

Appendix Tab. 34 伐採許容量の算定

Timber production area(Gera Forest from Compartment 1 to 15)	26,500ha
Standing volume	320.4 m <sup>3</sup> /ha
Incremental yields(EFAP Annex 1.3 Table 2, Attachment Table 2.1)	0.98 m <sup>3</sup> /ha/year
Incremental rate	0.306%

l : Cutting cycle  
s : Selecting cutting rate  
p : Incremental rate

$$(m - m \cdot s) 1.0 p^l = m$$

$$(1 - s) 1.0 p^l = 1$$

$$1.0 p^l = \frac{1}{1 - s}$$

$$l \cdot \log 1.0 p = \log 1 - \log(1 - s)$$

$$l = \frac{-\log(1 - s)}{\log 1.0 p}$$

$$s = 0.2$$

$$l = \frac{-\log 0.8}{\log 1.00306} \approx \frac{0.09691}{0.001327} \approx 73$$

$$26,500 \div 73 \approx 363 \text{ (ha)}$$

$$320.4 \times 0.2 \times 363 = 23,261 \text{ (m}^3\text{)}$$

$$s = 0.1$$

$$l = \frac{-\log 0.9}{\log 1.00306} \approx \frac{0.04576}{0.001327} \approx 34.5 \approx 35$$

$$26,500 \div 35 \approx 757 \text{ (ha)}$$

$$320.4 \times 0.1 \times 757 = 24,254 \text{ (m}^3\text{)}$$

Estimation of illegal felling volum by encroachment

Encroachment area : 263ha (Within Gera Forest, F1)

$$\begin{aligned} \text{Encroachment area (Within F1, Timber production area)} &= \frac{\text{Timber production area}}{\text{Within Gera Forest, F1}} \\ &= 263 \cdot \frac{26,500}{57,600} \approx 121 \text{ (ha)} \end{aligned}$$

On the assumption that 70% of the encroachment will be prevented when the Management Plan is carried out.

$$121 \times 0.3 = 36.3 \text{ (ha)}$$

$$320.4 \times 36.3 \approx 11,630 \text{ (m}^3\text{)}$$

Appendix Tab. 35 (1) 既存人工林の伐採量計算表

Forest P. No.	Sub Comp. P. No.	Species	Area (ha)	Planted Year	Age (yr)	Stem Dia. (cm)	Avg. DBH (cm)	Vol. (m <sup>3</sup> /ha)	Total Vol. (m <sup>3</sup> )	M.A.I. (m <sup>3</sup> /ha/yr)	1		2		3		4				
											Thin. Vol. (m <sup>3</sup> )	Area (ha)	Thin. Vol. (m <sup>3</sup> )	Area (ha)	Thin. Vol. (m <sup>3</sup> )	Area (ha)	Thin. Vol. (m <sup>3</sup> )	Area (ha)	Thin. Vol. (m <sup>3</sup> )	Area (ha)	
Forest	2	SP. parviflora	12.3	1968	6	1,920	8	98.3	996	8.03	10	11	17	13	13	13	13	13	13		
	2	SP. parviflora	4.0	1968	6	7,300	10	121.5	492	12.30	10	11	17	13	13	13	13	13	13		
	3	SP. parviflora	15.1	1967	10	1,920	10	76.7	1,198	7.93	11	12	14	14	14	14	14	14	14		
	3	SP. parviflora	1.0	1966	11	1,487	14	171.0	171	15.55	12	12	14	14	14	14	14	14	14	14	
	3	SP. parviflora	2.2	1966	11	1,487	14	171.0	376	15.55	12	14	14	14	14	14	14	14	14	14	
	2	SP. parviflora	3.7	1965	12	2,240	17	294.0	795	21.52	13	14	14	14	14	14	14	14	14	14	
	3	SP. parviflora	9.0	1965	12	2,240	17	294.0	1,988	22.10	13	14	14	14	14	14	14	14	14	14	
	2	SP. parviflora	19.3	1961	14	790	21	28	367.9	7,100	21.96	17	18	19	19	19	19	19	19	19	
	2	SP. parviflora	1.0	1963	17	648	26	26	472.5	473	27.75	18	19	19	19	19	19	19	19	19	19
	2	SP. parviflora	1.0	1975	22	1,075	22	22	22	22	22	24	24	24	24	24	24	24	24	24	24
2	SP. parviflora	1.0	1975	22	670	24	24	1,162.4	2,203	22.04	23	24	24	24	24	24	24	24	24	24	
Total											70	17	2186	18	676	20	5,215	2	26	100	1,453
Total											70	17	2186	18	676	20	5,215	2	26	100	1,453

Forest P. No.	Sub Comp. P. No.	Species	Area (ha)	Planted Year	Age (yr)	Stem Dia. (cm)	Avg. DBH (cm)	Vol. (m <sup>3</sup> /ha)	Total Vol. (m <sup>3</sup> )	M.A.I. (m <sup>3</sup> /ha/yr)	1		2		3		4				
											Thin. Vol. (m <sup>3</sup> )	Area (ha)	Thin. Vol. (m <sup>3</sup> )	Area (ha)	Thin. Vol. (m <sup>3</sup> )	Area (ha)	Thin. Vol. (m <sup>3</sup> )	Area (ha)	Thin. Vol. (m <sup>3</sup> )	Area (ha)	
Forest	6	CP. parviflora	16.2	1976	21	445	13	72.1	1,169	7.21	17	18	19	19	19	19	19	19	19		
	2	SP. parviflora	0.6	1990	7	1,360	17	9	77.3	46	11.04	17	18	19	19	19	19	19	19	19	
	3	SP. parviflora	12.3	1966	13	1,300	14	107.2	1,294	8.07	14	14	14	14	14	14	14	14	14	14	
	2	SP. parviflora	1.3	1975	22	987	24	18	255.0	264	13.41	24	24	24	24	24	24	24	24	24	24
3	SP. parviflora	1.1	1966	11	1,920	11	9	114.0	114	9.45	11	11	11	11	11	11	11	11	11	11	11
Total											31.5	17	2,186	18	676	20	5,215	2	26	100	1,453

Appendix Tab. 35 (2) 既存人工林の伐採量計算表

Forest Com. P.	Sub Com. P.	Species	Area (ha)	Planted Year	Year	Stems /ha	Avr. DBH (cm)	Avr. TH (m)	Volume /ha (m <sup>3</sup> /ha)	Total Volume (m <sup>3</sup> )	M.A.I. (m <sup>3</sup> /ha/yr)	5			6			7					
												Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )	Stems/ ha after thinn. (No./ha)	Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )	Stems/ ha after thinn. (No./ha)	Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )	Stems/ ha after thinn. (No./ha)
Belete	2	33	<i>P. patula</i>	12.4	1980	1,993	8	4	54.2	696	5.63	13	14	36	1,032	44	1,115	143	15	15			
Belete	2	34	<i>P. patula</i>	4.0	1985	2,520	10	9	121.6	498	13.50	4	14	26	277	32	956	192	15	15			
Belete	3	35	<i>P. patula</i>	15.1	1987	1,820	10	10	76.7	1,168	7.67		15						14	14			
Belete	3	20	<i>P. patula</i>	1.0	1986	1,487	15	17	171.0	171	15.55		16						17	17			
Belete	3	21	<i>P. patula</i>	2.2	1986	1,467	15	17	171.0	376	15.55		14						17	17			
Belete	2	20	<i>P. patula</i>	3.7	1985	1,240	17	15	204.0	795	17.00		17						14	14			
Belete	3	36	<i>P. patula</i>	9.0	1985	1,225	14	24	443.1	3,988	36.93		17						14	14			
Belete	2	27	<i>P. patula</i>	19.3	1981	760	21	25	367.5	7,100	22.99		21						22	22			
Belete	2	18	<i>P. patula</i>	1.0	1980	840	25	26	472.6	473	27.79		27						23	24			
Belete	2	17	<i>P. patula</i>		1975								27						24	24			
Belete	2	21	<i>P. patula</i>	1.9	1976	870	34	26	1,182.4	2,209	52.84		27						24	24			
70												17,411 Thinn			1,309			2,564					
Main harvest																							

合計

Forest Com. P.	Sub Com. P.	Species	Area (ha)	Planted Year	Year	Stems /ha	Avr. DBH (cm)	Avr. TH (m)	Volume /ha (m <sup>3</sup> /ha)	Total Volume (m <sup>3</sup> )	M.A.I. (m <sup>3</sup> /ha/yr)	5			6			7					
												Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )	Stems/ ha after thinn. (No./ha)	Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )	Stems/ ha after thinn. (No./ha)	Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )	Stems/ ha after thinn. (No./ha)
Belete	6	12	<i>C. equisetifolia</i>	16.2	1976	21	445	13	32.1	520	1.53												
Belete	2	15	<i>A. abyssinica</i>	0.6	1990	7	1,360	12	9	77.3	46	11.94											
Belete	3	45	<i>A. abyssinica</i>	12.3	1984	13	1,900	14	10	105.2	1,234	8.99											
Belete	2	22	<i>L. greenii</i>	1.3	1975	22	987	24	18	295.0	384	13.41											
Belete	3	22	<i>M. nod</i>	1.1	1986	11	1,300	11	9	104.0	114	9.45		1	16	30	58	90	135				
31.5												2,368 Thinn			58			Main harvest					

Appendix Tab. 35 (3) 既存人工林の伐採量計算表

Forest	Com. P.	Sub. P.	Species	Area (ha)	Plant. year	Year	Stems / ha	Avr. DBH (cm)	Avr. TH (m)	Volume / ha (m <sup>3</sup> /ha)	Total volume (m <sup>3</sup> )	M.A.I. (m <sup>3</sup> /ha/yr)	9			10				
													Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )	Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )	Area (ha)	Age
Beiete	2	31	<i>P. patula</i>	12.8	1988	8	1,983	8	8	54.3	695	6.03	12.8	18	865	30	781	174	19	
Beiete	2	34	<i>P. patula</i>	4.0	1984	8	2,520	10	9	121.5	486	13.50		18					19	
Beiete	3	35	<i>P. patula</i>	15.1	1987	10	1,620	10	10	76.7	1,194	7.87	15	18	790	30	839	135	20	
Beiete	3	20	<i>P. patula</i>	1.0	1986	11	1,467	15	17	171.0	171	15.55	1	19	28	117	30	760	300	21
Beiete	2	28	<i>P. patula</i>	3.7	1985	12	1,240	17	16	204.0	275	17.00	2	19	28	257	30	760	300	22
Beiete	3	30	<i>P. patula</i>	9.0	1985	12	1,225	14	24	443.1	3,948	36.93	20	21					22	
Beiete	2	27	<i>P. patula</i>	19.5	1981	16	760	21	25	967.9	7,100	22.29	24	25					25	
Beiete	2	18	<i>P. patula</i>	1.0	1980	17	640	26	26	472.5	473	27.79	25	26					26	
Beiete	2	17	<i>P. patula</i>		1975	22							30	31					32	
Beiete	2	21	<i>P. patula</i>	1.9	1975	22	870	34	36	1,162.4	2,026	32.84	30	31					32	
70												13	865		6	4011				
合計												17,411	1,184		18			6	4,011	

Forest	Com. P.	Sub. P.	Species	Area (ha)	Plant. year	Year	Stems / ha	Avr. DBH (cm)	Avr. TH (m)	Volume / ha (m <sup>3</sup> /ha)	Total volume (m <sup>3</sup> )	M.A.I. (m <sup>3</sup> /ha/yr)	8			9			10		
													Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )	Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )	Area (ha)	Age	Thinn. Volume (m <sup>3</sup> )
Forest	6	12	<i>C. equisetifolia</i>	16.2	1976	21	445	13	12	32.1	520	1.53									
Beiete	2	15	<i>abrazanice</i>	0.6	1990	7	1,360	12	9	77.3	46	11.04									
Beiete	3	45	<i>abyssiinim</i>	12.3	1984	14	1,300	14	10	105.2	1,294	8.09									
Beiete	2	22	<i>L. procer.</i>	1.3	1975	22	967	24	18	256.0	344	13.41	1.0	30	191	30	677	446			
Beiete	3	22	<i>mixed</i>	1.1	1985	11	1,300	11	9	104.0	114	9.45									
70												2,438	191		1.0						
合計												2,438	191		1.0						



Appendix Tab. 35 (5) 既存人工林の伐採量計算表

Forest Comp.	Sub Comp.	Species	Area (ha)	Plant. Year	Stems/ha	Avr. DBH (cm)	Avr. TH (m)	Volume / ha (m <sup>3</sup> )	Total volume (m <sup>3</sup> )	M.A.I. (m <sup>3</sup> /ha/yr)	Year 5		Year 6		Year 7			
											Thin. Volume (m <sup>3</sup> )	Thinn. Age (yr)	Thin. Volume (m <sup>3</sup> )	Thinn. Age (yr)	Thin. Volume (m <sup>3</sup> )	Thinn. Age (yr)	Thin. Volume (m <sup>3</sup> )	Thinn. Age (yr)
Belote	2	30 C. lasiocarpa	9.0	1947	15	12	156.4	1,501	15,644	1.73	15	9.6	16.24	746.30	657	210		
Belote	2	29 C. lasiocarpa	27.3	1944	13	15	219.3	5,987	16,387	27.3	21	21	4,402.32	537	484	23		
Belote	2	24 C. lasiocarpa	21.2	1941	16	18	340.6	7,221	21,251	21	23	23	24	29	29	24		
Belote	2	19 C. lasiocarpa	4.0	1940	17	18	245.4	980	14,444	22	24	24	24	29	29	24		
Belote	2	20 C. lasiocarpa	8.3	1975	22	26	487.4	4,240	22,115	27	24	24	24	29	29	24		
Belote	2	23 C. lasiocarpa	8.7	1975	22	26	487.4	4,240	22,115	27	24	24	24	29	29	24		
Belote	3	34 C. lasiocarpa	9.6	1978	18	20	350.0	3,360	18,422	24	24	9.6	25.30	1516.32	454	368	26	
Belote	3	37 C. lasiocarpa	44.1	1944	13	11	243.0	5,435	7,233	18	19	44	20.24	7554.30	700	145		
Belote	3	49 C. lasiocarpa	3.2	1962	15	1,000	17	224.0	2,488	13,271	20	21	21	22	22	22		
Belote	3	69 C. lasiocarpa	12.5	1962	15	733	20	193.0	2,488	13,271	20	21	21	22	22	22		
Belote	3	42 C. lasiocarpa	8.5	1945	11	1,300	11	138.1	1,144	12,224	17	17	17	17	17	17		
Belote	3	44 C. lasiocarpa	6.4	1962	15	1,000	17	14	199.0	1,353	13,271	21	21	21	21	21		
Belote	3	46 C. lasiocarpa	1.9	1962	15	1,000	17	14	199.0	1,353	13,271	21	21	21	21	21		
Belote	3	48 C. lasiocarpa	3.4	1960	17	1,000	14	131.0	726	11,244	23	23	23	23	23	23		
Belote	6	11 C. lasiocarpa	2.7	1962	15	1,740	13	16	259.5	1,843	19,971	20	21	21	21	21		
Belote	6	11 C. lasiocarpa	2.7	1976	21	630	23	17	224.6	936	10,701	26	26	26	26	26		
Belote	6	13 C. lasiocarpa	6.7	1976	21	640	23	19	258.6	1,732	12,311	25	25	25	25	25		
Belote	6	14 C. lasiocarpa	34.2	1976	21	620	23	22	373.1	11,050	16,339	26	26	26	26	26		
Belote	6	21 C. lasiocarpa	1.3	1976	21	800	23	16	295.0	361	13,361	24	24	24	24	24		
Belote	3	52 C. lasiocarpa	17.6	1962	15	1,133	19	15	284.0	4,541	17,270	20	20	20	20	20		
Belote	2	16 C. lasiocarpa	4.2	1950	7	1,900	12	10	95.9	480	13,701	12	12	12	12	12		
Belote	3	33 C. lasiocarpa	13.5	1945	13	1,840	16	14	267.1	3,406	22,261	17	17	17	17	17		
Belote	3	29 C. lasiocarpa	7.6	1944	13	1,340	15	10	121.2	921	9,321	18	18	18	18	18		
Belote	3	30 C. lasiocarpa	36.0	1944	13	1,600	16	12	214.6	7,726	16,511	14	14	14	14	14		
Belote	3	31 C. lasiocarpa	13.3	1944	13	2,080	14	12	219.7	2,922	16,390	18	18	18	18	18		
Belote	3	16 C. lasiocarpa	40.7	1965	11	1,640	17	12	344.9	14,200	31,772	16	16	16	16	16		
Belote	3	17 C. lasiocarpa	4.1	1966	11	1,367	12	8	119.0	463	10,221	16	16	16	16	16		
Belote	3	18 C. lasiocarpa	2.7	1966	11	1,000	15	14	102.0	275	9,271	16	16	16	16	16		
Belote	3	19 C. lasiocarpa	7.9	1948	11	1,400	14	11	142.4	446	12,941	16	16	16	16	16		
Belote	3	15 C. lasiocarpa	4.1	1966	11	1,520	13	11	132.3	542	12,031	16	16	16	16	16		
Belote	6	32 C. lasiocarpa	21.0	1941	6	1,400	7	5	29.9	624	4,941	14	14	14	14	14		
Belote	6	27 C. lasiocarpa	7.1	1967	10	1,320	13	11	132.0	277	13,230	15	15	15	15	15		
Belote	6	29 C. lasiocarpa	8.0	1967	10	700	14	5	80.0	640	8,001	15	15	15	15	15		
Belote	6	31 C. lasiocarpa	4.9	1967	10	543	15	6	81.0	559	8,101	15	15	15	15	15		
Belote	6	31 C. lasiocarpa	4.4	1967	10	543	15	6	81.0	556	8,101	15	15	15	15	15		
Belote	6	28 C. lasiocarpa	23.7	1966	11	1,260	15	12	170.7	4,046	13,532	16	16	16	16	16		
Carpa	14	33 C. lasiocarpa	44.6	1940	7	1,375	10	9	21.0	3,451	10,114	11.5	11.5	11.5	11.5	11.5		
Carpa	16	34 C. lasiocarpa	8.0	1940	7	1,575	10	9	71.0	564	10,114	14	14	14	14	14		
Carpa	16	29 C. lasiocarpa	15.7	1980	9	640	17	10	74.2	3,165	8,241	14	14	14	14	14		
Carpa	16	30 C. lasiocarpa	44.5	1948	6	640	17	10	74.2	3,165	8,241	14	14	14	14	14		
Carpa	16	26 C. lasiocarpa	10.9	1965	12	1,440	14	12	165.5	1,404	13,779	17	17	17	17	17		
Carpa	16	27 C. lasiocarpa	8.4	1944	13	940	14	19	278.4	2,459	21,491	18	18	18	18	18		
Carpa	16	24 C. lasiocarpa	14.1	1943	13	1,300	14	20	348.6	4,635	26,191	19	19	19	19	19		
											114,629	114,629	165	165	165	165	165	
											Mean harvest	75.34	75.34	75.34	75.34	75.34	75.34	75.34
											Mean harvest	10903	10903	10903	10903	10903	10903	10903

Appendix Tab. 35 (6) 既存人工林の伐採量計算表

Forest Comp.	Sub Comp.	Species	Area (ha)	Planted year	Stems / ha	Avg. DBH (cm)	Avg. TK (m)	Volume / ha (m <sup>3</sup> )	Total volume (m <sup>3</sup> )	M.A.L. (m <sup>3</sup> /ha)	Year R		Year Y		Year U			
											Thinn. Volume (m <sup>3</sup> )	Area (ha)	Thinn. Volume (m <sup>3</sup> )	Area (ha)	Thinn. Volume (m <sup>3</sup> )	Area (ha)		
Belete	2	10 C. <i>lustrata</i>	9.6	1967	1,300	15	18.4	1,501	15.04	14	19	19	19	23	23	23		
Belete	2	29 C. <i>lustrata</i>	27.3	1964	1,000	20	219.3	5,987	16.97	21	26	26	26	26	26	26		
Belete	2	24 C. <i>lustrata</i>	21.2	1961	790	26	340.6	7,221	21.29	24	26	26	26	26	26	26		
Belete	2	19 C. <i>lustrata</i>	4.0	1960	1,440	21	245.4	982	14.44	4	25	20	492	12	435	297		
Belete	2	20 C. <i>lustrata</i>	8.3	1975	700	31	287.1	6,264	34.41	4.0	30	100	3,063	100	31	31		
Belete	3	21 C. <i>lustrata</i>	8.7	1975	987	29	487.4	4,240	22.13	30	30	100	3,063	100	32	32		
Belete	3	34 C. <i>lustrata</i>	9.6	1978	1,978	19	697	20	350.0	3,360	18.42	27	28	29	29	29		
Belete	3	47 C. <i>lustrata</i>	44.1	1961	1,000	14	141	6,145	7.23	21	22	22	22	22	22	22		
Belete	3	49 C. <i>lustrata</i>	3.2	1962	1,000	16	17	224.0	717	14.87	23	24	24	24	24	24		
Belete	3	30 C. <i>lustrata</i>	17.5	1962	733	20	15	2,488	13.27	23	23	23	23	23	23	23		
Belete	3	42 C. <i>lustrata</i>	8.5	1968	1,300	11	9	138.1	1,148	12.24	19	21	21	21	21	21		
Belete	3	44 C. <i>lustrata</i>	6.8	1962	1,060	17	14	199.0	1,722	13.27	23	24	24	24	24	24		
Belete	3	46 C. <i>lustrata</i>	1.9	1962	1,000	17	14	199.0	1,722	13.27	23	24	24	24	24	24		
Belete	3	40 C. <i>lustrata</i>	3.8	1960	1,000	14	14	191.0	726	11.24	25	27	27	27	27	27		
Belete	6	10 C. <i>lustrata</i>	0.4	1962	1,740	15	16	298.6	1,380	19.97	23	24	24	24	24	24		
Belete	6	11 C. <i>lustrata</i>	2.7	1974	1,000	23	17	224.6	696	10.70	29	30	30	30	30	30		
Belete	6	13 C. <i>lustrata</i>	6.7	1976	690	23	19	288.5	1,732	12.31	29	30	30	30	30	30		
Belete	6	14 C. <i>lustrata</i>	24.2	1976	630	25	22	323.1	1,050	15.39	29	30	30	30	30	30		
Belete	6	21 C. <i>lustrata</i>	1.3	1976	800	21	16	293.0	381	13.96	29	30	30	30	30	30		
Belete	3	52 C. <i>lustrata</i>	17.6	1982	1,133	19	15	258.0	4,541	17.20	23	24	24	24	24	24		
Belete	2	16 C. <i>lustrata</i>	5.0	1960	1,560	12	10	96.0	490	13.71	15	15	15	15	15	15		
Belete	3	33 C. <i>lustrata</i>	7.6	1964	1,340	15	14	267.1	3,006	22.28	13.5	20	28	1924	30	476	387	
Belete	3	30 C. <i>lustrata</i>	36.0	1964	1,600	16	12	214.6	7,726	16.61	16	21	28	4137	30	762	296	
Belete	3	31 C. <i>lustrata</i>	13.3	1964	1,300	14	12	219.7	2,922	16.90	13.3	21	28	1666	30	940	303	
Belete	3	16 C. <i>lustrata</i>	40.7	1965	1,640	17	17	348.9	14,200	31.72	19	20	20	20	20	20		
Belete	3	17 C. <i>lustrata</i>	4.1	1965	1,367	12	8	113.0	483	10.27	19	20	20	20	20	20		
Belete	3	18 C. <i>lustrata</i>	2.7	1965	1,700	13	14	102.0	275	9.27	19	20	20	20	20	20		
Belete	3	19 C. <i>lustrata</i>	7.6	1965	1,600	16	12	144.0	1,394	16.73	19	20	20	20	20	20		
Belete	3	14 C. <i>lustrata</i>	3.4	1968	1,460	14	11	142.4	486	12.94	19	20	20	20	20	20		
Belete	3	15 C. <i>lustrata</i>	4.1	1968	1,520	13	11	132.3	542	12.03	19	20	20	20	20	20		
Belete	6	32 C. <i>lustrata</i>	21.0	1991	1,300	7	5	29.9	624	4.98	17	18	18	18	18	18		
Belete	6	27 C. <i>lustrata</i>	2.1	1987	1,520	13	11	132.0	277	13.20	18	19	19	19	19	19		
Belete	6	29 C. <i>lustrata</i>	4.0	1987	1,700	14	5	40.0	640	4.00	18	19	19	19	19	19		
Belete	6	30 C. <i>lustrata</i>	6.9	1987	1,600	15	6	41.0	569	4.10	18	19	19	19	19	19		
Belete	6	31 C. <i>lustrata</i>	4.4	1987	1,540	15	6	41.0	368	4.10	18	19	19	19	19	19		
Belete	6	28 C. <i>lustrata</i>	20.7	1968	1,260	15	12	170.7	4,046	15.52	19	20	20	20	20	20		
Belete	16	33 C. <i>lustrata</i>	4.8	1994	1,575	10	9	71.0	3,451	10.14	15	16	16	16	16	16		
Belete	16	34 C. <i>lustrata</i>	5.0	1990	1,575	10	9	71.0	564	10.14	15	16	16	16	16	16		
Belete	16	29 C. <i>lustrata</i>	15.7	1944	640	17	10	74.2	1,165	4.24	17	17	17	17	17	17		
Belete	16	30 C. <i>lustrata</i>	48.5	1988	640	17	10	74.2	3,599	4.24	17	17	17	17	17	17		
Belete	16	26 C. <i>lustrata</i>	10.9	1985	1,440	12	12	165.3	1,404	13.79	20	20	20	20	20	20		
Belete	16	27 C. <i>lustrata</i>	14.4	1984	1,440	14	19	279.4	2,459	21.49	21	21	21	21	21	21		
Belete	16	24 C. <i>lustrata</i>	18.1	1983	1,300	19	20	366.6	6,633	26.19	22	22	22	22	22	22		
											Main harvest		114,628		114,628		14413	
											Mean harvest		4.0		5063		3423	

Appendix Tab. 35 (7) 既存人工林の伐採量計算表

Forest	Co	Sub	Comp.	Species	Area (ha)	Planted year	Age (yr)	Stems/ha	Avg. DBH (cm)	Vol. (m <sup>3</sup> /ha)	Total Vol. (m <sup>3</sup> )	M.A.I. (m <sup>3</sup> /ha/yr)	1			2			3			4						
													Thinn. Volume (m <sup>3</sup> )	Thinn. Age (yr)	Stems/ha	Thinn. Volume (m <sup>3</sup> )	Thinn. Age (yr)	Stems/ha	Thinn. Volume (m <sup>3</sup> )	Thinn. Age (yr)	Stems/ha	Thinn. Volume (m <sup>3</sup> )	Thinn. Age (yr)	Stems/ha				
Balete	2	12	E. saligna	2.5	1985	11	1,017	14.7	21	153.0	393	15.9	12	2.6	13	30	197	40	610	152	14	15	15	15	15	15		
Balete	2	13	E. saligna	1.9	1988	11	970	21	25	195.3	387	17.8	17	15.2	18	34	1944	38	546	238	19	15	20	20	20	20	20	
Balete	2	28	E. saligna	15	1981	16	880	15	18	205.3	3,121	12.6	17	15.2	18	34	1944	38	546	238	19	15	15	15	15	15	15	
Balete	2	31	E. citrifolium	7.6	1988	11	745	7	7	18.3	139	17.2	12	13	13	13	13	13	13	13	14	14	14	14	14	14	14	
Balete	2	32	E. citrifolium	5.1	1985	11	745	7	7	18.0	92	16	12	13	13	13	13	13	13	13	14	14	14	14	14	14	14	
Balete	3	23	E. saligna	2.5	1989	8	933	13.6	18.9	114.0	843	14.3	9	2.5	10	30	305	40	660	284	11	11	12	12	12	12	12	
Balete	3	24	E. saligna	6	1989	8	1,100	15	20	287.0	718	35.9	9	6	10	30	291	40	560	113	11	11	12	12	12	12	12	
Balete	3	25	E. saligna	0.8	1989	8	1,100	15	20	287.2	200	35.9	9	0.8	10	30	305	40	660	284	11	11	12	12	12	12	12	
Balete	3	26	E. saligna	1.4	1988	8	1,100	15	20	287.2	402	35.9	9	1.4	10	30	305	40	660	284	11	11	12	12	12	12	12	
Balete	3	27	E. saligna	5.4	1985	8	1,210	15	22	303.1	1,937	37.6	9	5.4	10	30	305	40	660	284	11	11	12	12	12	12	12	
Balete	3	28	E. saligna	3.5	1989	8	940	12	14	101.4	365	12.7	9	3.5	10	30	305	40	660	284	11	11	12	12	12	12	12	
Balete	3	32	E. grandis	27	1984	13	1,070	16	22	340.2	9,282	26.2	15	27.3	14	30	3366	40	647	298	16	16	17	17	17	17	17	
Balete	3	37	E. citrifolium	19	1985	12	1,045	13	16	180.7	2,457	10.9	13	15	15	15	15	15	15	15	16	16	16	16	16	16	16	
Balete	3	38	E. citrifolium	12	1985	12	1,180	13	14	135.0	1,553	11.3	13	13	13	13	13	13	13	13	15	15	15	15	15	15	15	
Balete	3	39	E. camaldulensis	2.1	1980	17	990	18	18	221.9	406	19.1	18	2.1	21	30	256	40	588	285	19	19	20	20	20	20	20	
Balete	3	41	E. grandis	11	1982	15	600	21.3	24.6	320.0	3,648	21.3	16	11	11	11	11	11	11	11	17	17	17	17	17	17	17	
Balete	3	43	E. grandis	20	1980	8	1,140	11	12	98.2	1,042	10.4	10	20	20	20	20	20	20	20	17	17	17	17	17	17	17	
Balete	3	51	E. grandis	14	1982	15	550	20.6	22.5	292.0	3,155	15.3	16	14	14	14	14	14	14	14	17	17	17	17	17	17	17	
Balete	3	12	E. saligna	9.4	1986	11	644	16	21	101.0	949	9.2	12	9.4	16	16	16	16	16	16	13	13	13	13	13	13	13	
Balete	6	7	E. saligna	24	1984	13	1,057	12	17	194.5	3,798	12.3	14	11	11	11	11	11	11	11	15	15	15	15	15	15	15	
Balete	6	8	E. saligna	4.4	1982	15	1,300	6	9	42.6	197	2.8	15	4.4	15	15	15	15	15	15	17	17	17	17	17	17	17	
Balete	6	9	E. saligna	8.4	1982	15	1,060	11	16	154.6	1,299	10.3	15	8.4	15	15	15	15	15	15	17	17	17	17	17	17	17	
Balete	6	14	E. unguiculata	4.2	1984	8	1,380	5	10	31.1	331	10.4	4	4.2	5	5	5	5	5	5	6	6	6	6	6	6	6	
Balete	6	15	E. saligna	12	1979	16	460	19	19	195.4	2,349	10.5	19	12	12	12	12	12	12	12	17	17	17	17	17	17	17	
Balete	6	17	E. unguiculata	6.4	1976	21	1143	31	26.9	162.0	1,037	7.7	22	6.4	22	22	22	22	22	22	21	21	21	21	21	21	21	
Balete	6	20	E. unguiculata	3.7	1983	8	800	7	10	41.6	155	10.4	5	3.7	5	5	5	5	5	5	7	7	7	7	7	7	7	
Balete	6	22	E. saligna	2.6	1985	7	2,600	-	-	-	-	-	3	2.6	3	3	3	3	3	3	5	5	5	5	5	5	5	
Balete	6	24	E. saligna	13	1984	13	300	24	27.4	174.0	225	13.3	14	13	13	13	13	13	13	13	15	15	15	15	15	15	15	
Balete	6	24	E. saligna	3.7	1983	14	1,040	8	10	47.7	176	3.4	15	3.7	15	15	15	15	15	15	15	15	15	15	15	15	15	
Balete	6	25	E. saligna	36	1984	13	1,270	8	11	106.5	3,928	8.4	14	36	14	14	14	14	14	14	16	16	16	16	16	16	16	
Balete	6	26	E. saligna	1.4	1984	13	1,640	9	13	179.3	2,456	13.6	14	1.4	14	14	14	14	14	14	16	16	16	16	16	16	16	
Balete	6	27	E. saligna	1.2	1984	12	1400	25	34	889.2	827	57.4	13	1.2	13	13	13	13	13	13	15	15	15	15	15	15	15	
Cera	16	26	E. grandis	1.2	1984	12	770	19	22	260.5	276	23.7	12	1.2	12	12	12	12	12	12	14	14	14	14	14	14	14	
Cera	16	28	E. saligna	11	1980	11	650	22	25	295.5	3,444	26.7	14	11	11	11	11	11	11	11	14	14	14	14	14	14	14	
Cera	16	31	E. saligna	5.6	1986	11	650	22	25	295.5	3,444	26.7	14	5.6	14	14	14	14	14	14	16	16	16	16	16	16	16	
Cera	16	32	E. saligna	9.2	1982	15	617	17	22	137.0	1,250	9.13	17	9.2	17	17	17	17	17	17	18	18	18	18	18	18	18	
Balete	2	25	E. grandis	22	1982	15	650	20	22	177.0	3,406	11.80	16	22	16	16	16	16	16	16	21.5	21.5	21.5	21.5	21.5	21.5	21.5	
Balete	3	13	Mixed E.	28	1985	12	678	12	11	80.0	2,200	6.67	13	28	13	13	13	13	13	13	24	24	24	24	24	24	24	
Balete	6	18	Mixed E.	0.9	1976	21	200	31	19	207.0	186	9.88	22	0.9	22	22	22	22	22	22	24	24	24	24	24	24	24	
Balete	6	19	Mixed E.	2	1976	21	440	23	21	212.0	10	10	22	2	22	22	22	22	22	22	24	24	24	24	24	24	24	
													36.5	3694	36.5	3817	36.5	3817	36.5	3817	36.5	3817	36.5	3817	36.5	3817	36.5	3817
													Main harvest			90-152	Thin	38.1	3638	94.2	5681							



Appendix Tab. 35 (8) 既存人工林の伐採量計算表

Forest	Co. Sub Comp.	Species	Area Planted (ha)	Year	Stems/ha	Av. DBH (cm)	Av. H (m)	Volume / ha (m <sup>3</sup> /ha)	Total volume (m <sup>3</sup> )	M.A.I. (m <sup>3</sup> /ha/yr)	5		6		7	
											Thinn. Volume (m <sup>3</sup> )	Area (ha)	Thinn. Volume (m <sup>3</sup> )	Area (ha)	Thinn. Volume (m <sup>3</sup> )	Area (ha)
Belite	1	<i>E. saligna</i>	2.5	1985	11	1,017	14.7	21	183.0	393	13.9	17	17	18	18	18
Belite	2	<i>E. saligna</i>	1.9	1985	11	370	21	25	135.3	387	17.4	16	16	16	16	16
Belite	2	<i>E. saligna</i>	15	1981	16	660	15	18	265.3	3,121	12.8	21	21	21	21	21
Belite	2	<i>E. saligna</i>	7.6	1985	11	745	7	7	180.0	92	1.6	16	16	16	16	16
Belite	2	<i>E. saligna</i>	2.5	1985	6	1,100	15	20	267.0	718	28.9	13	13	13	13	13
Belite	3	<i>E. saligna</i>	6	1985	6	533	33.6	31.9	314.0	684	14.3	13	13	13	13	13
Belite	3	<i>E. saligna</i>	0.8	1985	6	1,100	15	20	267.0	230	28.9	13	13	13	13	13
Belite	3	<i>E. saligna</i>	5.4	1985	6	1,210	15	22	305.1	1,677	37.9	13	13	13	13	13
Belite	3	<i>E. saligna</i>	3.5	1985	6	640	12	14	101.4	355	12.7	13	13	13	13	13
Belite	3	<i>E. saligna</i>	27	1984	13	1,070	16	22	340.2	9,287	76.2	18	18	18	18	18
Belite	3	<i>E. saligna</i>	14	1985	12	1,045	13	15	130.7	2,457	10.9	17	17	17	17	17
Belite	3	<i>E. saligna</i>	12	1985	12	1,160	13	14	136.9	1,553	11.3	17	17	17	17	17
Belite	3	<i>E. saligna</i>	2.1	1980	17	600	16	18	221.9	468	13.1	22	22	22	22	22
Belite	3	<i>E. saligna</i>	11	1982	16	600	21.3	24.6	320.0	3,648	21.3	20	20	20	20	20
Belite	3	<i>E. saligna</i>	20	1985	6	1,140	11	12	98.2	1,642	10.8	14	14	14	14	14
Belite	3	<i>E. saligna</i>	14	1982	16	550	20.6	22.5	232.0	3,155	16.6	20	20	20	20	20
Belite	3	<i>E. saligna</i>	9.3	1985	11	656	16	21	101.9	949	9.2	16	16	16	16	16
Belite	6	<i>E. saligna</i>	24	1984	13	1,057	12	17	136.5	3,790	12.3	18	18	18	18	18
Belite	6	<i>E. saligna</i>	4.3	1982	16	1,600	6	9	42.8	187	2.8	20	20	20	20	20
Belite	6	<i>E. saligna</i>	8.4	1982	15	1,040	11	15	154.6	1,296	10.3	20	20	20	20	20
Belite	6	<i>E. saligna</i>	4.2	1984	6	1,390	6	10	71.1	131	10.4	8	8	8	8	8
Belite	6	<i>E. saligna</i>	12	1979	13	640	19	19	189.4	2,308	10.6	23	23	23	23	23
Belite	6	<i>E. saligna</i>	6.4	1976	21	1,261	31	26.8	182.0	1,037	7.7	27	27	27	27	27
Belite	6	<i>E. saligna</i>	3.7	1983	4	830	7	10	41.8	135	10.6	9	9	9	9	9
Belite	6	<i>E. saligna</i>	2.6	1985	7	2,500	-	-	-	-	-	7	7	7	7	7
Belite	6	<i>E. saligna</i>	3.3	1984	13	300	28	27.4	173.0	225	13.3	18	18	18	18	18
Belite	6	<i>E. saligna</i>	3.7	1983	14	1,090	6	10	47.7	176	14	19	19	19	19	19
Belite	6	<i>E. saligna</i>	38	1984	13	1,270	9	11	108.5	3,928	8.4	18	18	18	18	18
Belite	6	<i>E. saligna</i>	14	1984	13	1,540	9	13	179.3	2,456	14.6	18	18	18	18	18
Belite	6	<i>E. saligna</i>	12	1985	12	880	25	34	69.2	87	57.4	12	12	12	12	12
Belite	6	<i>E. saligna</i>	11	1986	11	770	19	21	280.5	2,761	23.7	17	17	17	17	17
Belite	6	<i>E. saligna</i>	3.6	1986	11	650	22	21	230.6	1,644	28.7	5.6	5.6	5.6	5.6	5.6
Belite	6	<i>E. saligna</i>	9.2	1982	15	617	17	22	137.0	1,260	9.13	21	21	21	21	21
Belite	6	<i>E. saligna</i>	22	1982	15	650	20	22	177.0	3,898	11.80	20	20	20	20	20
Belite	6	<i>E. saligna</i>	28	1985	12	678	12	11	30.0	2,200	6.67	17	17	17	17	17
Belite	6	<i>E. saligna</i>	0.4	1976	21	200	31	19	207.0	186	9.86	0.9	0.9	0.9	0.9	0.9
Belite	6	<i>E. saligna</i>	2	1976	21	440	23	21	212.0	424	10.10	2	2	2	2	2

96  
Main harvest 7.3  
60,462 Thun 194  
3,461  
2,415

Appendix Tab. 35 (9) 既存人工林の伐採量計算表

Forest	Co	Sub Comp.	Species	Area (ha)	Plant. year	Stems/ha	Avg. DBH (cm)	Avg. TH (m)	Volume / ha (m <sup>3</sup> /ha)	Total volume (m <sup>3</sup> )	N.A.L. (m <sup>3</sup> /ha)	8			9		
												Thinn. Volume after thinning (m <sup>3</sup> )	Area (ha)	Age (yr)	Thinn. Volume after thinning (m <sup>3</sup> )	Area (ha)	Age (yr)
Belote	2	12	<i>E. saligna</i>	2.5	1948	11	1,017	14.7	21	185.0	384	13.4	19	19	20	21	
Belote	2	13	<i>E. saligna</i>	1.9	1948	11	1,100	21	25	139.2	387	17.6	19	19	20	21	
Belote	2	29	<i>E. saligna</i>	15	1941	16	1,440	15	19	205.3	3,121	12.8	24	24	25	26	
Belote	2	31	<i>E. citriodora</i>	7.6	1948	11	745	7	7	18.3	139	1.7	19	19	20	21	
Belote	2	32	<i>E. citriodora</i>	5.1	1948	11	745	7	7	18.0	92	1.6	19	19	20	21	
Belote	3	24	<i>F. saligna</i>	2.6	1946	8	1,100	15	20	287.0	718	35.9	16	16	17	18	
Belote	3	24	<i>F. saligna</i>	6	1946	8	833	13.6	18.9	114.0	664	14.3	16	16	17	18	
Belote	3	25	<i>F. saligna</i>	0.8	1946	8	1,100	14	20	287.2	730	35.9	16	16	17	18	
Belote	3	26	<i>F. saligna</i>	1.4	1946	8	1,100	15	20	287.2	402	35.9	16	16	17	18	
Belote	3	27	<i>F. saligna</i>	5.4	1946	8	1,210	15	22	403.1	1,637	37.9	16	16	17	18	
Belote	3	28	<i>F. saligna</i>	3.5	1946	8	1,440	12	14	101.4	385	12.7	16	16	17	18	
Belote	3	37	<i>E. grandis</i>	27	1944	13	1,070	16	22	340.2	9,287	28.2	21	21	22	23	
Belote	3	37	<i>E. grandis</i>	19	1946	12	1,045	13	15	130.7	2,467	10.9	20	20	21	22	
Belote	3	38	<i>E. citriodora</i>	12	1945	12	1,160	13	14	116.0	1,353	11.3	20	20	21	22	
Belote	3	39	<i>E. commiphora</i>	2.1	1940	17	1,440	16	18	221.9	466	13.3	25	25	26	27	
Belote	3	41	<i>E. grandis</i>	11	1942	15	600	21.3	24.6	320.0	3,648	21.3	23	23	24	25	
Belote	3	43	<i>E. grandis</i>	20	1941	8	1,140	11	12	85.2	1,942	10.6	17	17	18	19	
Belote	3	51	<i>E. grandis</i>	14	1942	15	550	20.5	22.5	232.0	3,185	15.5	23	23	24	25	
Belote	3	12	<i>E. saligna</i>	9.4	1946	11	555	16	21	103.0	549	9.2	19	19	20	21	
Belote	6	7	<i>E. saligna</i>	24	1944	13	1,057	12	17	139.3	3,796	12.3	21	21	22	23	
Belote	6	8	<i>E. saligna</i>	3.3	1942	15	1,400	6	9	42.6	187	2.8	20	20	21	22	
Belote	6	9	<i>E. saligna</i>	14	1942	15	1,040	11	15	154.6	1,290	10.3	23	23	24	25	
Belote	6	14	<i>E. commiphora</i>	4.2	1944	8	1,300	6	10	31.1	131	10.4	11	11	12	13	
Belote	6	15	<i>E. saligna</i>	12	1972	36	460	14	19	189.4	2,349	10.5	26	26	27	28	
Belote	6	17	<i>E. commiphora</i>	6.3	1976	21	183	31	26.8	162.0	1,037	7.7	29	29	30	31	
Belote	6	20	<i>E. commiphora</i>	3.7	1945	8	830	7	10	41.8	155	10.6	12	12	13	14	
Belote	6	22	<i>F. saligna</i>	2.6	1945	2	2,500	-	-	-	-	-	10	10	11	12	
Belote	6	23	<i>F. saligna</i>	1.3	1944	15	800	24	27.4	173.0	225	13.3	21	21	22	23	
Belote	6	24	<i>F. saligna</i>	3.7	1943	14	1,090	4	10	47.7	176	3.4	22	22	23	24	
Belote	6	26	<i>F. saligna</i>	39	1944	15	1,270	4	11	104.5	3,928	8.4	21	21	22	23	
Belote	6	26	<i>F. saligna</i>	14	1944	15	1,640	9	13	179.3	2,456	13.6	21	21	22	23	
Belote	6	26	<i>F. saligna</i>	1.2	1945	12	860	25	34	684.2	827	57.4	20	20	21	22	
Belote	6	26	<i>F. saligna</i>	11	1946	11	770	19	22	260.5	2,761	23.7	19	19	20	21	
Belote	6	26	<i>F. saligna</i>	6.6	1945	11	630	22	25	293.9	3,644	26.7	19	19	20	21	
Belote	2	25	<i>E. citriodora</i>	3.2	1942	15	617	17	22	137.0	1,260	9.13	23	23	24	25	
Belote	3	40	<i>E. citriodora</i>	22	1942	15	650	20	22	177.0	3,165	11.80	23	23	24	25	
Belote	3	13	Mixed E.	28	1945	12	678	12	11	80.0	2,400	6.67	20	20	21	22	
Belote	6	18	Mixed E.	0.9	1976	21	200	31	18	207.0	186	9.64	29	29	30	31	
Belote	6	14	Mixed E.	2	1976	21	440	23	21	332.0	424	10.10	29	29	30	31	

366

60,432 Thin  
Main harvest

Appendix Tab. 36 (1) 年次別造林計画面積 (ベレテ フォレスト)

Forest name		Belete										Remarks											
Forest / None forest	Division	Compartment No.	Subcompartment No.	Area (ha)	Site condition					Plant plan										Remarks			
					Elevation (max.) (m)	Elevation (min.) (m)	Slope (%)	Soil type	Type	Area available to plant (a)	Area available to plant (N)	year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8		year 9	year 10	Total
F	02	001		266.0	1,940	1,620	34.0	CMd	F3	80	213	30	110	73								213	
F	02	008		34.0	2,100	2,040	18.0	CMd	F3	80	27			27								27	
F	02	010		61.0	1,860	1,540	40.4	CMd	F3	100	61			61								61	
F	03	001		809.0	2,160	1,580	30.0	CMd, NTh, CMe	F3	70	566	60	120	120	26							566	
F	03	004		97.0	2,376	2,040	29.3	NTh-CMd, NTh	F3	80	78											78	
F	03	006		195.0	2,300	2,080	27.2	NTh	F3	80	156											156	
F	06	003		65.0	1,960	1,740	40.0	NTh, NTh-CMd	F3	80	52			52								52	
	Subtotal			1,527.0						1,153	112	120	120	120	117	110	100	124	110	124	110	1,153	
F	02	018		1.0	2,120	2,040	1.0	Cmu	PL														<i>Pinus patula</i> , year 11
F	02	020		8.3	2,120	2,040	8.3	Cmu	PL	4								4				4	<i>Cupressus lusitanica</i>
F	02	021		1.9	2,120	2,040	1.9	Cmu	PL	2					2							2	<i>Pinus patula</i>
F	02	023		8.7	2,120	2,080	8.7	Cmu, CMe	PL	4												4	<i>Cupressus lusitanica</i>
F	02	027		19.3	2,300	2,120	19.3	NTh, NTh-CMd	PL														<i>Pinus patula</i> , year 11
F	06	018		0.9	1,460	1,280	43.3	CMd, CNd, NTh	PL	1				1								1	<i>Eucalyptus spp.</i>
F	06	017		6.4	1,460	1,280	43.0	CMd, CNd, NTh	PL	6				6								6	
	Subtotal			46.5						17				2	7							4	17
	Total			1,573.5						1,170	112	120	120	120	124	110	100	128	114	128	114	1,170	
										Belete (0.8ha)													
										Nursery establishment													

Appendix Tab. 36 (2) 年次別造林計画面積 (ゲラ フォレスト)

Forest name	Gera		Site condition				Plant plan											Remarks					
	Division	Area (ha)	Elevation (max.) (m)	Elevation (min.) (m)	Slope (%)	Soil type	Type	Area available to plant (%)	Area available to plant (ha)	year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8		year 9	year 10	Total		
F	08 005	173.0	2,280	2,080	21.3	NTh, Lpd-NTh	F3	80	138					138						138			
F	08 015	286.0	2,200	2,020	11.4	NTh, LPr-LVh	F3	80	229				200	29						229			
F	08 016	91.0	2,120	2,060	11.5	NTh	F4	80	73				73							73			
F	08 019	501.0	2,120	1,900	12.9	NTh, LPr-LVh	F3	80	401	100	200	101								401			
F	08 021	49.0	2,040	1,940	11.5	NTh	F3	90	44			44								44			
F	08 023	76.0	2,000	1,880	22.5	NTh, LVh-NTh	F4	100	76			76								76			
F	08 028	14.0	1,960	1,940	11.5	NTh, LVg-LVh	F3	100	14						14					14			
F	08 029	59.0	2,000	1,900	5.0	NTh, NTh-LPu	F3	90	53						53					53			
F	09 008	75.0	2,000	1,920	16.5	NTh, LVg, NTh-LPu	F3	90	68						68					68			
F	09 011	40.0	1,980	1,940	5.0	NTh	F3	100	40						40					40			
F	13 010	53.0	2,440	2,360	40.0	NTh	F4	100	53										53	53			
F	15 012	131.0	2,440	2,260	23.5	NTh	F4	100	131										131	131			
F	16 002	194.0	2,220	2,060	20.3	NTh	F3	70	136					136						136			
N	16 007	70.0	2,080	2,020	22.5	NTh	OT	80	56									24		56			
F	16 008	27.0	2,340	2,330	40.0	NTh	F3	90	24											24			
N	16 013	319.0	2,000	1,920	5.0	NTh, NTh	OT	60	191						150	41				191			
F	16 014	303.0	2,200	1,940	22.7	NTh	F3	90	273							273				273			
F	16 020	223.0	2,060	1,940	17.8	NTh	F3	90	201								201			201			
F	16 022	132.0	2,040	1,940	13.5	NTh	F3	90	119									119		119			
F	18 023	190.0	2,320	2,200	22.9	NTh	F4	90	171									171		171			
F	18 025	127.0	2,320	2,280	14.6	NTh, LVg-LVh	F3	90	114									114		114			
F	19 002	140.0	2,460	2,260	32.3	NTh	F3	80	112										112	112			
Total		3,273.0							2,717	156	200	221	273	303	325	314	320	309	266	2,717			
Nursery establishment										Chira											Sedi		Dedo-Boje

Appendix Tab. 37 既存人工林における保育計画

Forest Comp.	Sub Comp.	Species	Area (ha)	年次												
				1	2	3	4	5	6	7	8	9	10			
Cern	16	32	<i>Cupressus lusitanica</i>	48.5	49	8 1st	9	10	10	12	13	14	15	16	17	
Cern	16	34	<i>Cupressus lusitanica</i>	8.0	8	8 1st	9	10	10	12	13	14	15	16	17	
Cern	16	30	<i>Cupressus lusitanica</i>	48.5	49	10 access	11	49.0	12 1st	13	14	49	15 high	17	18	
Belete	6	29	<i>Cupressus lusitanica</i>	8.0	11	11	8	12 high	13	14	15	16	17	18	19	
Belete	6	31	<i>Cupressus lusitanica</i>	6.9	11	7	12 high	13	14	15	16	17	18	19	20	
Belete	6	31	<i>Cupressus lusitanica</i>	4.4	11	4	12 high	13	14	15	16	17	18	19	20	
Belete	3	14	<i>Cupressus lusitanica</i>	3.4	12	3	12 1st	13	14	3	15 high	16	17	18	21	
Belete	3	15	<i>Cupressus lusitanica</i>	4.1	12	4	12 1st	13	14	4	15 high	16	17	18	21	
Belete	3	16	<i>Cupressus lusitanica</i>	40.7	41	12 1st	13	14	14	41	15 high	16	17	18	21	
Belete	28	28	<i>Cupressus lusitanica</i>	23.7	12	24	13 high	14	15	16	17	18	19	20	21	
Belete	3	33	<i>Cupressus lusitanica</i>	13.5	13	14	14 1st	15	15	16	17	18	19	20	22	
Belete	3	44	<i>Cupressus lusitanica</i>	6.8	16	7	17 high	18	19	20	21	22	23	24	25	
Belete	2	19	<i>Cupressus lusitanica</i>	17.6	18	18	18 high	19	20	21	22	23	24	25	27	
Belete	3	52	<i>Cupressus lusitanica</i>	4.0	18	4	18 high	19	20	21	22	23	24	26	27	
Belete	2	33	<i>P. parvula</i>	12.8	13	10 1st	11	12	13	13 high	14	15	16	17	19	
Belete	2	34	<i>P. parvula</i>	4.0	4	10 1st	11	12	4	13 high	14	15	16	17	19	
Belete	3	20	<i>P. parvula</i>	1.0	12	1	13 high	14	15	16	17	18	19	20	21	
Belete	3	21	<i>P. parvula</i>	2.2	12	2	13 high	14	15	16	17	18	19	20	21	
Belete	2	28	<i>P. parvula</i>	3.7	4	4	13 1st	14	15	16	17	18	19	20	22	
Belete	2	18	<i>P. parvula</i>	1.0	1	1	18 high	19	20	21	22	23	24	25	27	
Belete	6	22	<i>E. saligna</i>	2.6	3	3	Weeding	4	5	6	7	8	9	10	12	
Total				183	67	5 Weeding 49 access 126 1st 53 high	67	67	18.0	18 high	19	21	22	23	24	26
				49	49	49 access 14 1st 53 high	126	126	126 high	14 high	14 high	49 high	49 high	49 high	49 high	49 high

Appendix Tab. 38 社会林業プログラムに適用可能な樹種のリスト

樹種	用途別				プログラム別			
	薪	建築用材	果実	養蜂	学校苗畑造成	農家植林	ハッピーゾーン植林	養蜂指導普及
<i>Acacia albida</i>	*			*		*		*
<i>Acacia decurrens</i>	*	*			*	*		*
<i>Acacia saligna</i>	*			*		*		*
<i>Albizia schimperiana</i>	*					*		*
<i>Aningeria-adffi federicii</i>				*		*		
<i>Annona muricata</i>			*		*	*		*
Citrus-orange, mandarin			*	*	*	*		*
<i>Cordia africana</i>				*		*	*	*
<i>Cupressus lusitanica</i>	*	*			*	*	*	
<i>Eriobotrya japonica, loquat</i>	*	*	*	*	*	*	*	*
<i>Eucalyptus grandis</i>	*	*			*	*	*	
<i>Eucalyptus saligna</i>	*	*			*	*	*	
<i>Eucalyptus citriodora</i>	*	*		*	*	*	*	*
Gatama				*				
<i>Grevillea robusta</i>	*	*			*	*		
<i>Hagenia abyssinica</i>	*	*			*	*		
<i>Leucaena leucocephala</i>	*				*	*		
<i>Maesa lanceolata</i>	*				*	*		
<i>Millettia ferruginea</i>	*				*	*		
<i>Ocotea kenyensis</i>			*		*	*		
papaya			*		*	*		
<i>Persea americana, avacado</i>			*		*	*		
<i>Sesbania sesban</i>		*			*	*		

Appendix Tab. 39 社会林業モデル候補村の集落あたり平均世帯数（住民参加の規模）

社会林業プログラム	District	Village	世帯数	Community数	平均世帯数
学校苗畑造成	Seka Chekorsa	Sombo	932	9	104
	Gera	Chira	536	8	67
農家植林普及	Seka Chekorsa	Kishe	1,033	5	207
	Gera	Sombo Daru	1,495	16	93
		Chira	536	8	67
		Wegecha	531	4	133
バッファゾーン植林	Seka Chekorsa	Elke Togobe	1,534	14	110
	Gera	Komo Hari	1,352	12	113
		Gore Dako	370	3	123
		Dusta	784	8	98
		Dedo Boge	660	8	83
合計			9,763	95	103

Appendix Tab. 40 学校苗畑造成事業費用（1箇所あたり）

年次	費目	工程（細目）	数量	単価 (Birr)	合計金額 (Birr)
初年次	会議費	会場費	12回	100	1,200
		委員手当て	10人×8回	70	5,600
	資器材購入費				10,000
	種子採取経費		10人×10日	4	400
	小計				17,200
2年次	苗畑造成	造成、整地、地ならし	0.25ha	1,500/ha	375
	育苗作業	播種準備、育苗管理			10,000
	人件費	DAの給与	2人	600/人月	14,400
	建物	管理事務所兼倉庫	1棟	800	800
	小計				25,575
	合計				42,775



Appendix Tab. 41 農家植林普及事業費用 (1箇所あたり)

年次	費目	工程	数量	単価 (Birr)	合計金額 (Birr)
初年次 (6か月)	資器材購入費				10,000
	小計				10,000
2年次 (1か年)	苗畑造成費	人力整地	0.2ha	1,500/ha	300
	育苗作業費	種子採取～配布	60,000	0.2/本	12,000
	建物	管理事務所	1棟	800/棟	800
		ボラینگ作業小屋	1棟	300/棟	300
		倉庫	1棟	1,000/棟	1,000
		小計			
合計				24,400	

Appendix Tab. 42 (1) バッファゾーン植林事業費用 (デド ボゲ)

年次	費目	細目	数量	単価 (Birr)	合計金額 (Birr)
1	プログラム作成経費 現地調査および 住民への説明経費	会議費	5人×6回	100	3,000
		作成経費(測量～図面作成)	100日	50	5,000
		旅費	5人×20日	50	5,000
		消耗品			1,000
		小計			
2	苗畑造成費 育苗作業費 建物	人力整地	0.5ha	1,500/ha	750
		種子採取～山出し	374,362	0.2/本	74,872
		苗畑事務所	1棟	800/棟	800
		ドラインク作業小屋	1棟	300/棟	300
		ガレハス、休憩所兼倉庫	1棟	1,000/棟	1,000
小計				77,722	
合計				91,722	

注：苗畑造成、育苗作業を地域住民の共同作業（Debo など）で実施する場合は、当該経費不要。

Appendix Tab. 42 (2) バッファゾーン植林事業費用 (ドウスダ、ゴレダカ)

年次	費目	細目	数量	単価 (Birr)	合計金額 (Birr)
初年次	プログラム作成経費 現地調査および 住民への説明経費	会議費	5人×6回	100	3,000
		作成経費(測量～図面作成)	100日	50	5,000
		旅費	5人×20日	50	5,000
		消耗品			1,000
		小計			
2年次	苗畑造成費 育苗作業費 建物	人力整地	0.4ha	1,500/ha	600
		種子採取～山出し	351,965	0.2/本	70,392
		苗畑事務所	1棟	800/棟	800
		ドラインク作業小屋	1棟	300/棟	300
		ガレハス、休憩所兼倉庫	1棟	1,000/棟	1,000
小計				73,092	
合計				87,092	

注：苗畑造成、育苗作業を地域住民の共同作業（Debo など）で実施する場合は、当該経費不要。

Appendix Tab. 42 (3) バッファゾーン植林事業費用 (エルケトゴベ)

年次	費目	細目	数量	単価 (Birr)	合計金額 (Birr)
初年次	プログラム作成経費 現地調査および 住民への説明経費	会議費	5人×6回	100	3,000
		作成経費 (測量～図面作成)	100日	50	5,000
		旅費	5人×20日	50	5,000
		消耗品			1,000
	小計				14,000
2年次	苗畑造成費 育苗作業費 建物	人力整地	0.2ha	1,500/ha	300
		種子採取～山出し	95,990	0.2/本	19,198
		苗畑事務所	1棟	800/棟	800
		ボランタリー作業小屋	1棟	300/棟	300
		ガレージハウス、休憩所兼倉庫	1棟	1,000/棟	1,000
		小計			
	合計				35,598

注：苗畑造成、育苗作業を地域住民の共同作業 (Debo など) で実施する場合は、当該経費不要。

Appendix Tab. 42 (4) バッファゾーン植林事業費用 (コモハリ)

年次	費目	細目	数量	単価 (Birr)	合計金額 (Birr)
初年次	プログラム作成経費 現地調査および 住民への説明経費	会議費	5人×6回	100	3,000
		作成経費 (測量～図面作成)	100日	50	5,000
		旅費	5人×20日	50	5,000
		消耗品			1,000
	小計				14,000
2年次	苗畑造成費 育苗作業費 建物	人力整地	0.1ha	1,500/ha	150
		種子採取～山出し	54,395	0.2/本	10,879
		苗畑事務所	1棟	800/棟	800
		ボランタリー作業小屋	1棟	300/棟	300
		ガレージハウス、休憩所兼倉庫	1棟	1,000/棟	1,000
		小計			
	合計				27,129

注：苗畑造成、育苗作業を地域住民の共同作業 (Debo など) で実施する場合は、当該経費不要。

Appendix Tab. 43 伝統的養蜂の指導普及および改善事業経費

費目	細目	数量	単価 (Birr)	合計金額 (Birr)
改善委員会経費	会場費	3回	100	300
	委員手当て	5人×3回	100	1,500
現地調査費	旅費	5人×60日間	50	15,000
	消耗品			5,000
指導普及事業費	旅費	5人×60日間	50	15,000
	普及冊子作成	1,000部	20	20,000
	消耗品			5,000
合計				61,800

Appendix Tab. 44 天然林伐採経費の算出根拠

1 Survey for trees to be felled

- Number of upper story of F1 forest : 456/ha
- Proportion of commercial species in the above number : 43.7%
- Number of commercial species :  $456 \times 0.437 \approx 199/\text{ha}$
- Number of felling tree :  $199 \times 0.2$  (felling rate)  $\approx 40/\text{ha}$
- Felling volume per ha :  $320.4 \times 0.2 = 64.08 \text{ m}^3/\text{ha}$
- Survey area :  $11,630 \div 64.08 \approx 182 \text{ ha}$
- Efficiency of the survey : 40 trees/1 group, 1 day  $\rightarrow$  1 ha/1 group, 1 day  
 $4(\text{Birr/day}) \times 2 \times 182 = 1,456(\text{Birr})$

2 Measurement of felled trees

- Efficiency of measurement : 20 trees/1 group, 1 day  $\rightarrow$  0.5 ha/1 group, 1 day  
 $4(\text{Birr/day}) \times 2 \times 182 \div 0.5 = 2,912(\text{Birr})$



Appendix Tab. 46 収獲表を基にした伐採木価格の平均値計算表

1) Transmission pole/Timber  
 Species: Group 2, *Eucalyptus grandis*/*Eucalyptus saligna*  
 Plants/ha: 1,600  
 Site class: 24 m<sup>3</sup>/ha  
 Production model No: 7

Age	Tree height (m)	DBH (cm)	Operaton	Unit price	Thinned/Removed				Sub total	Unit price (Birr/m <sup>3</sup> )
					Sawlogs	Trans. pole	Small poles	Fuel-wood		
					125.4	102.0	77.8	46.8	14.0	
4.0	13.8	12.4	Thinning 1	m <sup>3</sup> Birr			6.0 466.8	8.0 374.4	841.2	60.1
6.0	18.2	16.8	Thinning 2	m <sup>3</sup> Birr	4.5 564.3		16.5 1,283.7	12.0 561.6	2,409.6	73.0
9.0	23.1	23.9	Thinning 3	m <sup>3</sup> Birr	7.7 965.6		25.4 1,976.1	22.0 1,029.6	3,971.3	72.1
13.0	27.0	32.5	Thinning 4	m <sup>3</sup> Birr	15.0 1,881.0	6.0 612.0	23.8 1,851.6	15.0 702.0	5,046.6	84.4
18.0	30.1	38.5	Final Felling	m <sup>3</sup> Birr	74.0 9,279.6	74.0 7,548.0	32.5 2,528.5	41.5 1,942.2	21,298.3	95.9

2) Timber  
 Species: Group 3, *Cupressus lusitanica*/*Grevillea robusta*/*Pinus patula*  
 Plants/ha: 1,600  
 Site class: 24 m<sup>3</sup>/ha  
 Production model No. 9

Age	Tree height (m)	DBH (cm)	Operaton	Unit price	Thinned/Removed				Sub total	Unit price (Birr/m <sup>3</sup> )
					Sawlogs	Trans. pole	Small poles	Fuel-wood		
					193.8		77.8	14.8	48.0	
8.0	12.6	17.8	Thinning 1	m <sup>3</sup> Birr	3.0 581.4		8.0 622.4	37.0 547.6	1,751.4	36.5
12.0	17.7	24.4	Thinning 2	m <sup>3</sup> Birr	27.0 5,232.6		5.0 389.0	22.0 325.6	5,947.2	110.1
18.0	22.5	32.2	Thinning 3	m <sup>3</sup> Birr	65.0 12,597.0		5.0 389.0	18.0 266.4	13,252.4	150.6
26.0	25.5	38.3	Final felling	m <sup>3</sup> Birr	328.0 63,566.4		8.0 622.4	50.0 740.0	64,928.8	168.2

Source: The Orkut-Sadforest Consortium, Forest Products Pricing and Marketing Study, Vol.2, Ministry of Agriculture, 1990

Stumpage price (Source: FWCD(Oromia) ) Birr/m<sup>3</sup>

	Indigenous	Cyprus / pine	Eucalyptus
Sawlog	292.1	193.8	125.4
logging & Skidding	42.2	38.8	38.8
Fuelwood	54.8	14.8	46.8

Appendix Tab. 47 人工林伐採収入

收穫量(m <sup>3</sup> )	樹種	年次	作業	年次 收穫(m <sup>3</sup> )	10																																													
					1	2	3	4	5	6	7	8	9	合計																																				
Cupressus lusitanica Pinus patula Grevillea robusta 等	8 間伐 1 12 間伐 2 18 間伐 3 26 主伐	48 54 88 386	2,914 4,396	583 6,994	6,712	1,553	3,315 4,225 1,307	4,685 5,918	11,347	5,063	1,106	1,190	2,244	7,680 2,236 7,532 3,423	9,216	23,708 31,092 55,635 14,050																																		
																	Eucalyptus spp.	4 間伐 1 6 間伐 2 9 間伐 3 13 間伐 4 18 主伐	14 33 55 60 212	3,366 518	1,711 2,106	2,261	756 2,495	896 2,901 993	952 6,616	2,112	2,244	2,970	1,106 2,244	1,190 2,244	2,260 2,607	2,607 2,970	6,160 19,723 10,698 10,353 2,495																	
																																		Hagenia abyssinica Juniperus procera Mixed	間伐 間伐 間伐	41 58	41	58	191	41	191	41	191	41	191	41	191	58	191	58

收入(Birr)	樹種	年次	作業	年次 單位/m <sup>3</sup>	10																																													
					1	2	3	4	5	6	7	8	9	合計																																				
Cupressus lusitanica Pinus patula Grevillea robusta 等	8 間伐 1 12 間伐 2 18 間伐 3 26 主伐	36.5 110.1 150.6 168.2	106,361 484,000	21,280 770,039	738,991	979,201	120,998 465,173 196,834	515,819 891,251	74,868 1,708,858	128,156 1,297,570	851,597	71,519	163,812	280,320 246,184	336,384	865,343 3,423,230 8,378,631 2,363,205																																		
																	Eucalyptus spp.	4 間伐 1 6 間伐 2 9 間伐 3 13 間伐 4 18 主伐	60.1 73.0 72.1 84.4 95.5	245,718 37,348	124,903 151,843	77,891 158,836	292,108 238,273	53,850 209,162 83,809	57,215 482,968	66,471 154,176	75,726	190,311	214,137	1,439,779 771,226 873,792 238,273	2,247	10,467	6,380																	
																																		Hagenia abyssinica Juniperus procera Mixed	間伐 間伐 間伐	54.8 54.8 110.0	2,247	6,380	10,467	10,467	10,467	10,467	10,467	10,467	10,467	10,467	10,467	10,467	10,467	10,467



Appendix Tab. 48 年次毎の保育経費

保育作業面積

年次	作業	年次 単位	年次							10 合計				
			1	2	3	4	5	6	7		8	9		
<i>Cupressus lusitanica</i> <i>Pinus patula</i> <i>Grevillea robusta</i> 等	植栽、下刈り、補植	ha	160	192	205	235	255	269	294	252	263	246	2,331	
	1 下刈り	ha		160	192	205	235	255	269	254	252	263	2,085	
	2 つる切り、除伐	ha			160	192	205	235	255	269	252	252	1,822	
	3 枝打ち (Access pruning)	ha	49			160	192	205	235	255	269	254	1,619	
	5 枝打ち (First pruning)	ha	126	14	49			160	192	205	235	255	1,236	
	8 枝打ち (High pruning)	ha	5	53	18	126	14					192	582	
	<i>Eucalyptus</i> spp.	植栽、下刈り、補植	ha	54	64	68	79	85	90	85	84	87	82	778
		1 下刈り	ha		64	68	79	85	90	85	84	87	82	696
2 つる切り、除伐		ha		54	64	64	68	79	85	90	85	84	609	
3 つる切り、除伐		ha			54	54	64	68	79	85	90	85	525	
在来種		植栽、下刈り、補植	ha	54	64	68	79	85	90	85	84	87	82	778
		1 下刈り	ha		64	64	68	79	85	90	85	84	87	696
		2 下刈り	ha		54	54	64	68	79	85	90	85	84	609
	3 下刈り	ha			54	54	64	68	79	85	90	85	525	
4 つる切り	ha					54	64	64	79	85	90	440		
7 枝打ち (つる切り・除伐)	ha										68	265		

保育作業経費 (Birr)

年次	作業	年次 単価 (Birr)	年次							10 合計				
			1	2	3	4	5	6	7		8	9		
<i>Cupressus lusitanica</i> <i>Pinus patula</i> <i>Grevillea robusta</i> 等	植栽、下刈り、補植	136	21,760	26,112	27,880	31,960	34,680	36,584	34,544	34,272	35,768	33,456	317,015	
	1 下刈り	52		8,320	9,984	10,660	12,220	13,260	13,988	13,208	13,104	13,676	108,420	
	2 つる切り、除伐	60			9,600	11,520	12,300	14,100	15,300	16,140	15,240	15,120	109,320	
	3 枝打ち (Access pruning)	100	4,900			16,000	19,200	20,500	23,500	25,500	26,900	25,400	161,900	
	5 枝打ち (First pruning)	120	15,120	1,680	5,880			19,200	23,040	24,600	28,200	30,600	148,320	
	8 枝打ち (High pruning)	140	700	7,420	2,520	17,640	1,960				22,400	26,880	81,480	
	<i>Eucalyptus</i> spp.	植栽、下刈り、補植	136	7,344	8,704	9,248	10,744	11,560	12,240	11,560	11,424	11,832	11,152	105,808
		1 下刈り	52		2,808	3,328	3,536	4,108	4,420	4,680	4,420	4,368	4,524	36,192
2 つる切り、除伐		60			3,240	3,840	4,080	4,740	5,100	5,400	5,100	5,040	36,540	
3 つる切り、除伐	60				3,240	3,840	4,080	4,740	5,100	5,400	5,100	31,500		
在来種	植栽、下刈り、補植	184	9,936	11,776	12,512	14,536	15,640	16,560	15,640	15,456	16,008	15,088	143,152	
	1 下刈り	70		3,780	4,480	4,760	5,530	5,950	6,300	5,950	5,880	6,090	48,720	
	2 下刈り	70			3,780	4,480	4,760	5,530	5,950	6,300	5,950	5,880	42,630	
	3 下刈り	70				3,780	4,480	4,760	5,530	5,950	6,300	5,950	36,750	
	4 つる切り	90					3,780	4,480	4,860	5,760	6,120	7,650	39,600	
	7 枝打ち (つる切り・除伐)	90						4,860	5,760	6,120	7,110	8,100	39,600	
	合計		59,760	70,600	92,452	136,696	139,218	169,644	180,652	186,590	216,220	219,166	1,471,198	

Appendix Tab. 49 道路整備算出根拠

Extension of roads improvement : 47 km (5 Roads)

Surface grading : 60% → 27.6 "

Graveling : 20 " → 9.2 "

1 Surface grading by bulldozer

1km/4 hours (1 day)

$27.6\text{km} \div 1\text{km} = 27.6 \text{ days}$        $4 \text{ hours} \times 27.6 \text{ days} = 110.4 \text{ hours}$

$110.4 \times 400 \text{ (Birr/hour)} = \text{Birr } 44,160$

2 Graveling (3m in width  $\times$  0.2m thickness of graveling)

$0.6\text{m}^2/\text{m} \times 9.2\text{km} \times 1,000 = 5,520\text{m}^2$

$5,520\text{m}^2 \times 3 \text{ ton/m}^2 = 16,560 \text{ ton}$      $16,560 \text{ ton} \div 6 \text{ ton} = 2,760 \text{ (lorries)}$

$140 \text{ (Birr/l lorry)} \times 2,760 = \text{Birr } 386,400$

3 Labourers

20m/1 day (5 labourers/1 group)

$(27.6 + 9.2)\text{km} \times 1,000 \div 20 = 1,840 \text{ days}$

$1,840 \times 4 \text{ (Birr/day)} \times 5 \text{ (labourers)} = \text{Birr } 36,800$

4 Simple bridges (10m in length  $\times$  3m in width, 2 bridges)

8 logs (8.72m<sup>3</sup>)       $8.72 \times 364 \text{ (Birr/m}^3) = \text{Birr } 3,200$

bulldozer     $400 \text{ (Birr/hour)} \times 4 \text{ hour} = \text{Birr } 1,600$

labourers     $10 \text{ (labourers)} \times 3 \text{ (days)} \times 4 \text{ (Birr/day)} = \text{Birr } 120$

$3,200 + 1,600 + 120 = \text{Birr } 4,920$      $4,920 \times 2 = \text{Birr } 9,840$

Total :  $44,160 + 386,400 + 36,800 + 9,840 = \text{Birr } 477,200$

Appendix Tab. 50 農業普及員宿舎の建築コスト事例

単位：Birr

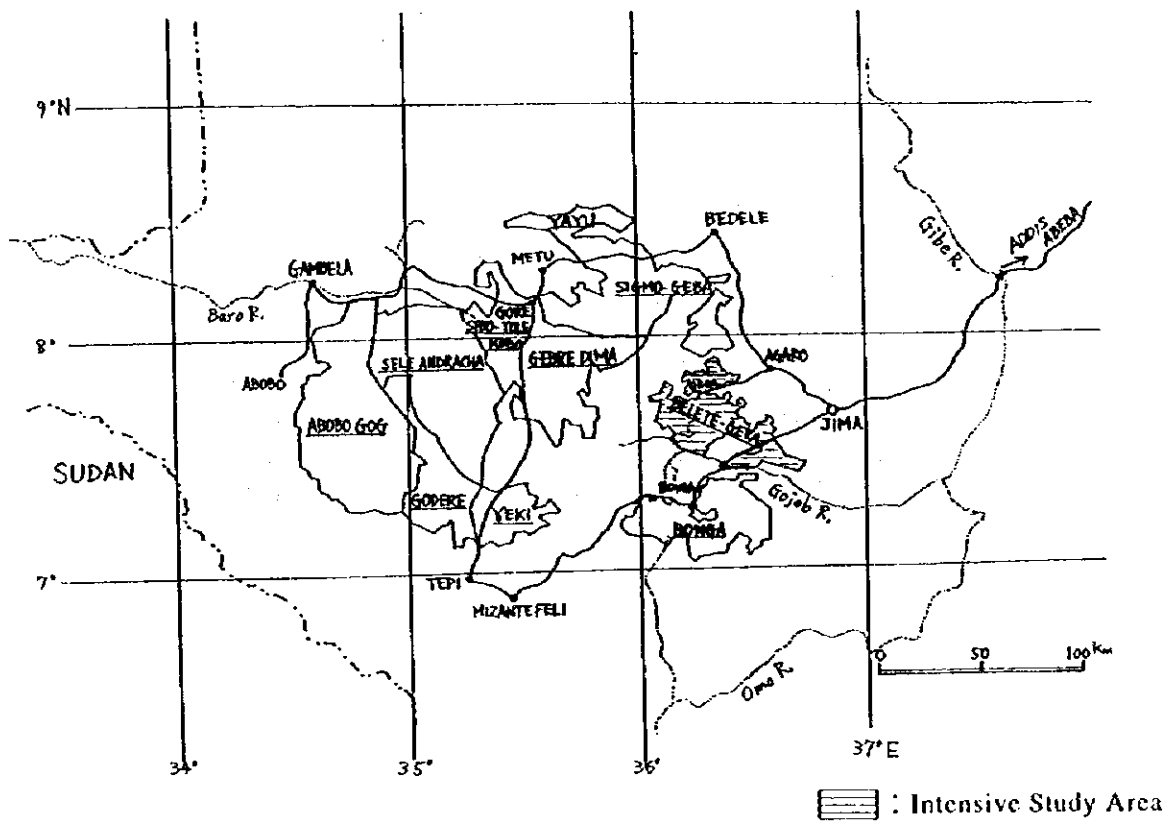
Village		Ilelo Seboka	Kachama	Sedi Loya
建物の等級		標準	高級	標準
建築年	年	1997	1993	1996
建築期間	か月	4	4	9
耐用年数	年間	30	35	?
総費用金額	Birr	13,420	19,659	14,092
内訳	資材費計	8,867	14,659	8,789
	木材	244	0	-
	トタン板	2,584	2,584	-
	粘土	100	2,000	-
	ブロック	700	1,440	-
	セメント	847	2,825	-
	ペンキ	190	500	-
	その他	4,202	5,310	-
	人件費計	4,553	5,000	5,303

Appendix Tab. 51 プロジェクトの収入・支出

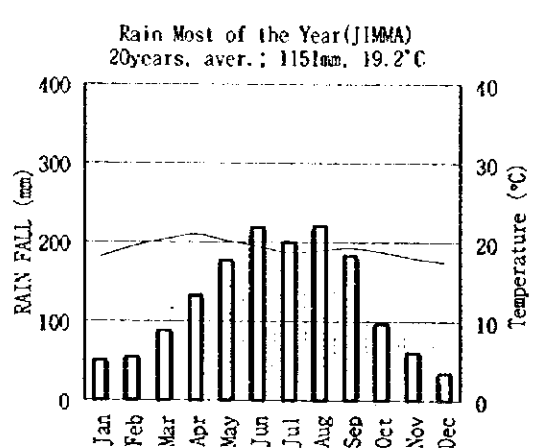
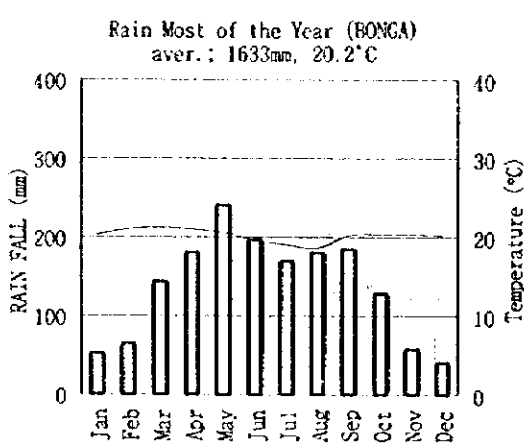
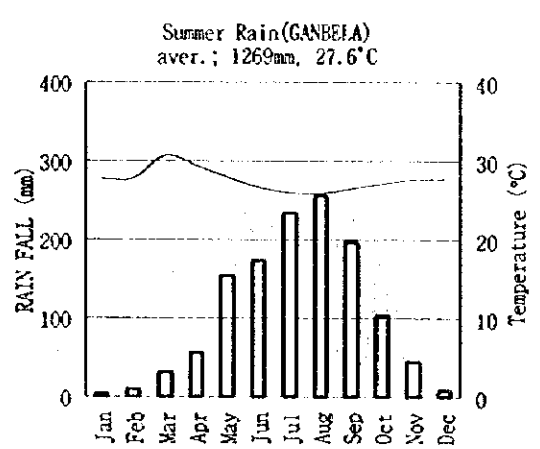
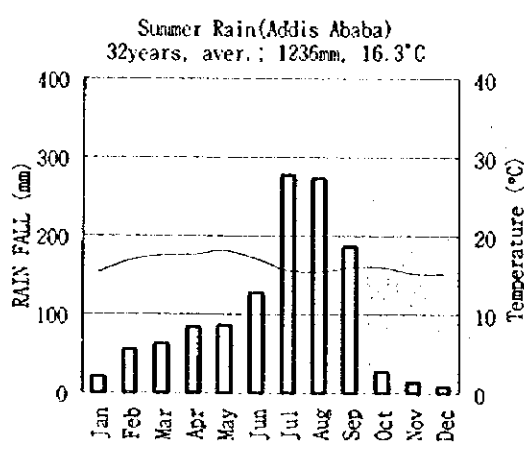
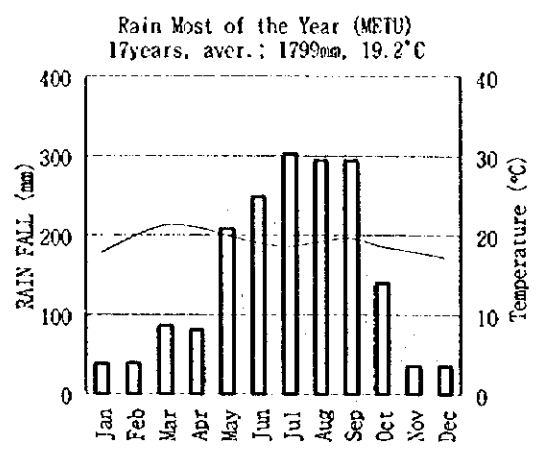
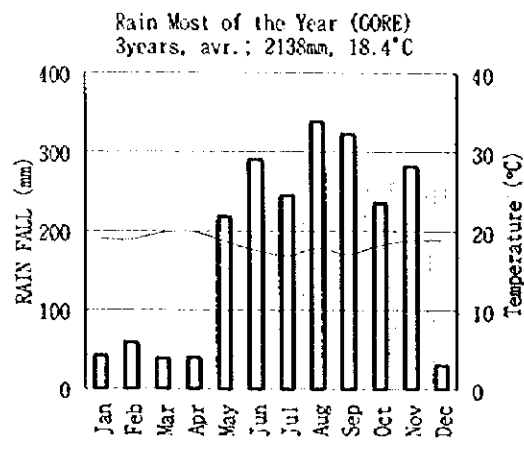
## 収入・支出

事業名	(千円)										
	第1年次	第2年次	第3年次	第4年次	第5年次	第6年次	第7年次	第8年次	第9年次	第10年次	計
蛋食防止	30	30	30	30	10	10	10	10	10	10	180
伐採・販売	39	35	32	32	53	45	71	61	88	125	581
造林・保護	504	454	485	603	637	681	666	671	726	709	6,136
社会林業	103	118	61	112	61	53	62	52	37	25	684
施設整備	465	347	337	171	16		4			3	1,343
その他	1,430	829	675	421	287	1,347	1,077	757	237	437	7,497
計	2,571	1,813	1,620	1,369	1,064	2,136	1,890	1,551	1,098	1,309	16,421
職員給与	460	504	504	504	504	504	504	504	504	504	4,996
合計(a)	3,031	2,317	2,124	1,873	1,568	2,640	2,394	2,055	1,602	1,813	21,417
収入											
天然林	876	1,168	1,461	1,753	2,045	2,045	2,045	2,045	2,045	2,045	17,528
人工林	873	1,068	1,286	1,430	1,365	1,754	2,324	2,509	2,472	3,662	18,743
間伐	873	1,068	1,286	1,169	1,127	1,754	2,324	1,657	1,896	2,987	16,141
主伐				261	238			852	576	675	2,602
合計(b)	1,749	2,236	2,747	3,183	3,410	3,799	4,369	4,554	4,517	5,707	36,271
差引き (b-a)	△ 1,282	△ 81	623	1,310	1,842	1,159	1,975	2,499	2,915	3,894	14,854

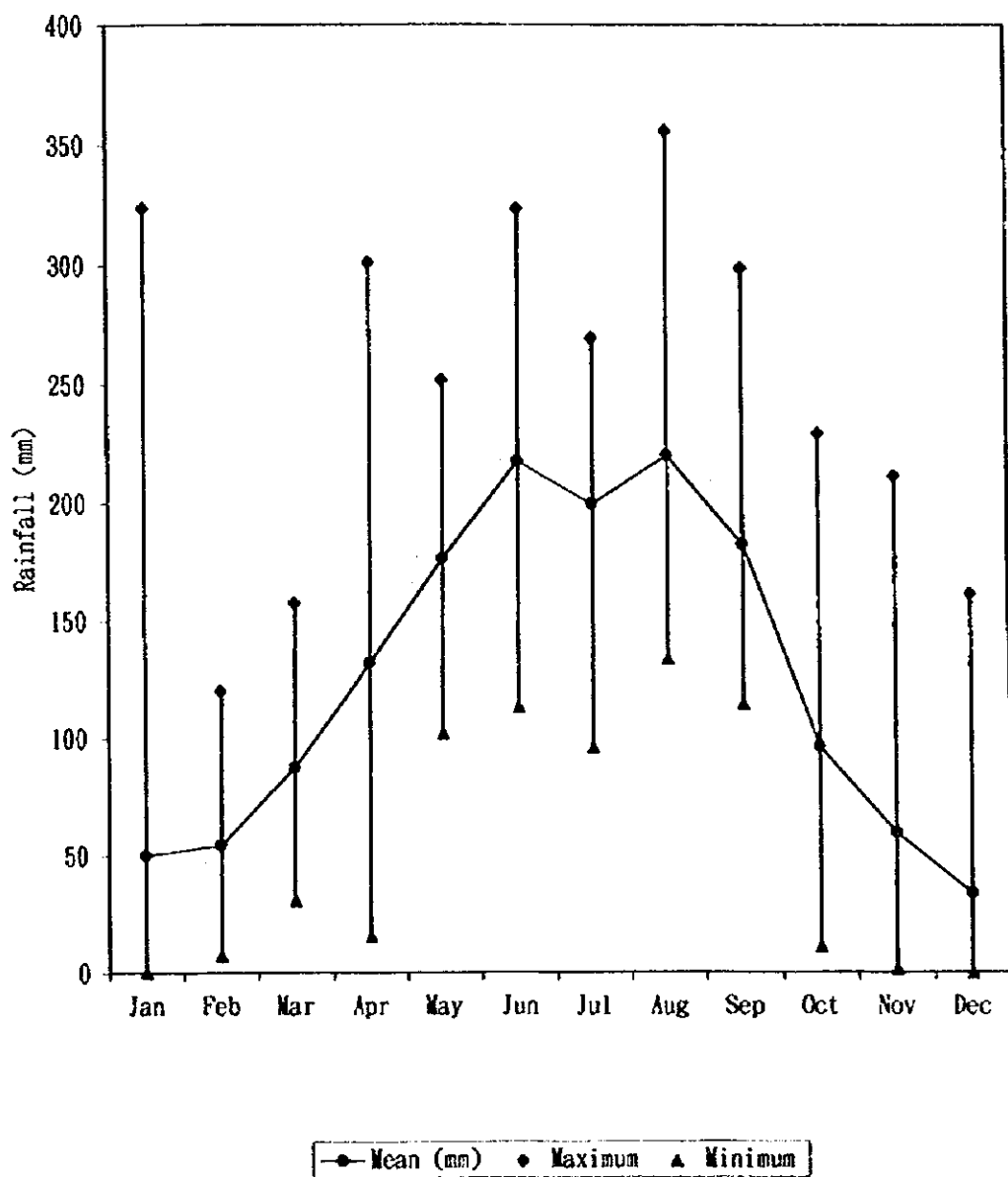




Appendix Fig. 1 スタディエリア内のNFPA位置図 (10 NFPA)



Appendix Fig. 2 月別平均降水量および平均気温



Appendix Fig. 3 ジマにおける月別降水量の変動 (1976 - 1995)

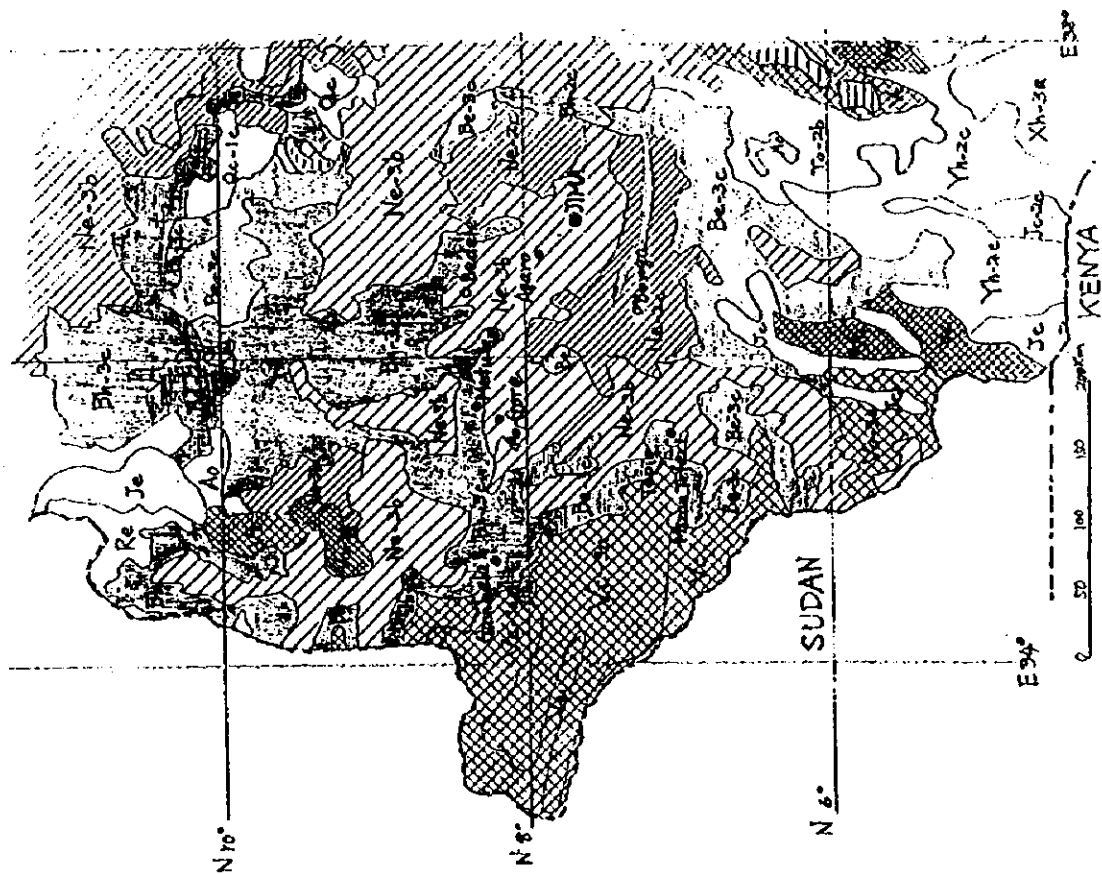




**LEGEND**

- |    |   |   |            |  |  |
|----|---|---|------------|--|--|
| 1  | Quaternary Sediments  |   |            |  |  |
| 2  | Basaltic flows and related Spatter Cones                        | — | QUATERNARY |  |  |
| 3  | Basaltic Intermediate and felsic Volcanics                      | — | VOLCANICS  |  |  |
| 4  | Alkaline granite and Syenite                                    |   |            |  |  |
| 5  | Magdala Group   |   |            |  |  |
| 6  | Trap Series   |   |            |  |  |
| 7  | Amba Aradam Formation   |   |            |  |  |
| 8  | Antalo group  |   |            |  |  |
| 9  | Adigrat Sandstone   |   |            |  |  |
| 10 | Hamanlei Series, Uarandab Series, Gabrodate Series, Maun Gypsum |   |            |  |  |
| 11 | Dibigia and Genale Doria Formation                              |   |            |  |  |
| 12 | Upper Palaeozoic Triassic Sandstone, Shale, Glacial deposits    |   |            |  |  |
| 13 | Post-tectonic granitoids  |   |            |  |  |
| 14 | Syn-tectonic granitoids (Upper Complex)                         |   |            |  |  |
| 15 | Upper Complex   |   |            |  |  |
| 16 | Middle Complex  |   |            |  |  |
| 17 | Lower Complex   |   |            |  |  |
| 18 | Lake  |   |            |  |  |
- TERTIARY VOLCANICS  
 CENTRAL PLATEAU SEDIMENTS  
 EASTERN & WESTERN OGADEN SEDIMENTS  
 SOUTHERN SIDAMO SEDIMENTS
- CENOZOIC  
 MESOZOIC  
 PRECAMBRIAN

Appendix Fig. 4 エチオピア南西部の地質



**Legend (Soil Map)**  
(FAO/UNESCO)

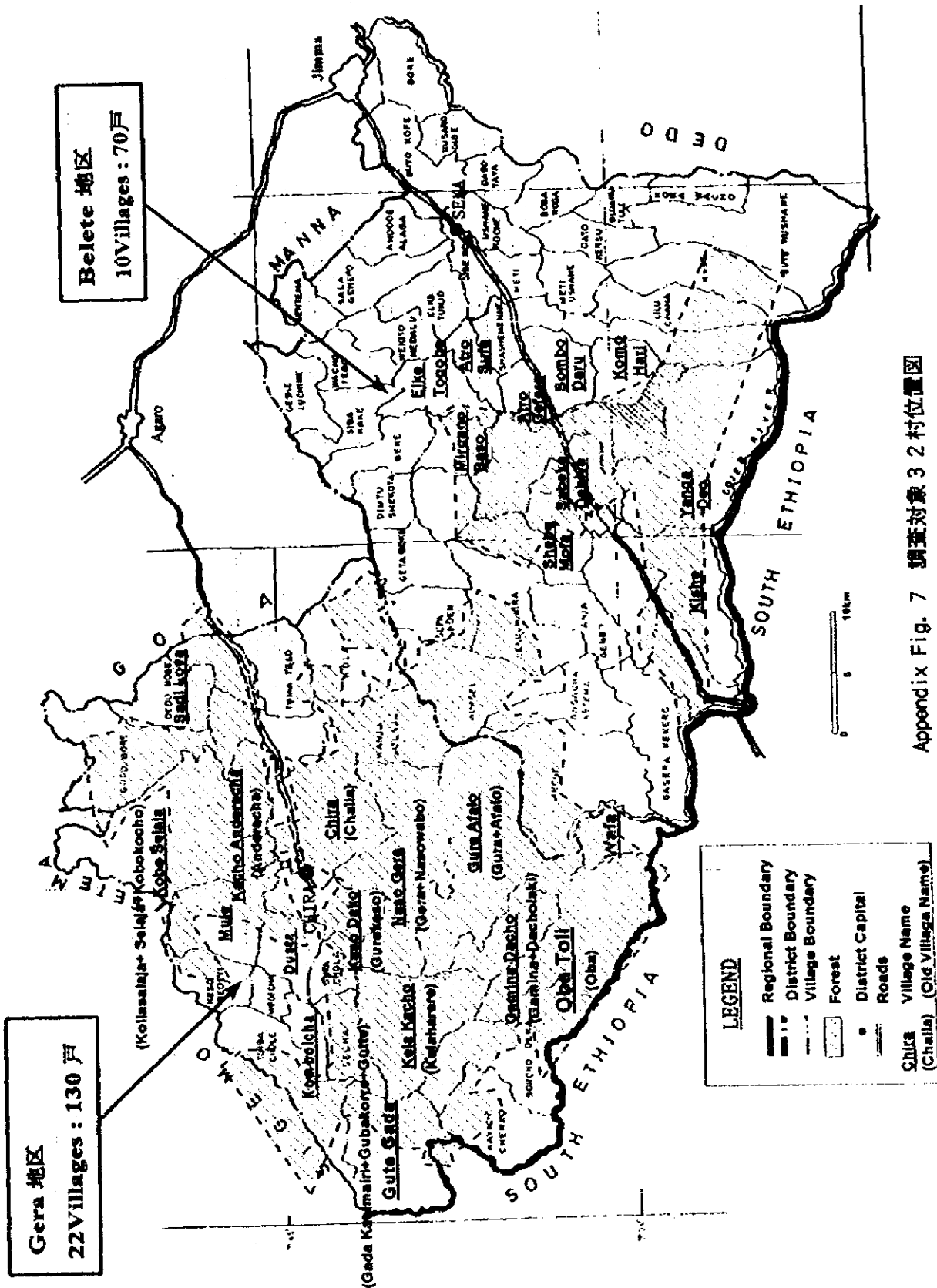
Symbol	Soil Unit
[Diagonal lines /]	Ne
[Diagonal lines \]	Be
[Horizontal lines]	Bh
[Vertical lines]	Bd
[Cross-hatch]	Vc
[Dotted]	Re
[Stippled]	Je
[Diagonal lines /]	Je
[Diagonal lines \]	To
[Horizontal lines]	AO
[Vertical lines]	Oc
[Cross-hatch]	Yh
[Stippled]	Xh

Texture 1	coarse
Texture 2	medium
Texture 3	fine
Slope a	flat
Slope b	undulating
Slope c	steeply

Appendix Fig. 5 エチオピア南西部の土壤





Appendix Fig. 7 調査対象 3 村位置図

# Soil Profile

Profile No.	Location	Date	Weather	Surveyor			
Land form		Elevation	Slope	Land use or Vegetation			
Parent Material		Moisture Condition					
Drainage		Groundwater table (m)					
1. Horizon symbol		I	II	III	IV	V	VI
2. Depth of top and bottom of horizon							
3. Boundary of horizon		a c g d	a c g d	a c g d	a c g d	a c g d	a c g d
4. Form of boundary		s w i b	s w i b	s w i b	s w i b	s w i b	s w i b
5. Colour	<ul style="list-style-type: none"> <li>• wet</li> <li>• dry</li> </ul>						
6. Mottling	<ul style="list-style-type: none"> <li>• abundance</li> <li>• size</li> <li>• contrast</li> <li>• colour</li> </ul>	f c m	f c m	f c m	f c m	f c m	f c m
7. Texture	<ul style="list-style-type: none"> <li>• fine earth</li> <li>• large particle - Size (cm) %</li> </ul>	f m c	f m c	f m c	f m c	f m c	f m c
8. Structure	<ul style="list-style-type: none"> <li>• grade</li> <li>• type</li> <li>• size</li> </ul>	f d p	f d p	f d p	f d p	f d p	f d p
9. Consistence	<ul style="list-style-type: none"> <li>• wet</li> <li>• plasticity</li> <li>• moist</li> <li>• dry</li> </ul>	S L Si C	S L Si C	S L Si C	S L Si C	S L Si C	S L Si C
10. Others (Odours, Cementation, pores, pans, Efflorescence, pH, Roots, Humus Dip, Ben. Hardness (mm), etc)		S L Si C	S L Si C	S L Si C	S L Si C	S L Si C	S L Si C
		I w m s	I w m s	I w m s	I w m s	I w m s	I w m s
		p c b s p g v	p c b s p g v	p c b s p g v	p c b s p g v	p c b s p g v	p c b s p g v
		f m c	f m c	f m c	f m c	f m c	f m c
		n s a s s v s	n s a s s v s	n s a s s v s	n s a s s v s	n s a s s v s	n s a s s v s
		n p a p p v p	n p a p p v p	n p a p p v p	n p a p p v p	n p a p p v p	n p a p p v p
		lo, vl, fr, Fi, vF, eF	lo, vl, fr, Fi, vF, eF	lo, vl, fr, Fi, vF, eF	lo, vl, fr, Fi, vF, eF	lo, vl, fr, Fi, vF, eF	lo, vl, fr, Fi, vF, eF
		lo, S, aH, H, vH, eH	lo, S, aH, H, vH, eH	lo, S, aH, H, vH, eH	lo, S, aH, H, vH, eH	lo, S, aH, H, vH, eH	lo, S, aH, H, vH, eH

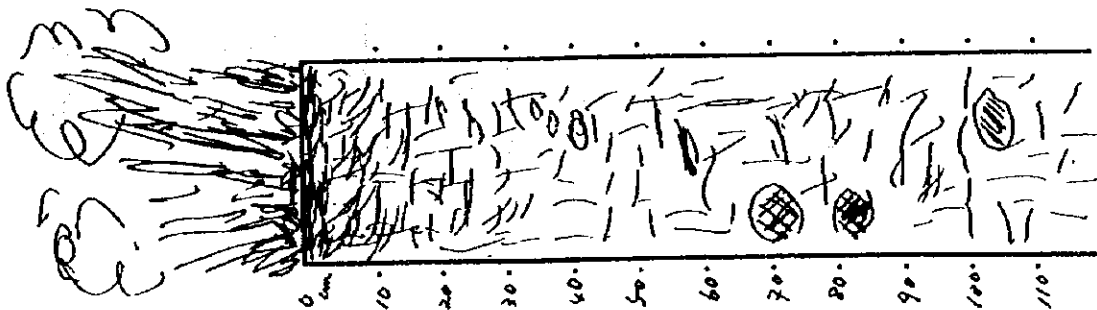
Appendix Fig. 8 (1) 土壤断面調査票



# Soil Profile

Profile No. <b>Z7</b>	Location <b>Belete / Tugo Melki</b>	Date <b>Jan. 11 - 97</b>	Weather <b>Fine</b>	Surveyor <b>HIROSAKI TAKATOMI TESSEAYE MULUGETA</b>		
Land form <b>Steep</b>	Elevation <b>2365 m</b>	Slope <b>15 ~ 30°</b>	Land use or Vegetation <b>Natural forest</b>			
Parent Material <b>Basalt</b>	Drainage <b>Well</b>	Moisture Condition <b>Wet</b>	Groundwater table (m) <b>—</b>			
1. Horizon symbol	<b>I A<sub>1</sub></b>	<b>II A<sub>2</sub></b>	<b>III B<sub>1</sub></b>	<b>IV B<sub>2</sub></b>	<b>V B<sub>t3</sub></b>	<b>VI C</b>
2. Depth of top and bottom of horizon	<b>0 - 3</b>	<b>3 - 15</b>	<b>15 - 40</b>	<b>40 - 70</b>	<b>70 - 100</b>	<b>100 ~</b>
3. Boundary of horizon	<b>a c (L) d</b>	<b>a c (R) d</b>	<b>a c (B) d</b>	<b>a c (D) d</b>	<b>a c (E) d</b>	<b>a c (F) d</b>
4. Form of boundary	<b>(S) w i b s</b>	<b>(S) i b s</b>	<b>(S) i b s</b>	<b>(S) i b s</b>	<b>(S) i b s</b>	<b>(S) i b s</b>
5. Colour	<b>5YR 3/2</b>	<b>5YR 4/2</b>	<b>2.5YR 4/3</b>	<b>2.5YR 3/3</b>	<b>2.5YR 3/4</b>	<b>5YR 4/6 7.5YR 4/6</b>
6. Mottling	<b>f c m</b>	<b>f c m</b>	<b>f c m</b>	<b>f c m</b>	<b>f c m</b>	<b>f c m</b>
7. Texture	<b>S L Si C</b>	<b>S L Si C</b>	<b>S L Si C</b>	<b>S L Si C</b>	<b>S L Si C</b>	<b>S L Si C</b>
8. Structure	<b>CL</b>	<b>CL~L;C</b>	<b>L;C</b>	<b>L;C</b>	<b>L;C</b>	<b>L;C</b>
9. Consistence	<b>ns (S) s vs</b>	<b>ns (S) s vs</b>	<b>ns (S) s vs</b>	<b>ns (S) s vs</b>	<b>ns (S) s vs</b>	<b>ns (S) s vs</b>
10. Others (Gases, Cementation, pores, pans, Efflorescence, pH, Roots, Humus Dp, Ben, Hardness (mm), etc)	<b>Root - a (f)</b>	<b>Root - c (m c)</b>	<b>Root - c (m c)</b>	<b>Root - few (f)</b> 25x30mm	<b>Root - very few (f)</b>	<b>Root - very few (f)</b> weathering rock
	Hardness <b>4 mm</b>	Hardness <b>6 mm</b>	Hardness <b>10 mm</b>	Hardness <b>16 mm</b>	Hardness <b>19 mm</b>	Hardness <b>21 mm</b>
	<b>pH 5.05</b>	<b>pH 4.87</b>	<b>pH 4.67</b>	<b>pH 4.76</b>	<b>pH 4.97</b>	<b>pH 4.64</b>

Appendix Fig. 9 (1) 土壤断面調査票記入例



1. *Maytenus undata*

2. *Ficus sur*

3. *Schefflera abyssinica*

4. *Syzygium guineense*

5. *Pygeum africanum*

6. *Hagenia abyssinica*

7. *Ekebergia capensis*

8. *Ocotea kenyensis*

9. *Polyscias ferruginea*

10. *Millettia ferruginea*

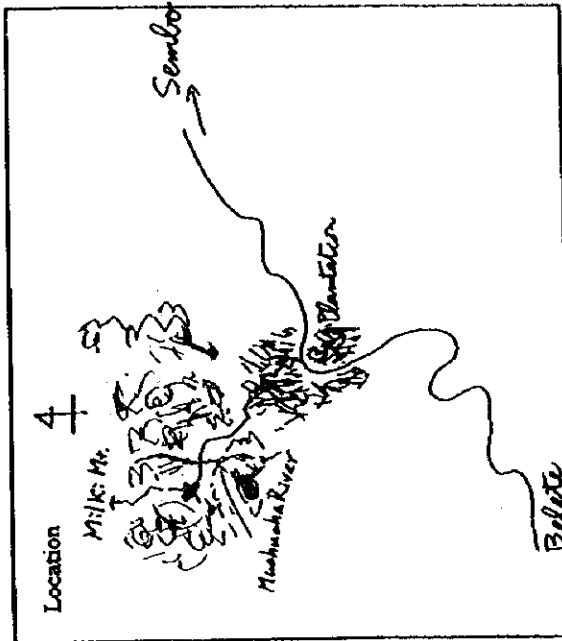
11. *Vepris dainellii*

12. *Measa lanceolata*

13. *Croton macrostachyus*

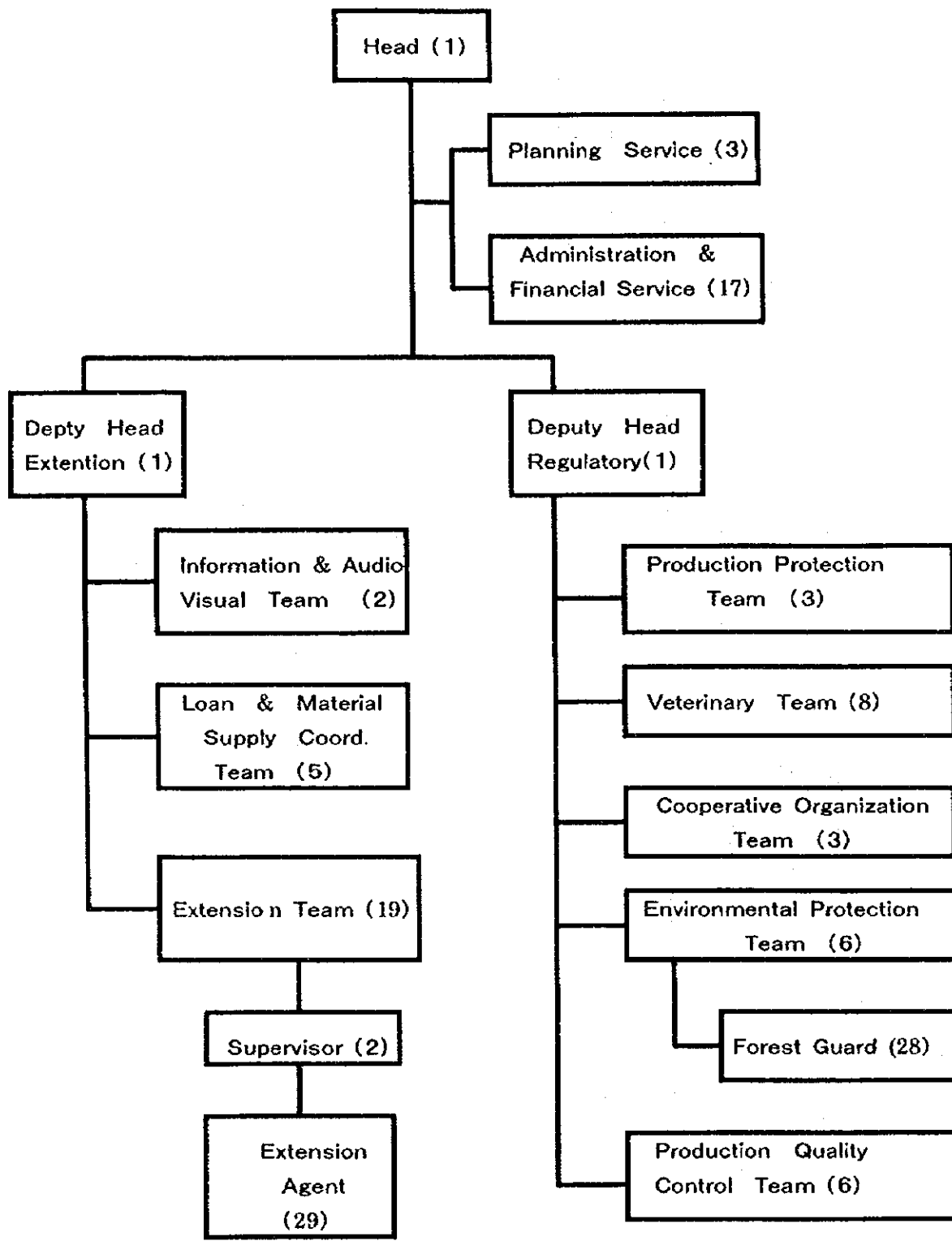
14. *Podocarpus gracillior*

15. *Albizia gummifera*



Appendix Fig. 9 (2) 土壤断面調査票記入例

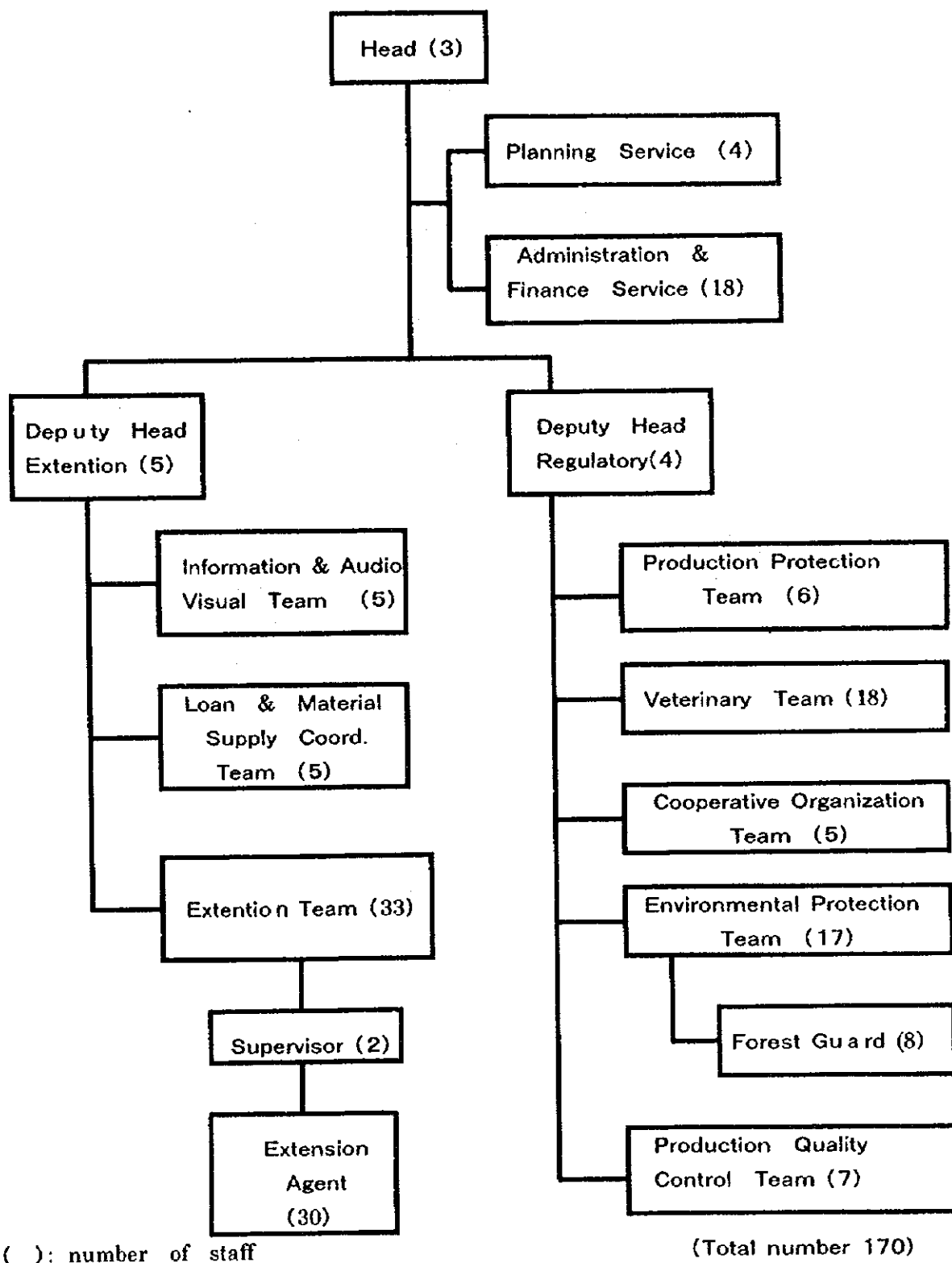




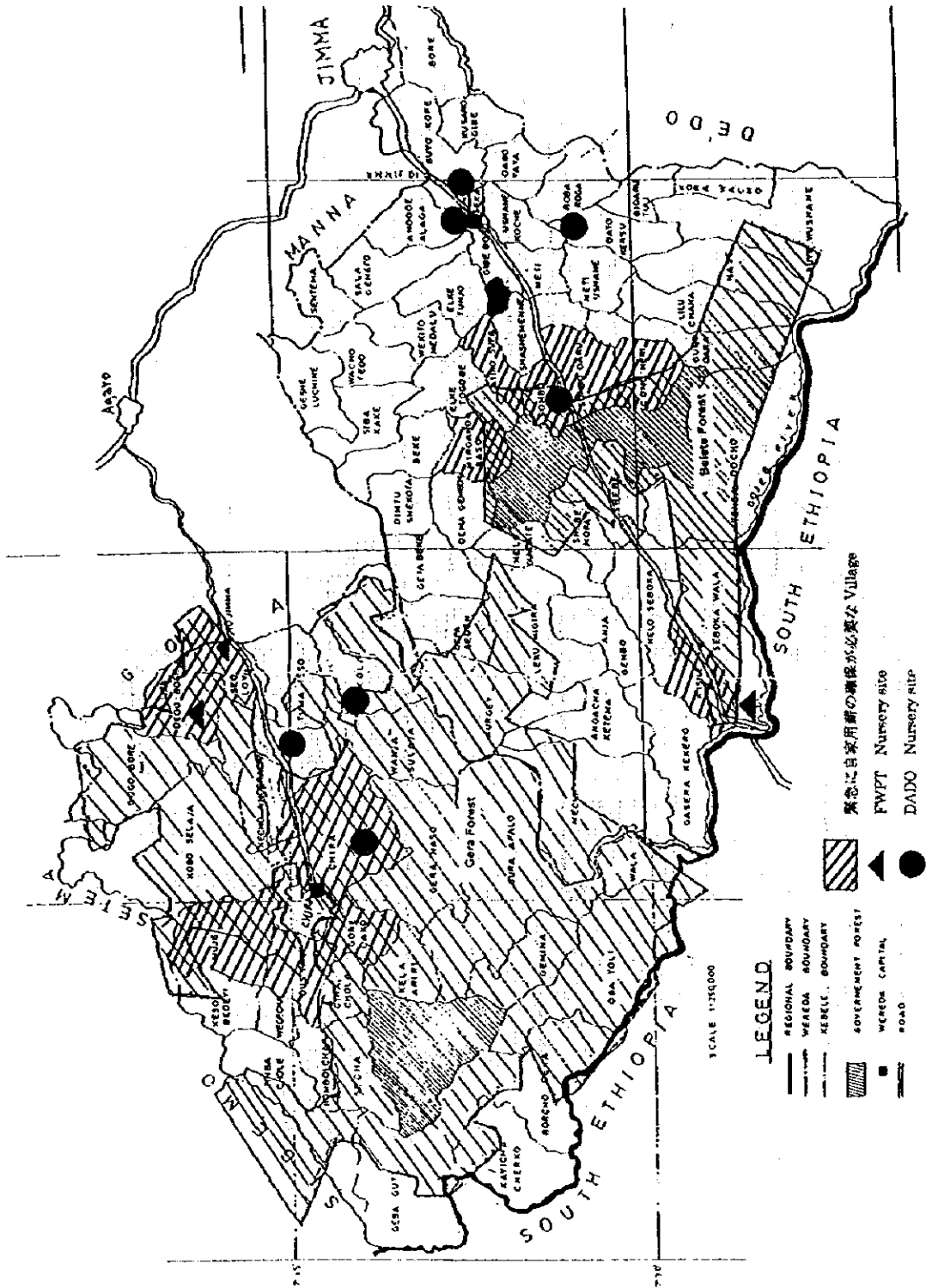
( ): number of staff

(total 135)

Appendix Fig.10 セカ チョコレサ DADO の組織図 (1997 年)

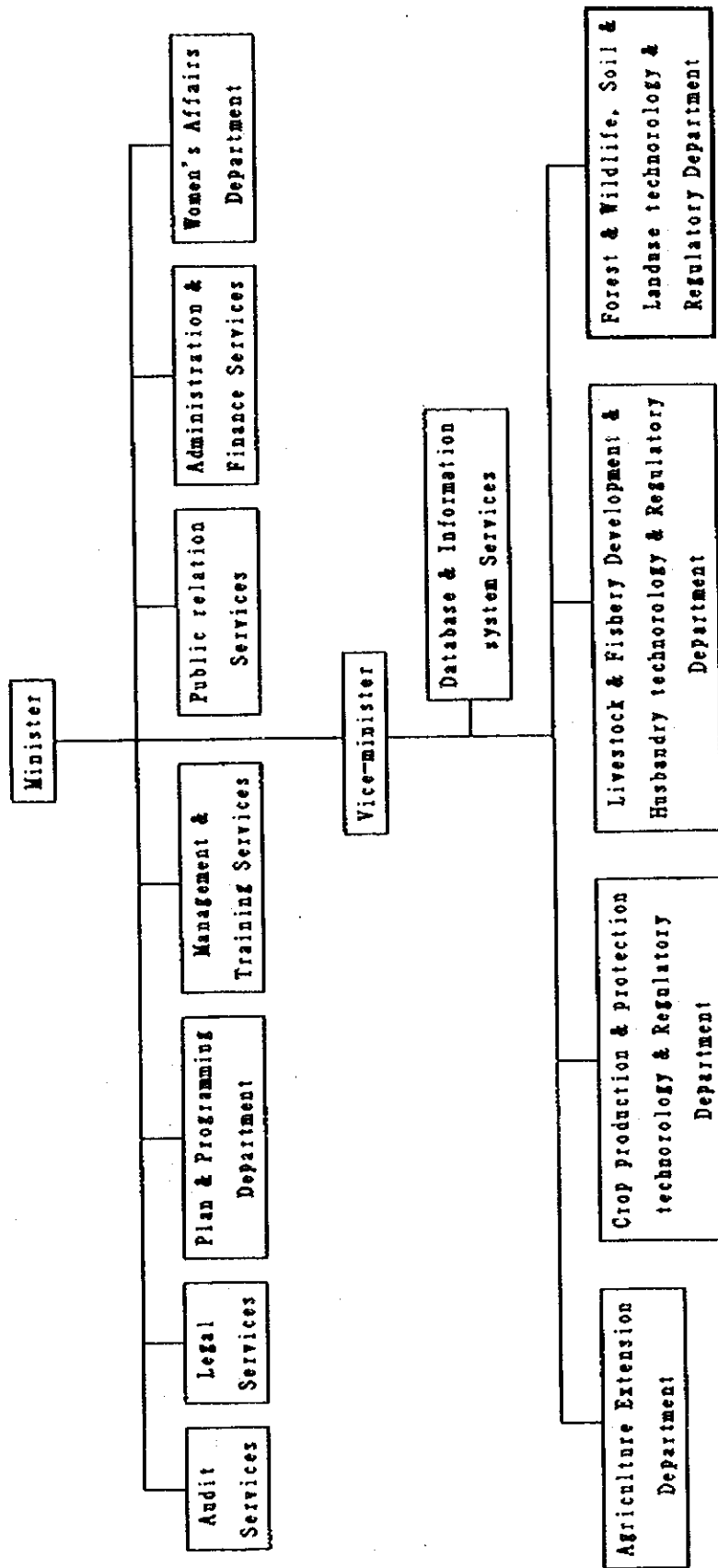


Appendix Fig. 11 ゲラ DADO の組織図 (1997 年 予定)

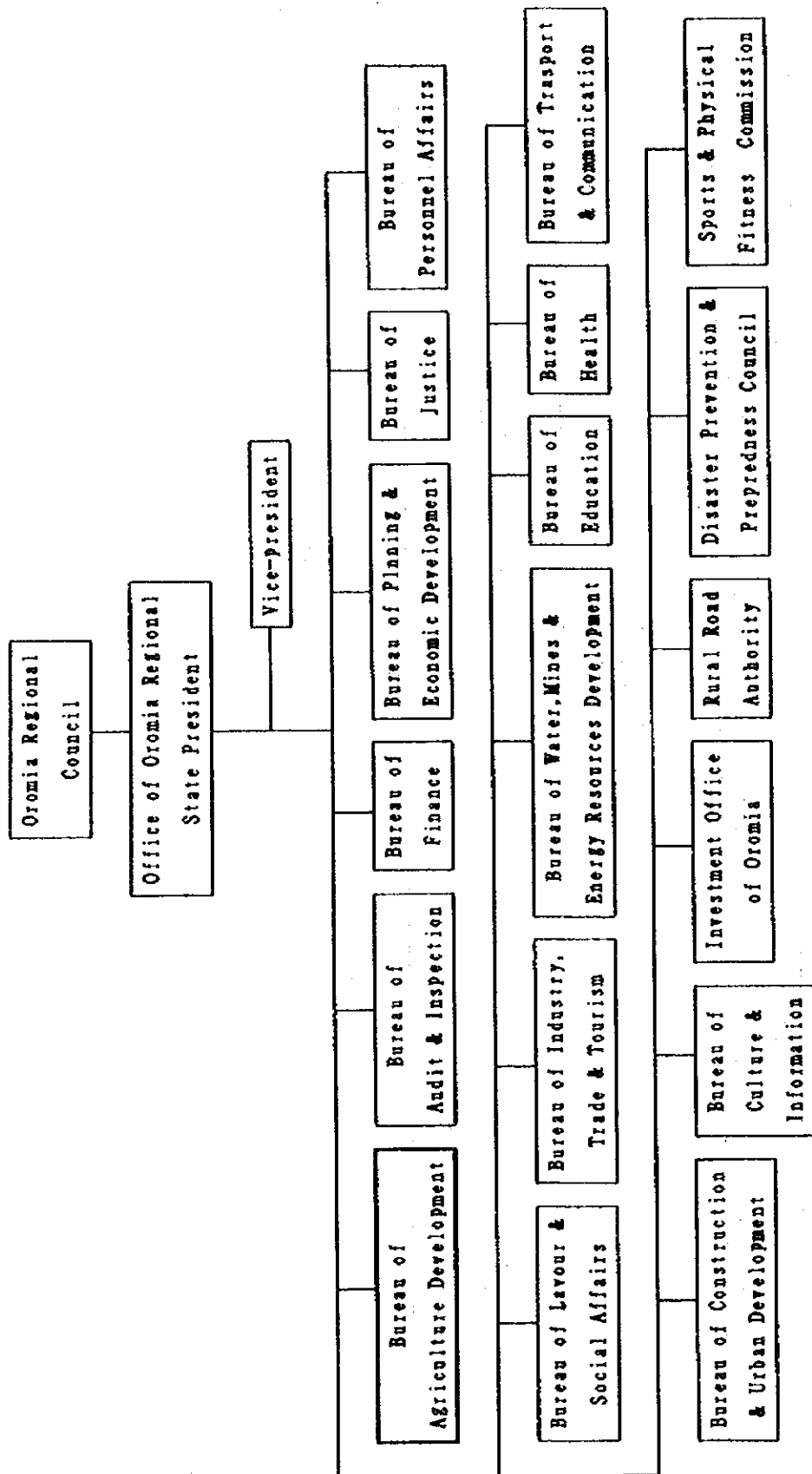


Appendix Fig. 12 緊急に自家用薪の確保が必要な村と苗畑の位置

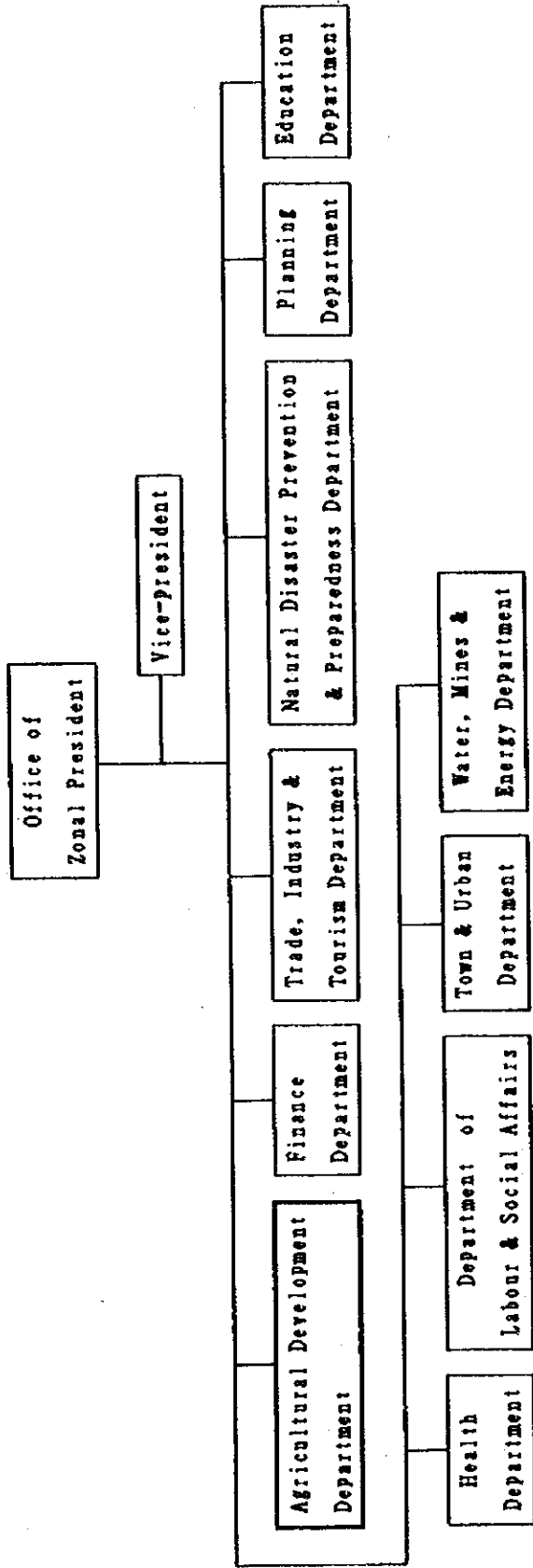
注) この村位置図は、地域社会調査および社会林業調査のために便宜上作成されたものである。



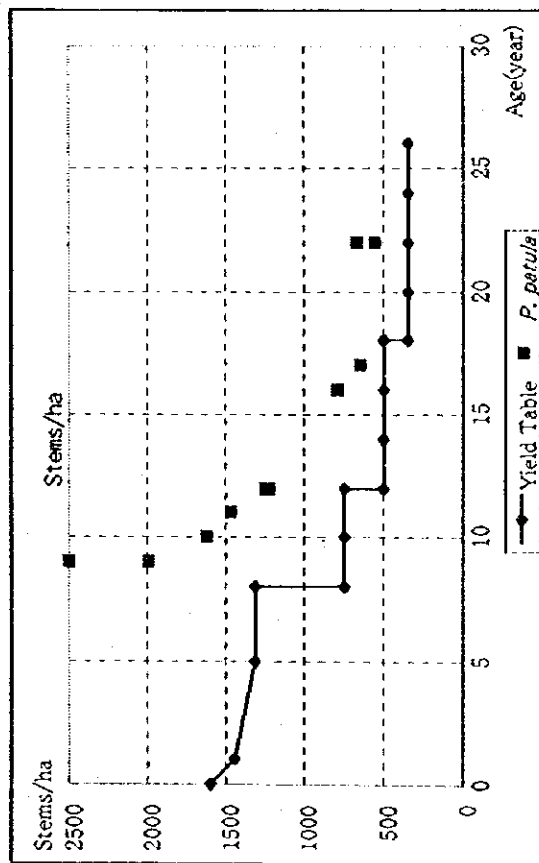
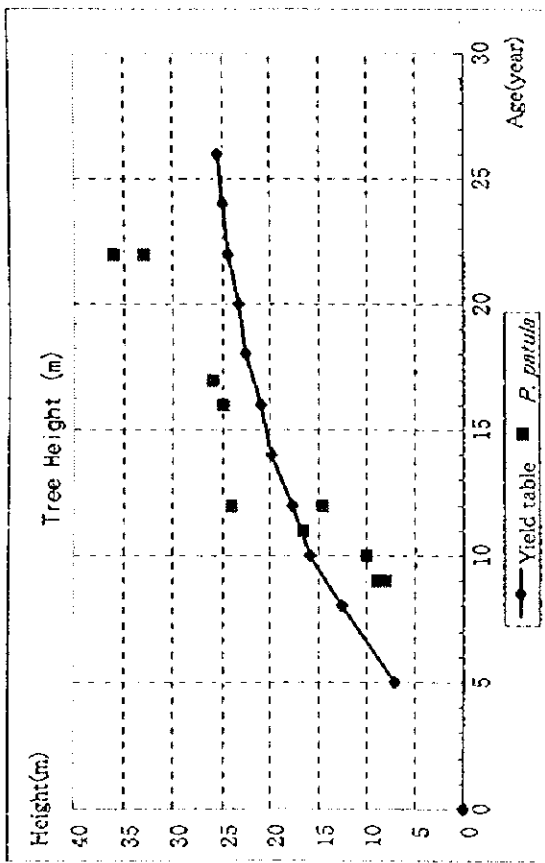
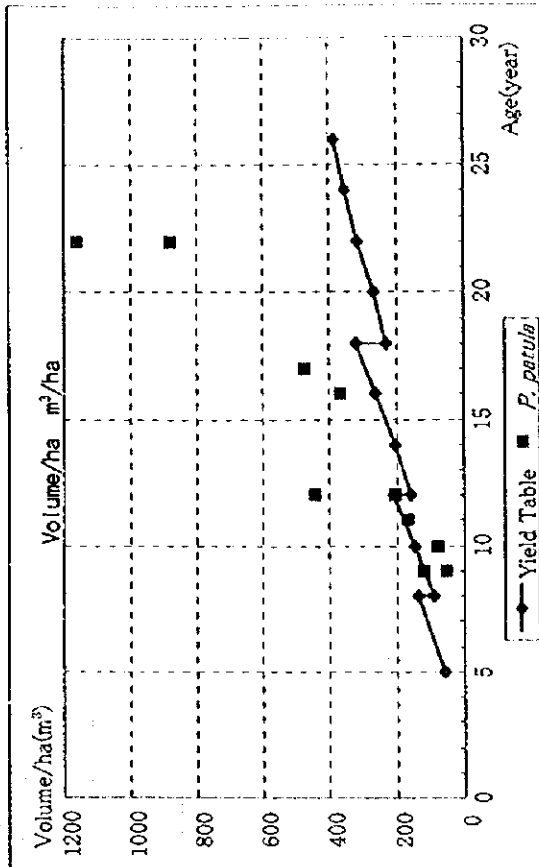
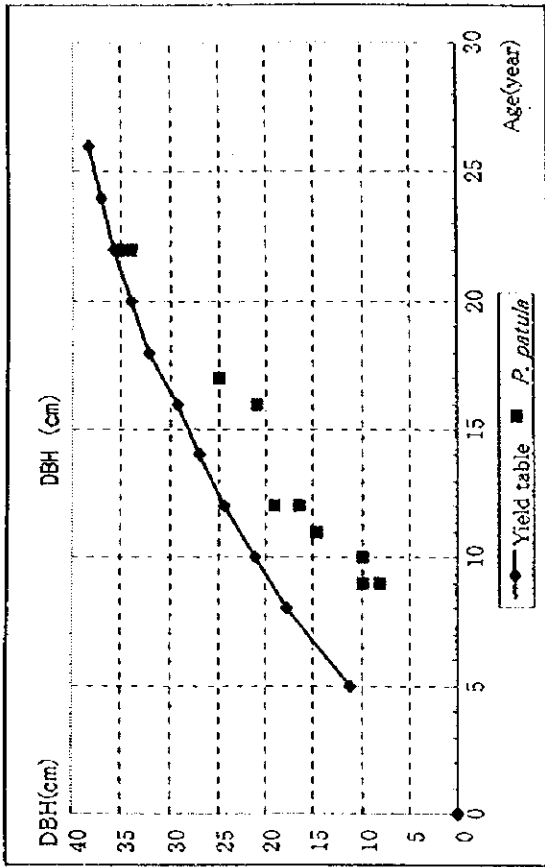
Appendix Fig. 13 MoA の組織図



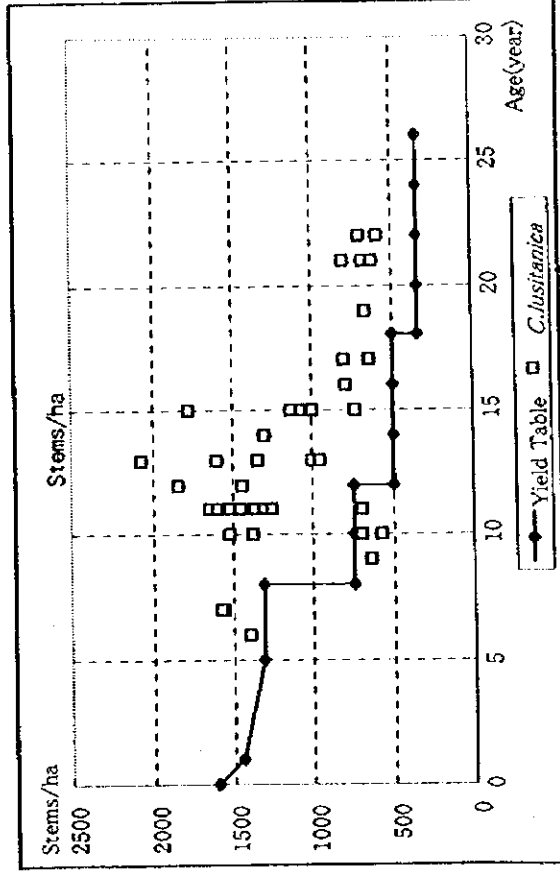
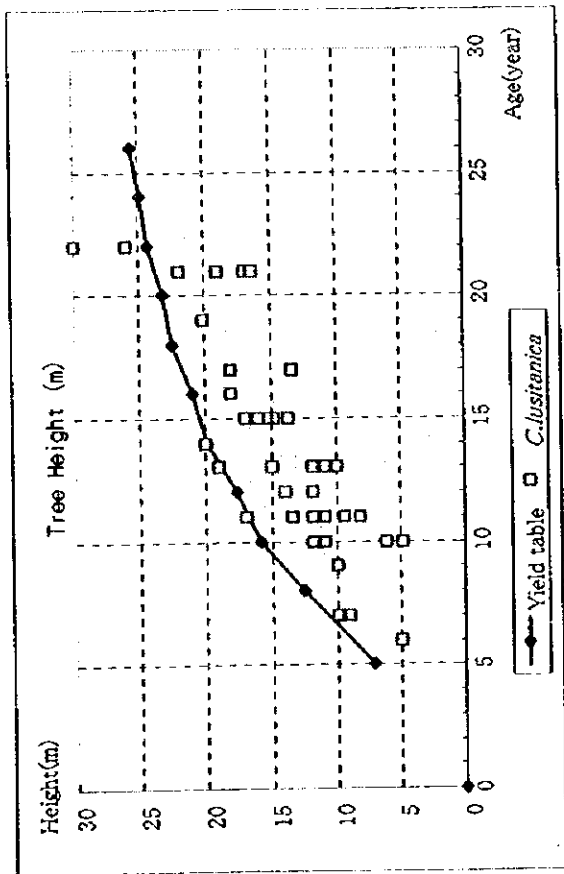
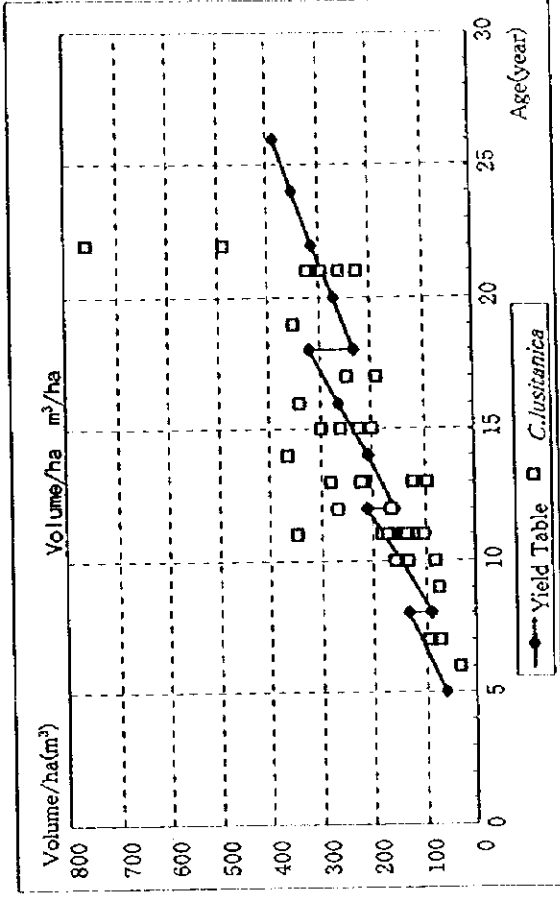
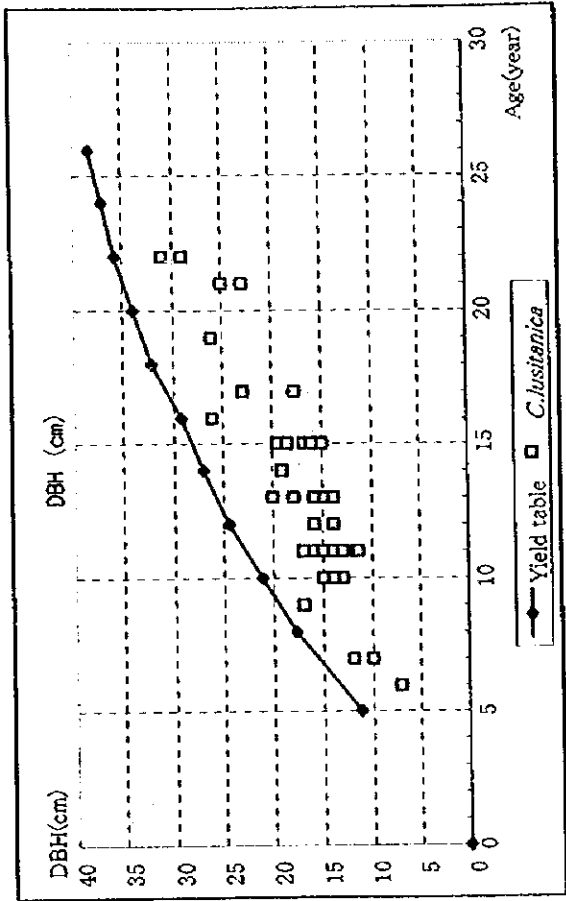
Appendix Fig. 14 オロミア州の行政機構



Appendix Fig. 15 オロミア州内ゾーンの行政機構

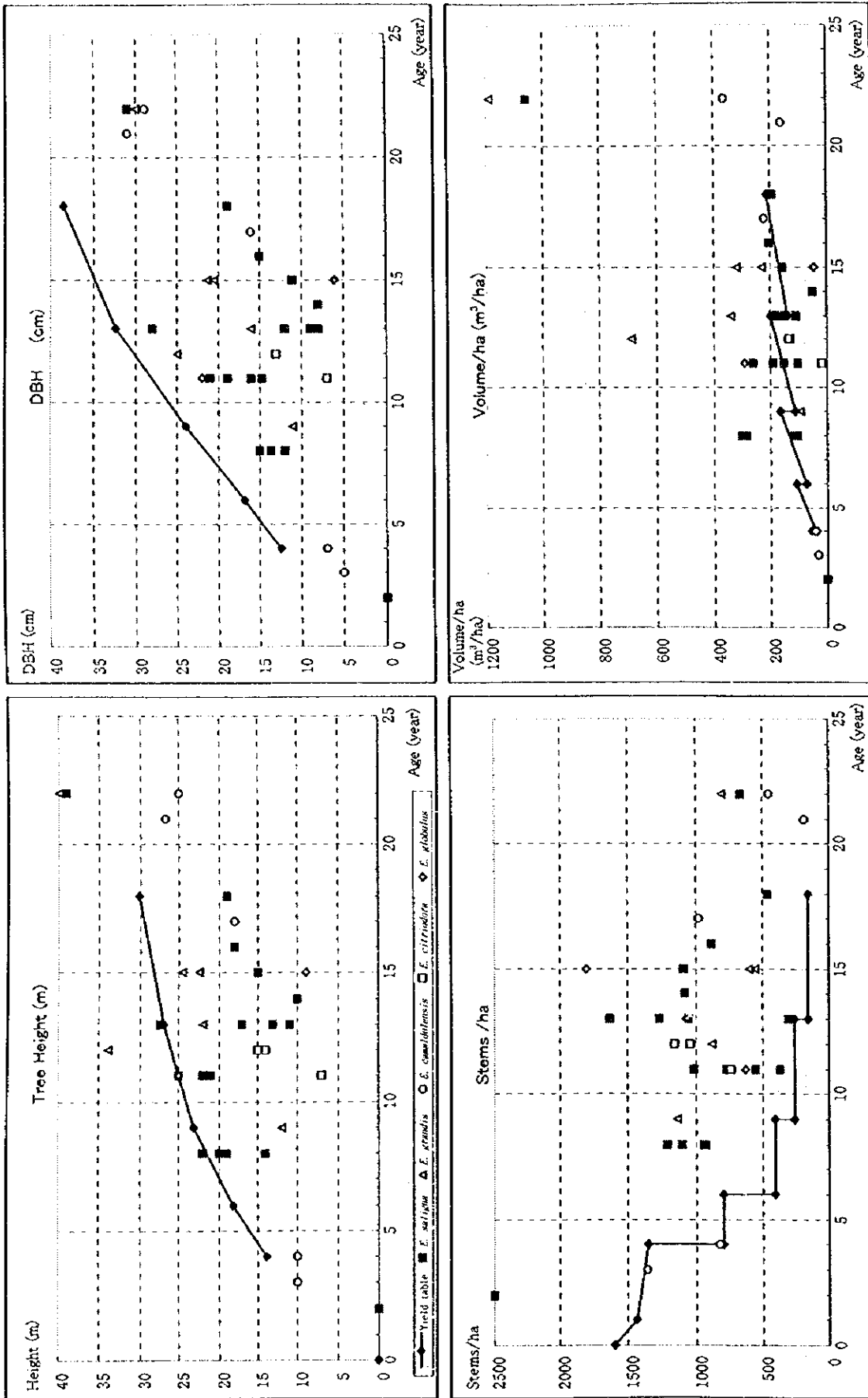


Appendix Fig. 16 *Pinus patula* 人工林のプロットデータと既存収穫表の比較

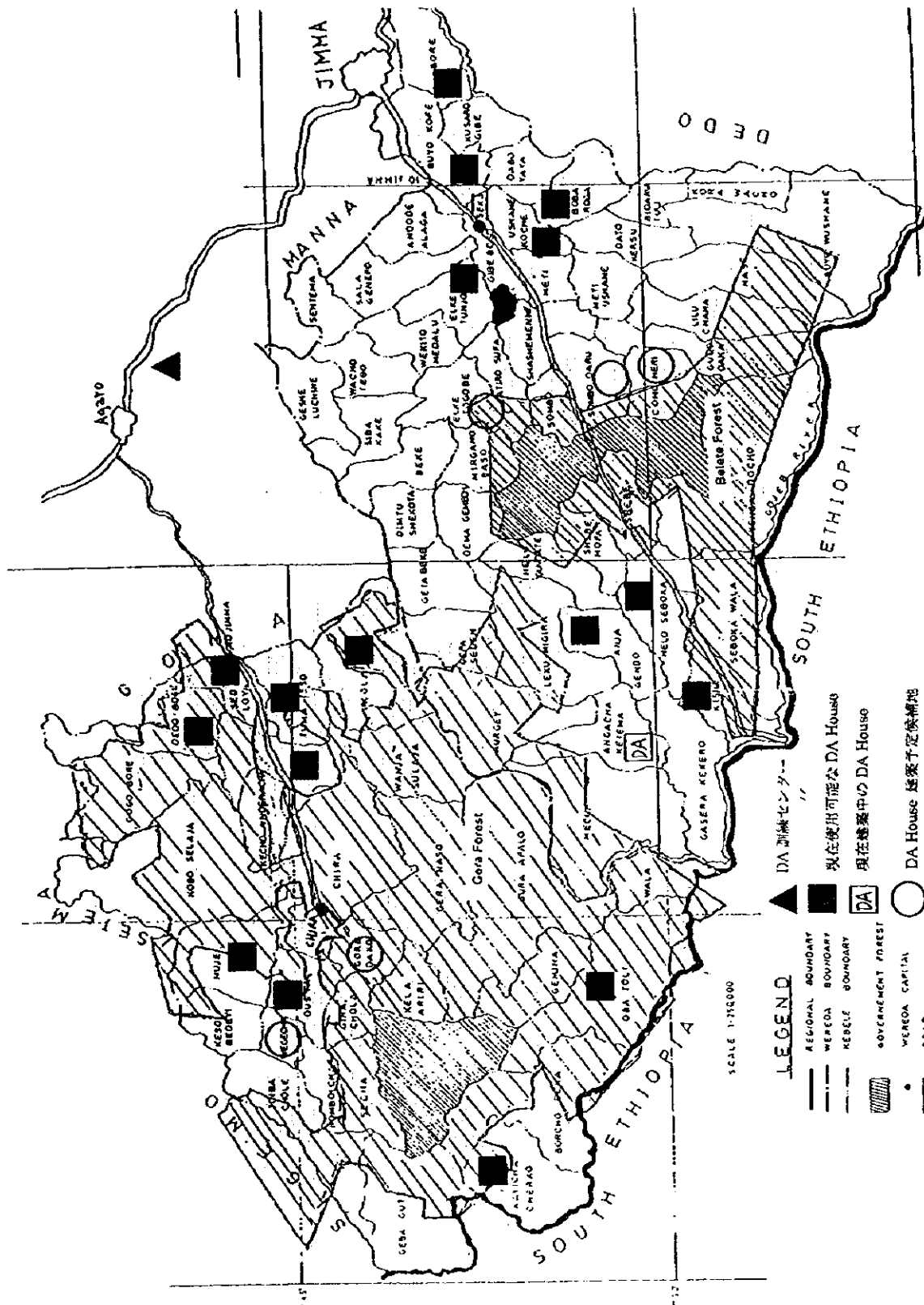


Appendix Fig. 17 *Cupressus lusitanica* 人工林のプロットデータと既存収穫表の比較





Appendix Fig. 18 *Eucalyptus* spp. 人工林のプロットデータと既存収種表の比較



Appendix Fig. 19 農業普及員宿舎の位置と建築候補地

(注) この村位置図は、地域社会調査および社会林業調査のために便宜上作成されたものである。









JICA