³

◦ In case of buying logs in wood yard

Adding up 30% to above price

26. PRICES FOR SEEDS AND SEEDLINGS

Prices for seeds and seedlings as of October, 1983 are as tabulated below. Since the number of seeds per kg, germination rate, survival percent of seedlings, etc. vary in the available data, these were not listed and left for review in the stage of the implementation program.

	Species	Price	Country of origin	Remark
Seeds	Elliottii pine	Gs 8,000 ~ 10,000/kg	Brazil	1. Price delivered to Asuncion.
	Caribbean pine	Gs 25,000 ~ 30,000/kg	Cuba, Honduras, Guatemala	2. No problem in import quarantine.
	Araucaria	Gs 250/kg	Brazil	
	Eucalyptus	Gs 8,000 ~ 10,000/kg	Brazil	
		Gs 25,000 ~ 35,000/kg	Rhodesia	
Seedlings	Araucaria	Gs 10/seedling		1. Spot delivered price.
	Elliottii pine (naked root)	Gs 10/seedling		Every one nursed within Paraguay.
	Elliottii pine (planted in pot)	Gs 15/seedling		2. Pot is made of vinyl.

27. PRICES FOR HEAVY EQUIPMENT

The attached table shows the prices of major heavy equipment as of November 1983 inquired at Caterpillar Tractor Company (Asuncion).

Normally, import becomes possible by receiving foreign currency allocation from the Central Bank, but as there is no foreign currency allocation currently, the would-be user has to provide U.S.\$ by himself in order to import.

In the event that these are imported through Caterpillar Tractor Company, the would-be user has to bear the costs of opening L/C, clearing through customs and moving the equipment. As a principle, the guarantee period of the equipment is either 6 months or according to the number of operating hours.

CIF, US\$ price

(as of November 1983)

Model		HP	Made in Brazil	Made in U.S.A.	Made in Japan
Bulldozer	D10L	700		681,000	
	D9L	460		393,000	
	D8L	335		307,530	
	D76	200		195,500	
	D6D	140	122,020	137,000	
	D5B	105		102,100	
	D4D	75	63,840	67,500	
	D3	65			45,000
Skidder	518	120		79,615	
	528	175		111,000	
Grader	120B	125	85,200		
	140B	150	110,200		

(Source) Caterpillar Tractor Co. (Asuncion)

28. FIXED ASSETS DEPRECIATION RATES

The maximum depreciation rates were determined pursuant to Resolution N: 20/31.XII.81 by the Board of Trustees of the Income Tax Offices. Following table shows the depreciation rates of fixed assets by category.

Table Fixed assets depreciation rates

Code	Classification	Maximum annual depreciation rate %
Group A	Furniture and furnishings	
A-1	Furniture and furnishings in general except those that belong to the following category	10
A-2	Those which quickly wear out, such as tablewares and sheets of hotel, stock raising farm, etc.	25
Group B	Machinery, instrument and tool	
B-1	Machinery of work shop and repair shop	6
B-2	Agricultural development machinery	8
B-3	Tool for fabricating objects of craftwork, tool for repair shop	15
B-4	Agricultural implement and tool for agricultural development	20
B-5	Measuring instrument, X-ray instrument, testing instrument, medical instrument, camera, drafting instrument, scaling instrument, etc.	7
B-6	All others	
Group C	Ground transportation equipment	
C-1	Motor vehicle, small truck, truck, trailer, tractor	12
C-2	Autobicycle, scooter, auto-tricycle, bicycle	16

Code	Classification	Maximum annual depreciation rate %
C-3	Passenger car, vehicle	15
Group D	Air transportation equipment	
D-1	Small airplane, airplane, flying instrument	20
D-2	Ground facility	15
Group E	Marine and river transportation equipment	
E-1	Ship in general, steamship, tugboat, steam launch, barge, etc.	5
E-2	Row boat	20
Group F	Railroad transportation equipment	
F-1	Locomotive, wagon, rail track, open freight car, inch. other vehicle	5
F-2	Track laying work	10
Group G	Livestock	
G-1	Livestock in general, cattle, sheep, swine, goat, etc. which are raised	-
G-2	Same as above, bought from third party	-
G-3	Superior-bred or crossbred for reproduction	25
Group H	Real estate	
H-1	Urban real estate including land, building and equipment	3
H-2	Rural real estate including land, building and equipment	4
H-3	Building and equipment built on other's land and returnable to the land owner without compensation upon expiration of leasehold	15
H-4	Building for residence, etc. built mostly of wood	10

Code	Classification	Maximum annual depreciation rate %
H-5	Rural facilities, cattle fence, corral, gate, pigsty, banking, road, reservoir, water supply, waterway, well, water tank, etc.	8
H-6	Rural industrial facilities susceptible to quickly wear out, such as, mate tea, drying facility, etc. (Note) Categories H-1 and H-2 clearly indicate to include land. Categories H-3 to H-6 do not include the value of land.	12

29. CHANGES COMPARED WITH LABOR WAGES OF THE PRECEDING YEARS

(Unit: %)

Occupational Category	1978	1979	1980	1981
Manufacturing	15.4	17.8	24.6	20.3
Power, Gas & Water (Public Utilities)	11.0	12.1	22.8	20.0
Construction	12.0	14.0	17.7	19.3
Commerce	11.0	8.9	42.6	24.5
Communication	14.1	28.3	20.9	19.4
Services	14.6	25.9	32.0	21.5
Average	14.5	20.0	23.3	20.0

(Source) Central Bank of Paraguay

30. CHANGES COMPARED WITH COST OF LIVING OF THE PRECEDING YEARS

(Unit: %)

Item	1977	1978	1979	1980	1981
Food	11.3	13.0	29.5	18.9	6.5
Housing	8.0	6.4	22.4	22.8	27.1
Clothing	7.5	11.7	23.2	21.2	10.7
Sundry Expenses	6.7	7.6	31.3	13.4	20.2
Average	9.4	10.6	28.2	22.4	13.0

(Source) Central Bank of Paraguay

31. WATER RATES

Kind of meter	Minimum consumption volume m ³	Basic water rate Gs/month	Excess usage rate Gs/m ³	Fee for the right of installation
Minimum	10	300	30	24,000
Meter 1/2"	20	750	60	24,000
3/4"	30	1,125	60	37,000
1"	75	2,812	60	53,000
1" 1/2	150	5,625	60	69,700
2"	185	6,937	60	127,400
3"	333	12,487	60	237,400
6"	900	33,750	60	280,300

(Note) Waterwork services are provided by:

- The sanitary facilities public corporation (CORPOSANA) in cities with population above 4,000.
- By the surrounding environment preservation bureau (SENASA) in villages with population below 4,000.

32. ELECTRIC RATES (FOR INDUSTRIAL AND RURAL USERS)

kWh	Gs/kWh
1 ~ 100	12.12
101 ~ 200	11.81
201 ~ 500	11.35
501 ~ 750	10.97
751 ~ 1,500	10.51
1,501 ~ 2,250	10.06
2,251 ~ 3,500	9.67
3,501 ~ 5,500	9.14
5,501 ~	8.84

(Source) ANDE (Electric Power Public Corporation)

[References]

Hydraulic power generation projects include the followings:

1. Itaipu Project (being implemented)

A joint project by and between Paraguay and Brazil.

Location: The Parana River

Scale : 12,600,000 kWh
18 sets of 700 MW turbine

Onstream: Three sets of turbines are scheduled for on-stream in 1983. Services will be started in 1984.

2. Yacyreta Project (being implemented)

A joint project by and between Paraguay and Argentina.

Location: The Parana River

Scale : 4,050,000 kWh

Onstream: Scheduled for onstream in 1988.

3. Corpus Project (under study)

A joint project by and between Paraguay and Argentina.

Location: The Paranan River

Scale : 2,000,000 kWh

Onstream: Scheduled for onstream by 1990.

33. PRODUCTION VOLUMES OF MAJOR CROPS BY YEAR

Perennial crop	1975	1976	1977	1978	1979	1980	1981	1982
Laurel pear 1,000 pcs.	10,610	10,950	10,620	11,360	11,700	12,050	12,410	12,780
Banana 1,000 bunches	11,650	13,400	14,740	13,270	13,530	14,070	12,660	14,560
Coffee tons	9,600	3,910	6,000	7,200	7,560	7,180	10,000	7,900
Sugar cane tons	1,200,000	1,440,000	1,600,000	1,785,600	2,053,440	2,356,992	2,121,293	2,333,422
Plum 1,000 pcs.	32,220	32,550	31,900	32,860	33,850	34,527	36,253	37,340
Palm tons	200,000	206,000	236,900	225,055	236,300	248,115	243,150	413,355
Peach 1,000 pcs.	45,000	46,350	45,420	46,330	46,800	44,460	45,790	47,160
Guayaba 1,000 pcs.	178,890	184,250	189,770	191,670	201,250	205,275	211,430	217,770
Persian variety lima 1,000 pcs.	68,630	72,060	70,620	71,330	72,040	72,760	76,390	77,920
Real lemon 1,000 pcs.	10,700	11,240	11,010	11,340	11,910	13,101	13,760	14,450
Sutil lemon 1,000 pcs.	32,790	34,430	33,400	34,400	36,120	39,732	40,527	42,550
Mango 1,000 pcs.	83,290	71,800	75,390	86,700	95,370	104,907	105,960	109,140
Papaya 1,000 pcs.	8,080	8,250	8,420	8,670	9,100	9,191	9,470	9,940
Apple 1,000 pcs.	4,560	4,700	4,560	4,510	4,600	4,140	4,260	4,380
Mandarin 1,000 pcs.	336,190	437,050	415,200	394,440	406,270	394,082	413,780	417,920
Sweet orange (grafted) 1,000 pcs.	82,300	86,410	82,000	180,400	189,420	185,632	193,060	202,710
Orange (spontaneous) 1,000 pcs.	1,349,250	1,416,700	1,345,800	1,318,884	1,345,260	1,331,800	1,771,750	1,594,580
Orange (sour) Ton	110,420	121,462	110,000	107,800	104,570	127,575	102,060	117,600
Pear 1,000 pcs.	1,000	1,030	930	910	940	912	1,003	1,050
Pineapple 1,000 pcs.	15,750	17,325	16,450	16,610	17,110	19,950	20,550	21,580
Grapefruit 1,000 pcs.	104,450	109,670	98,700	95,740	100,530	94,480	99,200	104,160
Castor oil Ton	23,400	22,230	24,500	30,625	31,910	33,505	33,840	37,224
Tung oil Ton	120,000	131,200	137,700	96,390	106,030	95,427	100,200	105,210
Grape Ton	14,050	14,410	14,120	15,530	16,300	19,070	18,115	19,020
Mate tea Ton	19,850	20,370	22,400	24,640	25,870	27,164	28,520	31,370

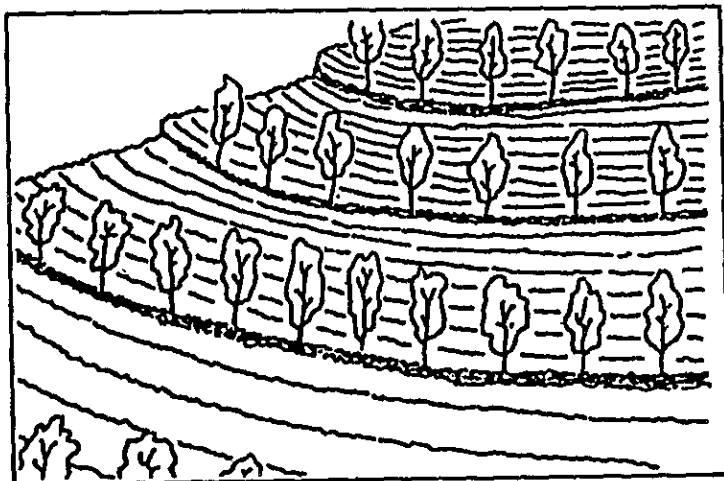
Seasonal crop	1975	1976	1977	1978	1979	1980	1981	1982
Garlic	190	200	210	323	330	347	357	375
Alfalfa	28,541	29,110	29,980	29,380	29,670	27,040	26,645	27,480
Cotton	100,000	105,040	222,500	284,700	230,000	235,000	317,000	253,627
Rice	50,000	52,000	36,400	35,672	68,300	60,500	62,315	65,000
Peas	4,285	4,390	4,600	4,416	4,500	4,225	4,436	4,570
Sweet potatoes	178,190	187,100	196,500	186,675	192,275	207,395	213,617	220,030
Pumpkin	14,180	14,550	15,300	17,595	18,120	19,025	19,596	20,580
Onion	24,740	26,720	27,520	33,024	25,000	27,500	26,125	28,220
Strawberry	520	550	540	594	565	595	654	720
Red beans	4,790	4,932	5,180	6,475	6,280	6,595	6,925	7,130
Corn	337,800	344,220	372,200	368,200	405,326	506,000	495,880	520,680
Peanuts	20,540	19,900	21,890	21,452	23,500	24,675	23,440	23,910
Manioc (for food and industrial use)	862,558	867,500	876,175	867,413	893,435	911,303	920,416	948,030
Melon	11,990	12,590	12,400	14,260	13,830	14,520	14,810	15,100
Irish potatoes	9,786	10,680	11,750	9,400	9,120	9,670	9,960	10,260
Mis. beans	59,950	33,600	36,960	49,896	51,400	54,485	57,209	60,640
Water melon	37,500	39,370	27,400	34,250	35,300	37,770	37,903	39,800
Sorghum (grain)	6,280	6,590	6,800	8,700	8,960	9,050	9,502	9,980
Sorghum (broom)	8,620	8,850	9,000	9,230	9,570	10,050	10,552	11,080
Soybeans	220,000	280,000	350,000	330,000	450,000	650,000	880,000	750,000
Tobacco	25,000	40,000	32,000	20,000	25,000	16,500	15,000	18,000
Wheat	13,000	25,000	27,450	30,190	65,000	43,500	55,000	70,000
Sunflower	-	-	9,350	14,400	15,120	17,390	23,476	25,820
Manioc (for animal feed)	862,558	867,500	876,175	867,413	893,435	911,303	920,416	948,030

(Source) The Central Bank of Paraguay, Economic statistics.

34. AGROFORESTRY SYSTEM

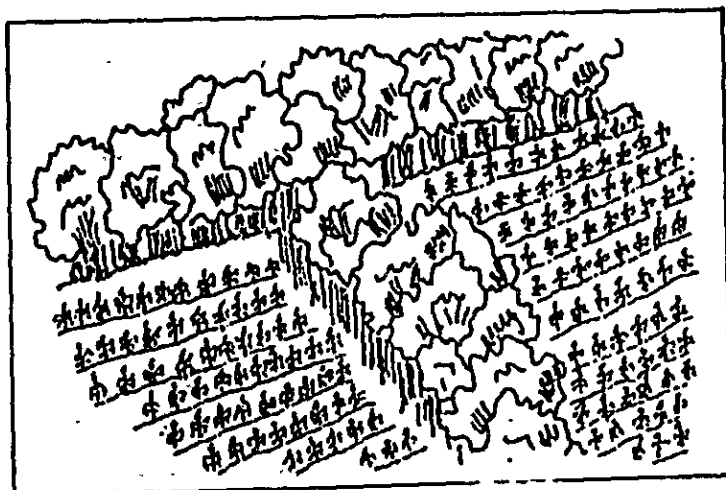
Reference: Extracted from "Agroforestry system"
(Aruto Parana forestry center; 1982)

(1) Agroforestry combination example



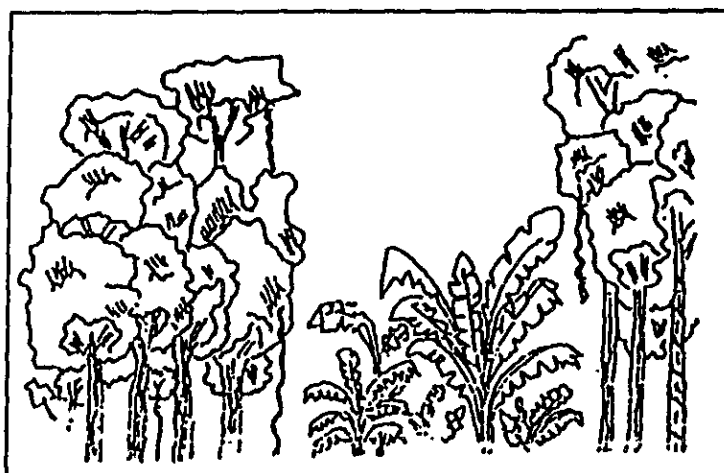
1) Trees are transplanted to farm or pasture.

34-1



2) Crops or grasses are grown in belt-shaped area in forest.

34-2

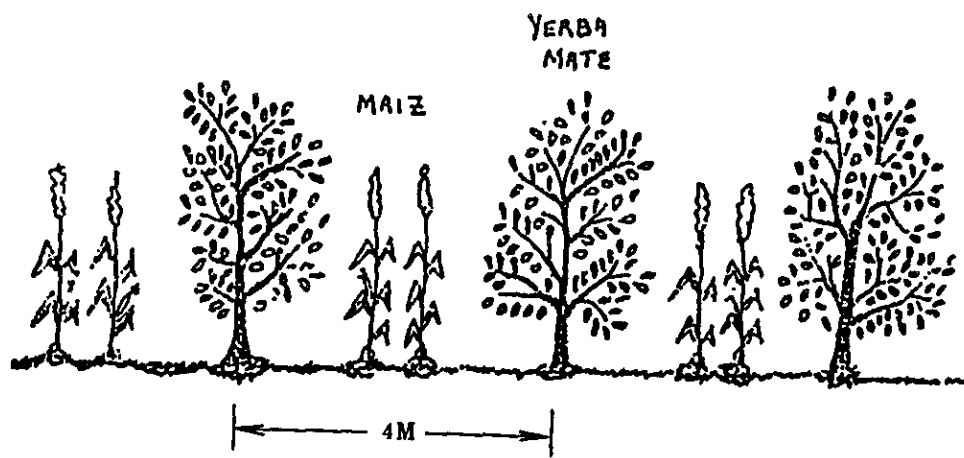


3) Growing of crops, such as banana, coffee, balmeat, etc., utilizing the shade of trees in natural forest.

34-3

(2) Example of agro-forestry system applicable to this area

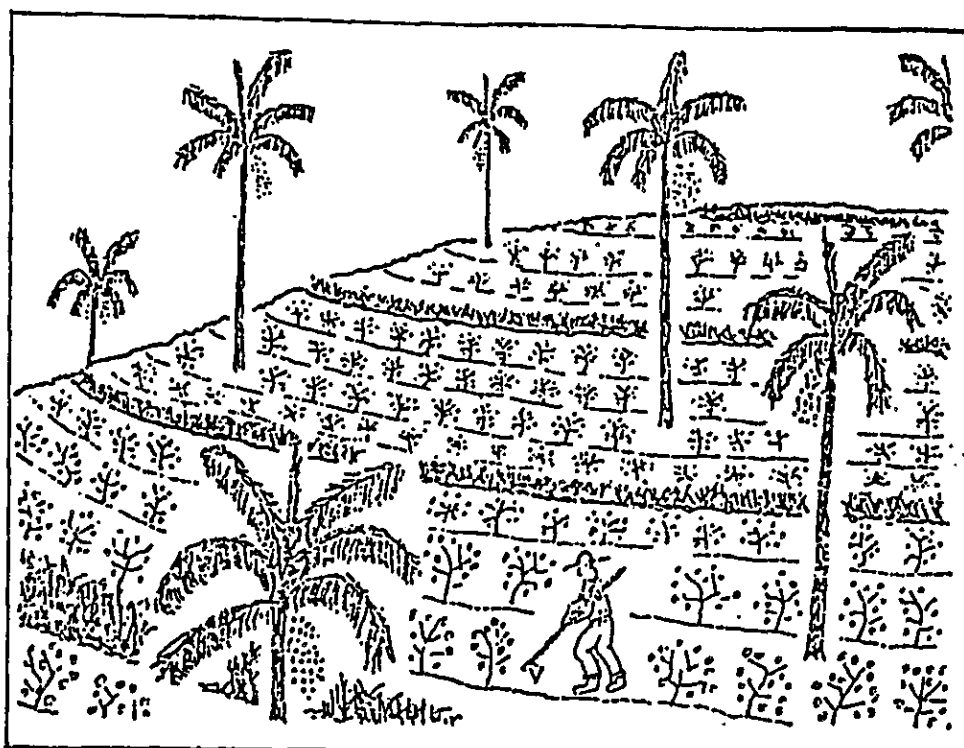
① Yerba mate and therophyte



34-4

On a slope, Yerba mate is planted with a space of 4 m × 4 m along the contour line of the slope, and a therophyte is grown between the trees of Yerba mate. Soybean, wheat, manioc, corn, cotton, etc. are suitable.

② Therophyte and cocotero (coconut palm)



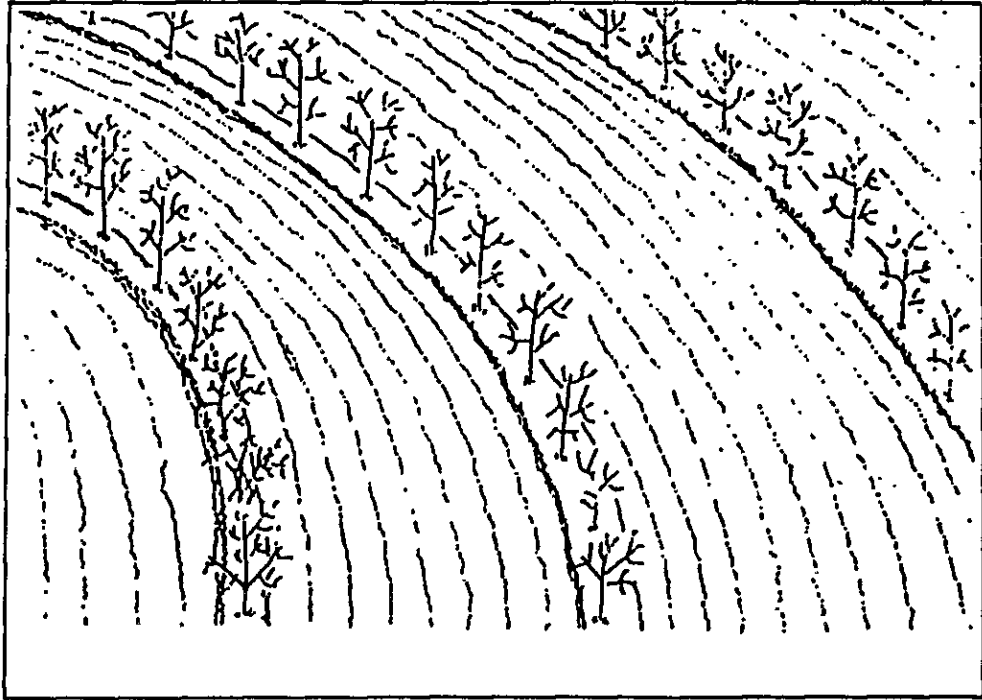
34-5

When cutting down trees of a forest and clearing away for a farm, the cocotero (coconut palm) trees are left unremoved. The cocotero does not give any large shade under the tree, and the space between the trees of cocotero is suitable for growing cotton, manioc, corn, and vegetables.

③ Tung oil tree and intercropping

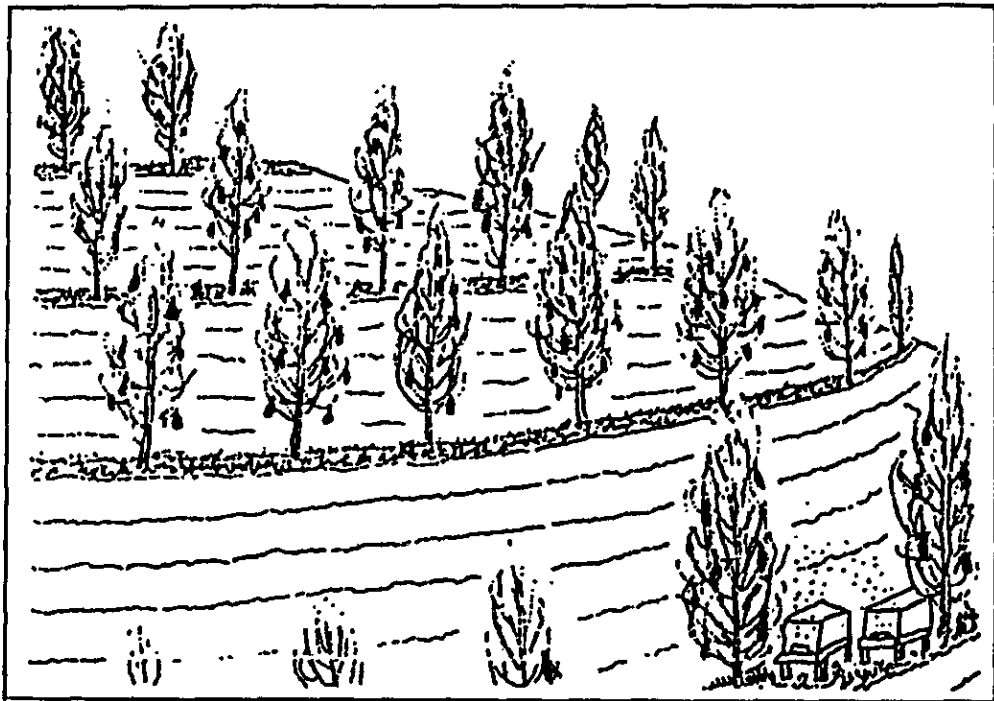
Tung oil trees are planted in straight, or along the contour line, with a space of ridge distance 10 m and tree-to-tree distance of 5 m, and some other crops are grown in this space.

Growing of crops is possible for five to eight years until the tung oil trees grow large, expanding their shade on the ground.



34-6

④ Fruit trees and other crops



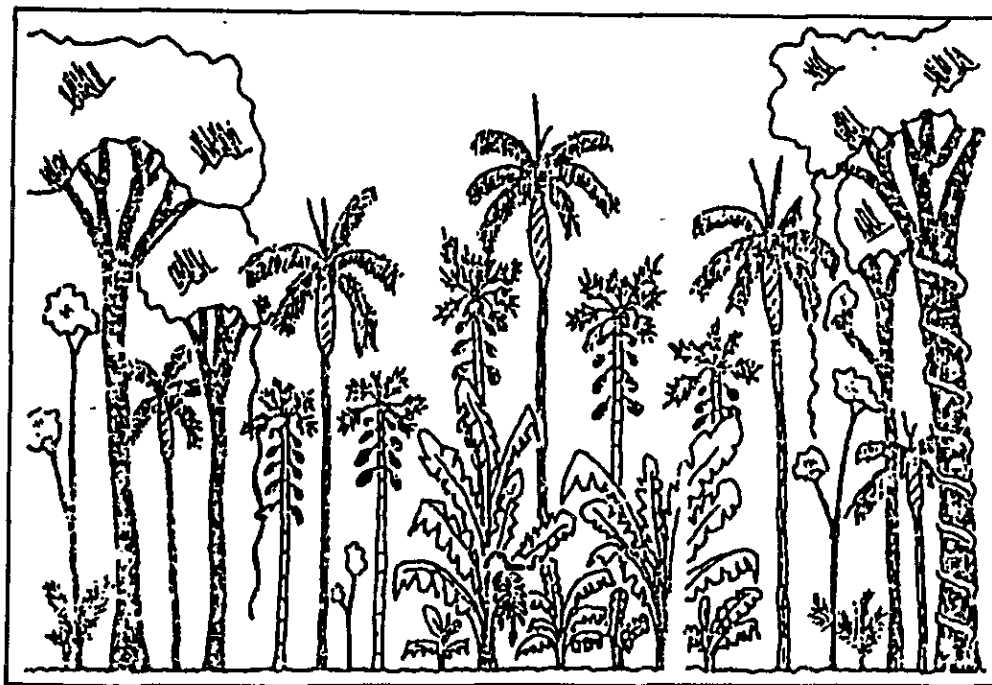
34-7

Fruit trees are planted with a space of ridge distance 10 m and tree-to-tree distance 6 m, and other crops are grown in the space.

Guajaba, orange, lemon, mango, aguakate (avocado), peach, pear, pecan, etc. are suitable.

Beekeeping gathering the honey from the fruit tree flowers is also possible.

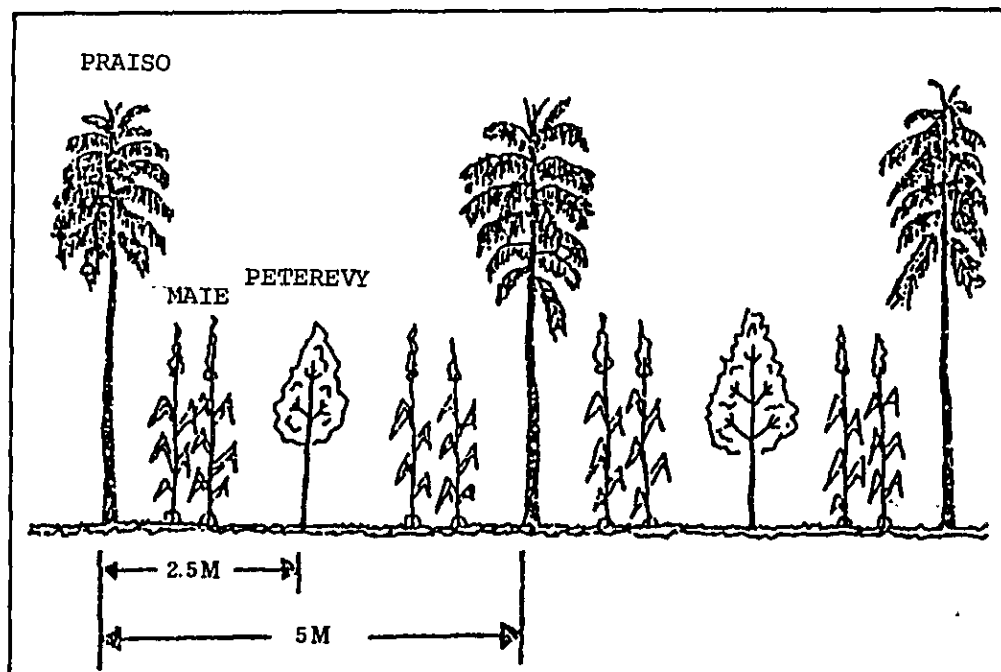
⑤ Palmito, banana, or mamon (papaya) in forest



34-8

These trees are planted in a space of 25 to 400 m² found in a natural forest. The surrounding forest is effective for preventing frost-damage to these planted trees.

⑥ Paraiso gigante, peterevy and crops

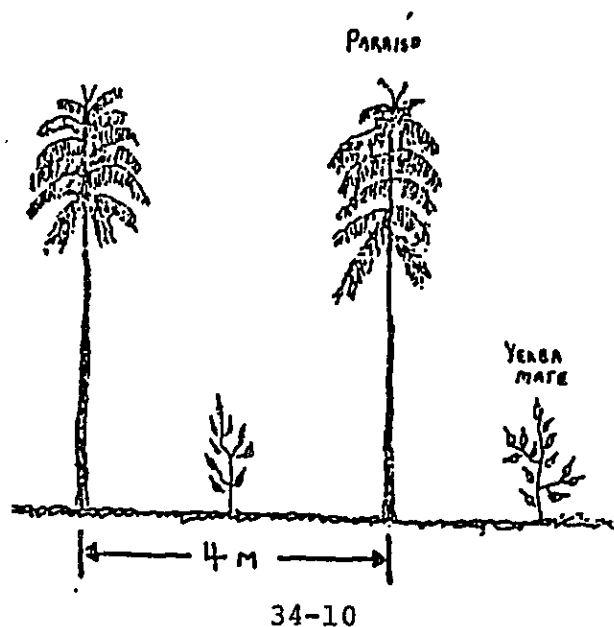


34-9

These trees are utilized as high-quality wood-working material. Paraiso and peterevy are planted alternately with a space of 2.5 m × 2.5 m, and crops are grown in this space area. Paraiso and peterevy require trimming of branches for the first three years.

⑦ Mixed planting of paraiso gigante and yerba mate

Paraiso and yerba mate are planted alternately with a space of 2 m × 2 m. Paraiso trees are cut down after 6 to 12 years of plantation, and then the normal growth space (4 m × 4 m) for the yerba mate are attained.



⑧ Afforestation and cattle breeding

Eucalyptas, paraiso, pine trees are planted in a belt or in groups inside a pasture for providing shade of trees, promoting growth of grasses, and also for producing wood.

Also, the pasture may be divided into the wood producing area and cattle breeding area, and these areas are alternated to each other every 10 to 15 years for maintaining the fertility of soil.

(3) Trees and fruit trees suitable for agro-forestry

The following trees and fruit trees are generally suitable for agro-forestry:

Trees:

Native kind (Local name)

Yerba mate	Timbó
Pino parana	Lapacho
Peterevú	Guatambú
Loro Blancó	Incienso
Yvyra Jú	Yvyra ró
Yvyra Pytá	

Foreign kind (Local name)

Kiri	Caliandra
Leucaena	Eucalipts
Paraiso Gigante	Ciprés
Sesbania	Grevillea
Hovenia	Pinos

Fruit trees:

Palmito	Mango	Pineapple
Tung oil tree	Guyajaba	Pecan
Coffee	Lemon	Mandarine orange
Pear	Orange	Mulberry
Banana	Aguakate (avocado)	Loquat
Peach	Mamon	Grape-fruit
	Persimmon	Plum

35. NATIONAL HOLIDAYS

January 1	New Year's Day
February 3	San Blas' Day (religious festival day)
March 1	Heroes' Day
April 8 and 9	Easter (unfixed)
May 1	May Day
May 14 and 15	Independence Day
June 10	Corpo Cristi (religious festival day)
June 12	Anniversary of the End of the Chaco War
August 15	Anniversary of Foundation of Asuncion City
August 25	Anniversary of Proclamation of Constitution
September 29	Anniversary of the Boqueron Battle (the Chaco War)
October 12	Anniversary of Discovery of American Continent
November 1	All Saints' Day
December 8	Holy Virgin Caacupe Festival
December 25	Christmas

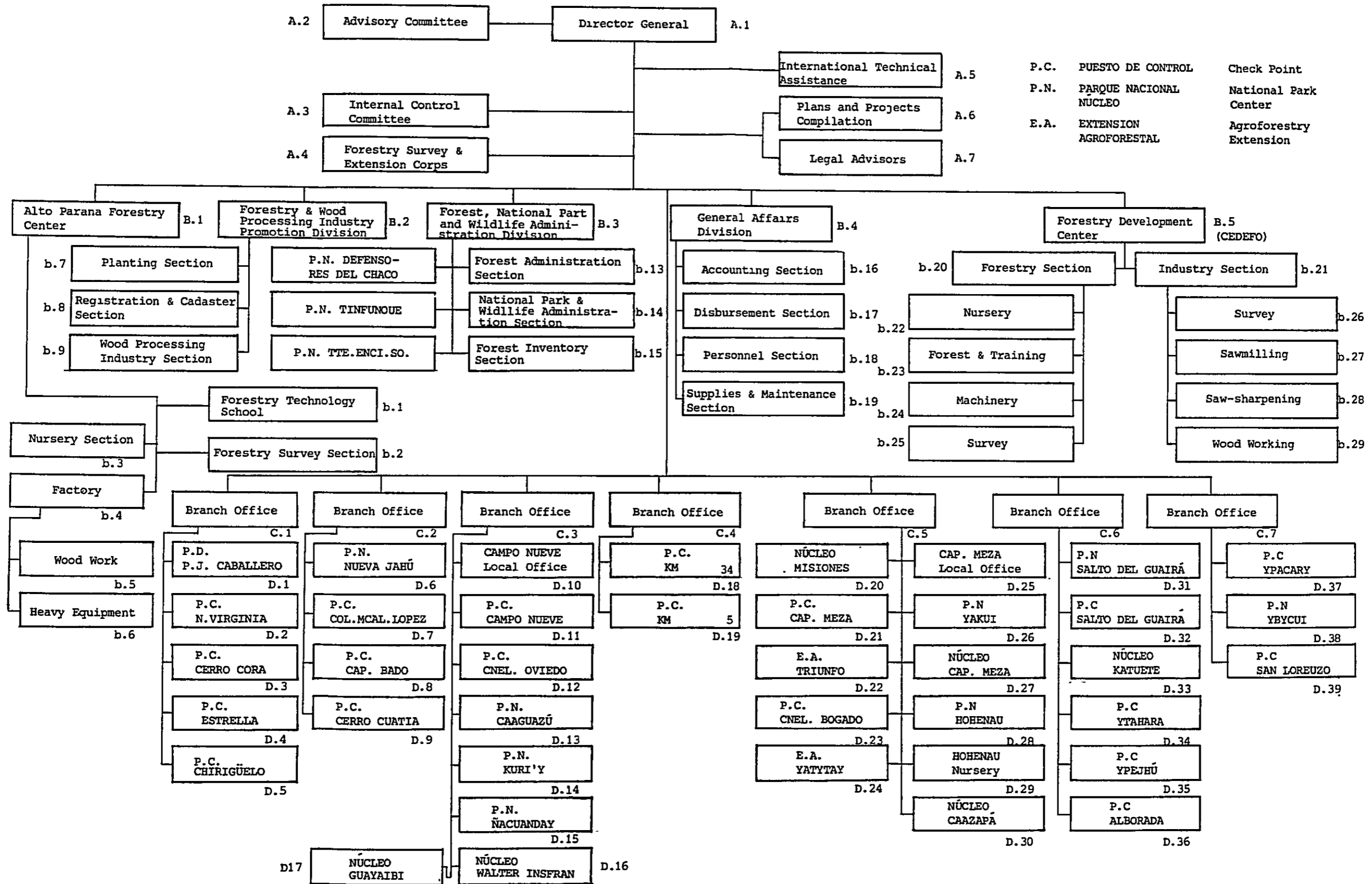
36. NO. OF LAND OWNERS WITH 10,000 HA OR MORE
BY DEPARTMENT

Department	Total area (ha)	Holdings above 10,000 ha	
		No. of owners	Area (ha)
I Departamento de Concepción	1,805,100	27	841,569 (46.6)
II Departamento de San Pedro	2,000,200	27	422,941 (21.1)
V Departamento de Caaguazú	1,147,400	7	164,697 (14.4)
VI Departamento de Caazapá	949,600	11	208,617 (22.0)
VIII Departamento de Misiones	955,600	6	139,206 (14.6)
XI Departamento de Paraguari	870,500	6	92,089 (10.6)
X Departamento Alto Paraná y parte de Canendiyú	1,489,500	11	265,953 (17.9)
XII Departamento de Ñeembucú	1,214,700	19	281,292 (23.2)
XIII Departamento de Amambay	1,293,300	13	329,145 (25.5)
XIV Departamento de Cadendiyú	1,466,700	5	100,356 (6.9)
VII Departamento de Itapúa	1,652,500	6	103,633 (6.3)
	14,845,100	138	2,949,945 (20.0)

(Source) Per IBR statistical data.

- (Note) 1. Excludes land held by the Rural Village Welfare Institute (IBR).
2. Figures in parentheses () are percentages to the total area.

37. ORGANIZATION CHART OF THE NATIONAL FOREST SERVICE
Aug. 1, 1983



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