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THE CONSEQUENCES OF SMALL RICE FARM MECHANIZATION PROJECT

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SITE DESCRIPTION: MECHANIZATION CONSEQUENCES PROJECT IN SOUTH SULAWESI

Yusuf Maamum
The International Rice Research Institute

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ABSTRACT

The objective in this paper is to provide information of the site selection of the Consequences of Mechanization Study. A combination of random and purposive sampling procedure was used to determine the representative sites in South Sulawesi.

Eight villages were selected in two districts for the research which involved an extensive survey, farm recordkeeping, case studies and price and wage monitoring Data were collected from 1979 (wet season) through 1980/81 (dry season) for more than 300 households in mechanized and non-mechanized farms and in two different environments, irrigated and rainfed.

INTRODUCTION

The "Consequences of Small Farm Mechanization on Income, Employment and Production" project is being conducted in South Sulawesi as a cooperative research venture between the Maros Research Institute for Food Crops (LPPM), Provincial Agricultural Extension (DIPERTA), Hasanuddin University (UNHAS) and the International Rice Research Institute (IRRI, with Agro Economic Survey (SAE) as a national coordinator.

South Sulawesi, which is one of 27 provinces in Indonesia, was chosen as a research site because it is one of the few areas in the low population density, outer islands where tractors have been used for several years. In 1973 sixty-three percent of the labor force worked in the agricultural sector (BPS, 1975). South Sulawesi consists of 23 districts, 169 sub-districts and 1170 villages with 72,781 sq. km. total land area. Only 12% of the land area is farmed including 521,919 ha. of lowland (Table 1) and 407,222 ha of upland. The remaining 88% is in forest, mountains, rivers, swamps and homelots (Maamun and Patong, 1978). Of the total of 760,993 ha planted to food crops, 66 percent is in lowland rice, followed by upland rice (26 percent), corn (22 percent), cassava (4.2 percent), peanut and vegetable (3.2 percent). Approximately 20 percent of the lowland area was double cropped with rice (Agricultural Statistics, 1976). In 1976, about 6.0 percent of the paddy area (wet and dry land), and 6.1 percent of the national paddy output was produced in this province (Lains, 1978). Due to its low population density (77 person per km^2), moderate farm size (0.72 ha lowland and 0.62 ha upland) and relatively high productivity (3.7 t/ha), per capita output averaged 330 kg/person/year in 1976 (S.S.A.E.), 1978). Since per capita yearly consumption in Indonesia is approximately 120 kg, we see that South Sulawesi is a major rice surplus area, annually exporting approximately 1.2 million metric tons of grain.

SITE SELECTION AND DESCRIPTION

The research sites in South Sulawesi were selected through a combination of random and purposeful procedures, based on the structure of Administrative Unit in Indonesia (Figure 1).

Districts selection

Secondary data of farm area and production in each 23 districts in South Sulawesi were collected to determine their distribution in the province (Tables 1 and 2). Sidrap and Pinrang districts were the leading areas in terms of irrigated lowland and food production. In addition, of the ten districts with tractors, Sidrap and Pinrang accounted for 51 percent of the total (Table 3). These districts were therefore selected as the research sites.

Sidrap district, is located 200 km to the north of the provincial capital of Ujung Pandang (Fig. 2). Of its total population of 193,084 (SSPG, 1976), seventy-five percent of the adult males were classified as farmers (SSAEO, 1977-78). The area is principally a rice prudüction center. Of the 102,197 ha of agricultural land, 42 percent is upland (SSAEO, 1977-78). While the total lowland area in Sidrap covers only 45,126 ha or 8.6 percent of the provincial total; 67 percent of the lowland area is irrigated. Approximately 63 percent of this lowland rice area was planted to a dry season rice crop. In 1976 Sidrap was the leading district for rice production with a total output of 273,489 tons of paddy or approxomately 15% of the provincial output (Table 2). In addition, the highest rice yields in the province were obtained in Sidrap, - about 4.8 t/ha compared to an overall provincial average of 3.7 t/ha (SSAC, 1976). With an average output of 1416 kg/person/year Sidrap has a major rice surplus, and this represents a significant cash crop. Mechanized land preparation was first introduced in 1974. In 1978, the year before the survey, the population of tractors was 165 four-wheel mini tractor. Presently, there are approximately 300 four-wheel mini tractors or 81 percent increase within a year (SAE, 1980). In addition, 16,389 carabao are owned by local residents and are used for land preparation.

Pinrang district, is located adjacent to Sidrap. The total population is 269,837, a somewhat smaller percent of the adult males are farmers (SSPG, 1976). Of the 106,384 ha of agricultural land, 52 percent is upland. While the lowland area is 47.978 ha (9.1 percent of the provincial total), 67 percent of this area is irrigated (SSAEO, 1977-78). In 1976, Pinrang was the second most important rice production area in the province with a total output of 211,278 tons of paddy or 12 percent of the provincial output. In 1976, the output/person/year average 783 kg, and we see that Pinrang also has a major rice surplus with rice as a significant cash crop. As was the case with Sidrap, tractors were first introduced in 1974, the tractor population was 138 four-wheel mini tractor in 1978, and recent data indicates that there are approximately 208 tractors or a 51 percent increase within one year. The carabao population is somewhat less than Sidrap - only 7.254 (AEO, 1978).

Sub-Districts Selection

The secondary data on the population of tractors in each sub-district were collected. Table 4 shows that most of these units were concentrated in only a few of the sub-districts. All sub-districts with 10 or more tractors were selected as possible sites, giving a total of three locations in Sidrap and five locations in Pinrang.

Villages Selection

Finally, in order to select villages where tractor users could be expected to occur in sufficient frequency to permit stratification, the following decision rule was used. First, in the eight sub-districts, all villages with five or more tractors were assigned a number. Then, four villages with at least five tractors were randomly selected in each district. This procedure led to the selection of villages (Wt. Sidenreng, Lancirang, Tauru Tedong and Rappang) as assigned no. 2,4,5 and 7 in Sidrap (Table 4) and Temmassarange, Mattiro Deceng, Mattongang-tongang and Padakkalawa as assigned no. of 1,3,6 and 12 in Pinrang (Table 5).

SAMPLE VILLAGES DESCRIPTION

Demographic Characteristics

The eight sample villages, with 69,906 population, consist of 88 unions of neighborhood organizations (RK) and 250 neighborhood organizations (RT).

Of the total 12833 households of the eight villages in two districts, 76 percent were classified as farm household, the remaining 24 percent were in industries and services sector (Table 6). Based on the household census of approximately 2000 households, the households involved in Farm Survey were classified into two main environments, irrigated and rainfed and three types of power source for land preparation. Man, animal and combination of man-animal as non-mechanized and man-tractor, man-animal-tractor as mechanized farm. The distribution of household sample are shown in Table 7. The average age of the household head is 39 years on mechanized farms and 40.4 years on non-mechanized farm. Household members varied between 5 to 6 and/or 6 to 7 among the farmer cooperators. Non-mechanized farmers are, in general, less educated but have much more experience in farming and larger households than mechanized farm (Table 8). The magnitude of these differences are however small ones.

Agro-Economic Characteristics

The total farm land area is 15,996 ha; comprising some 85 percent of rice land with water control. Sixty-nine percent of irrigated area is classified in technical irrigation (Table 9). The fourth sample villages in (Padakkalawa, Mattiro, Deceng, Temmassarange and Mattongang) in Pinrang and Wt. Sidenrang in Sidrap are served by water of "Saddang irrigation system", Tanru Tedong and Lancirang villages through "Bulu Cenrana irrigation" and Rappang of "Bulo irrigation".

The average size of farm operated during the wet season 1979 was 1.37 ha (Table 10). Rainfed farms are larger than irrigated farms and ranged from 1.22 to 1.58 hectares. Rainfed-mechanized are slightly larger than rainfed non-mechanized. On the other hand, irrigated non-mechanized are slightly larger than mechanized (Table 10).

Approximately 74% of the non-mechanized rainfed farms were owner operated and 60% of the non-mechanized irrigated farms were share-cropped For both rainfed and irrigated mechanized farms, about half were owner-operated and half share-cropped. Non farm income for mechanized-farms was over three times more than non-mechanized for both rainfed and irrigated (Table 11). The farmers had opportunities to become employee outside of their farms, such as fishpond and fisheries.

Yield (output) on irrigated farms was about twice that of rainfed for both mechanized and non-mechanized. Among rainfed farms, the yield on mechanized was 50 percent higher than on non-mechanized, and only 40 percent in irrigated farms (Table 12). The difference of the yield is due to the difference in the amount of fertilizer applied and to crop failure during the wet season 1979. Mechanized farm applied fertilizer twice than the non-mechanized for both rainfed and irrigated area. Crop failure also caused the yield differences. Rainfed non-mechanized was the highest percentage in crop failure due to the drought during the wet season.

The number of farm machines and animals are shown in Table 13. Sixty seven percent of the four-wheel tractors, with 12-15 hp, were found in the villages sampled in Sidrap. All of two-wheel tractors, with 7-10 hp were in Pinrang district. Alternate types of power for land preparation are animals (cows and carabao) and manual (hoe). Horses were seldom used in land preparation but normally were retained for transportation.

Only one repair shop of tractor is located in the village sampled (Rappang), most of repair shops being located in town. In terms of adoption of the new technology, each village was served by the institutions such as extension workers (PPL), credit banks, farm cooperators, and markets. Another institutional facilities of the eight sample villages are shown in Table 14.

SUMMARY

South Sulawesi is one of outer islands in Indonesia, introduced mechanization for land preparation since several years ago. The population of tractors concentrated in a certain districts which has a large area of lowland and irrigation facilities.

Sidrap and Pinrang districts were selected as a research study sites where more than one-half of the tractors were found in this area and would have greatly increased management problems on tractors.

Data was collected intensively in eight villages of the two districts, through the survey of about 300 households. Seventy of them were involved in Farm Record keeping and the additional case studies of 50 tractor owners.

The villages were varied in terms of land preparation based on water sources, the fifth villages served by Saddang irrigation were classified in irrigated double cropped and the remaining as rainfed. They are homogenous in farm households composition and occupation. The average farm size was 1.4 ha and planted improve rice varieties and other crops.

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Table 1. Lowland area irrigated and non-irrigated, by district, South Sulawesi.

	District	Lowland area (ha)	Irrigated		Non-irrigated	
			hectares	percent	hectares	percent
1.	Luwu	50,624	9,427	19	41,197	81
2.	Tator	21,237	2,750	13	18,487	87
3.	Soppeng	21,693	10,305	48	11,388	52
4.	Wajo	69,842	954	1	68,888	99
5.	Bone	76,076	6,502	9	69,574	91
6.	Sinjai	11,263	2,327	21	8,936	79
7.	Bulukumba	22,371	15,000	67	7,371	33
8.	Selayar	800	-	-	800	100
9.	Bantang	6,222	4,059	65	2,163	35
10.	Jeneponto	13,841	395	3	13,446	97
11.	Takalar	16,123	1,381	9	14,742	91
12.	Gowa	28,811	7,191	28	18,620	72
13.	Ujung Pandang	3,688	-	-	3,688	100
14.	Maros	21,639	2,400	11	19,239	89
15.	Pangkep	21,314	3,557	17	17,757	83
16.	Barru	11,482	652	5	10,857	95
17.	Pare-pare	879	-	-	879	100
18.	Sidrap	45,126	30,053	67	15,073	33
19.	Enrekang	9,000	893	10	8,107	90
20.	Pinrang	47,978	32,275	67	15,703	33
21.	Polmas	19,011	5,700	30	13,311	70
22.	Majene	1,130	100	9	1,030	91
23.	Mamuju	4,769	-	-	4,769	100
	Total	521,919	135,894	26	386,025	74

Source: South Sulawesi Agricultural Extension Office, 1977.

Table 2. Rice production (ton) each district in South Sulawesi (1976).

No.	District	Wet season	Dry season	Total
1	Luwu	138,149	14,427	142,576 (4)
2	Tator	67,022	12,269	79,291
3	Soppeng	69,317	60,964	130,221 (5)
4	Wajo	105,420	2,241	107,661 (7)
5	Bone	139,567	13,256	152,823 (3)
6	Sinjai	21,800	17,659	39,459
7	Bulukumba	48,263	43,115	91,378
8	Selayar	1,332	-	1,332
9	Bantaeng	9,292	13,420	22,712
10	Jeneponto	28,596	596	29,192
11	Takalar	43,789	675	44,464
12	Gowa	83,072	7,269	90,341
13	Ujung Pandang	7,936	-	7,936
14	Maros	119,386	10,545	129,931 (6)
15	Pangkep	97,945	2,369	100,314 (8)
16	Barru	37,791	1,535	39,326
17	Pare-pare	4,425	-	4,425
18	Sidrap	167,687	105,802	273,489 (1)
19	Enrekang	16,369	7,355	23,724
20	Pinrang	82,277	120,001	211,278 (2)
21	Polmas	48,861	25,521	74,382
22	Majene	4,402	216	4,618
23	Mamuju	2,904	-	2,904
	Total	1,355,611	466,180	1,821,791

Source: Agricultural Census, South Sulawesi, 1976.

Table 3. Tractor population by district, South Sulawesi, 1978-79.

District	Tractor population				Annual percentage increase
	1978	Percent	1979	Percent	
Sidrap	165	28	300	26	81
Pinrang	138	23	208	18	51
Polmas	67	11	170	15	154
Soppeng	65	11	119	10	83
Luwu	57	10	128	11	125
Tator	25	4	17	1	-32
Maros	22	4	43	4	95
Bone	22	4	58	5	164
Wajo	15	3	93	8	520
Pangkep	12	2	24	2	100
	588	100	1160	100	

Source: Agricultural Extension office.

Table 4 Distribution of tractors in Sidrap, by village, 1978.

Sub-district (Kecamatan)	Villages (desa)	Tractors (all types)	Assigned number
Maritengae	Pangkajene	44	1
	Wt. Sidenreng	27	2
	Mojang	5	3
	Sereang	3	
	Allakuang	3	
	Sub total	82	
Dua-Pitue			
	Lancirang	14	4
	Tanru Tedong	11	5
	Bila	6	6
	Otting	2	
	Sub total	33	
Panca-Rijang			
	Rappang	15	7
	Timoreng Panua	4	
	Macorawalie	3	
	Kulo	2	
	Rijang Panua	2	
	Sub total	26	

Source: Agricultural Extension, Sidrap.

Table 5 Distribution of tractors in Pinrang, by villages, 1978.

Sub-district (Kecamatan)	Villages (Desa)	Tractors (all types)	Assigned number
Watang Sawitto			
	Tommaserange	13	1
	Salo	9	2
	Mattiro Deceng	8	3
	Sawitto	7	4
	Macorawalie	5	5
	Macinnae	3	
	Tiroang	2	
		47	
Mattiro-Sompe			
	Matongang-tongang	9	6
	Lanrisang	5	7
	Mattombong	4	
	Langnga	3	
	Mallongi-longi	2	
		23	
Duam Panua			
	Cempa	6	8
	Paria	6	9
	Lampa	4	
	Bungi	2	
	Pekkabata	1	
		19	
Patam Panua			
	Tenyamang	7	10
	Leppangang	6	11
	Teppo	3	
		16	
Mattirobulu			
	Padakkalawa	10	12
	Manarang	3	
	Alita	2	
		15	

Source: Agricultural Extension, Pinrang.

Table 6. Distribution of households, farm households and number of HH members 8 villages in Pinrang and Sidrap, South Sulawesi, 1979.

Village[a]	Total number of household	Persons/ house-hold	Total number of farm household
PDKL	967	5.2	928
MD	1355	5.1	1300
TMS	1503	6.9	1277
MTG	1345	5.1	1319
Pinrang	5170	5.6	4824
RP	2036	5.1	479
WTS	1078	6.1	1089
LC	1463	5.9	613
TT	3086	6.9	2792
Sidrap	7663	6.0	4973
Total	12833	-	9719

[a]PDKL = Padakkalawa
MD = Mattiro Deceng
TMS = Temmasarange
MTG = Matongang-tongang
RP = Rappang
WTS = Watang Sidenreng
LC = Lancirang
TT = Tanru -Tedong

Source = Village office, Sidrap and Pinrang 1979.

Table 7. CELL DISTRIBUTION IN EACH VILLAGE BASED ON HOUSEHOLD SAMPLING CENSUS

NO	LEVEL OF IRRIGATION.	LEVEL[a] OF MECHANIZATION	VILLAGES[b]																									TOTAL		
			PDKL			MD			TMS			MTG			Rp			WTS			LC			TT					
			TS	S	RK	TS	S	RK	TS	S	RK	TS	S	RK	TS	S	RK	TS	S	RK	TS	S	RK	TS	S	RK	TS	S	RK
1.	~~Two~~	M	20	12	7	11	7	-	20	11	-	-	-	-	4	-	-	1	-	-	-	-	-	-	-	-	56	30	7
2.	~~crop~~	A	=	=	=	=	=	=	-	-	-	118	30	7	-	-	-	-	-	-	-	-	-	-	-	-	118	30	7
3.	Irri-	MA	71	4	4	67	5	-	54	5	-	44	5	3	24	3	-	105	7	-	43	1	-	24	-	-	432	30	7
4.	gated	MT	8	8	4	5	5	-	1	1	-	-	-	-	8	7	-	9	6	-	3	3	3	6	-	-	40	30	7
5.		MAT/ AT	36	2	-	61	4	-	19	2	-	18	4	4	69	3	-	113	11	-	51	3	2	15	1	1	384	30	7
		Sub Total	137	26	15	144	21	-	94	19	-	180	39	14	105	13	-	228	24	-	97	7	5	45	1	1	1030	150	35
6.	~~Rainfed~~	M	9	8	2	-	-	-	-	-	-	3	2	1	1	-	-	-	-	-	1	-	-	24	20	4	38	30	7
7.	~~One~~	A	-	-	-	-	-	-	-	-	-	7	2	-	-	-	-	-	-	-	-	-	-	166	28	7	173	30	7
8.	~~crop~~ only	MA	14	1	-	-	-	-	30	2	-	47	7	4	1	-	-	2	1	-	189	11	2	189	8	1	472	30	7
9.		MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	7	20	20	7
10.		MAT/ AT	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	7	3	-	5	1	1	47	26	6	61	30	7
		Sub Total	23	9	2	-	-	-	32	2	-	57	11	5	2	-	-	9	4	-	195	12	3	446	102	25	764	140	35
	TOTAL		160	35	17	144	21	-	126	21	-	237	50	19	107	13	-	237	28	-	292	19	8	491	103	26	1794	290	70

[a] M = Manual
A = Animal
T = Tractor

[b] PDKL = Padakkalawa
MD = Mattiro Deceng
TMS = Tammasarangge
MTG = Matongang-tongang
Rp = Rappang
WTS = Watang Sidenreng
LC = Langirang
TT = Tanru Tedong.

TS = Total sample (Total HH).
S = Sample Survey
RK = Sample Record Keeping

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Best Available Document

Table 8. Demographic characteristics by type of household of eight sample villages, South Sulawesi, 1979.

Characteristics	Type of household	
	Mechanized*	Non-mechanized*
Number of households	124	166
Ave. age of HH head (years)	39	40.4
Ave. education of HH head (years)	4.6	3.8
Ave. experiences in farming (years)	19.9	20.3
Ave. number of HH members	6.3	6.8
Ave. number of permanent laborers	0.1	0.2

*Both of irrigated and rainfed farm.

Source: Farm Survey, Mechanization Consequences, 1979.

Table 9. Distribution of farm area by irrigation facilities, 8 villages in Pinrang and Sidrap, South Sulawesi, 1979

Village	Area (ha)				
	Irrigation				
	Tech.[a]	Semi tech.[b]	Simple[c]	Rainfed	Total
Padakkalawa	1202	-	-	-	1202
Mattiro Deceng	1332	-	-	322	1654
Temmasarange	1286	-	-	59	1345
Matongang-tongang	1824	-	-	613	2437
Pinrang	5644	-	-	994	6638
Rappang	209	-	-	-	209
Watang Sidenreng	2377	1658	-	37	4072
Lancirang	400	-	1819	250	2469
Wanru-Tedong	724	765	-	1119	2608
Sidrap	3710	2423	1819	1406	9358
Total	9354	2423	1819	2400	15996

[a]Irrigation infrastructure is complete, permitting control over water allocation through accurate measurement.

[b]Irrigation infrastructure is incomplete, permitting some control over water allocation, but without accurate measurement.

[c]Irrigation system is of simple construction, permitting little control over water allocation.

Source: Villages office.

Table 10. Farm size distribution per farm in eight villages, South Sulawesi, 1979.

Village	No. reporting	Average size per farm (ha)
Padakkalawa	28	0.99
Mattiro Deceng	10	0.77
Temmassarange	18	0.49
Matongang-tongang	33	1.96
Pinrang	89	1.05
Rappang	13	1.03
Watang- Sidenreng	28	1.79
Lancirang	18	0.93
Tayru-Tedong	104	1.50
Sidrap	163	1.31
Total	252	1.37

Source: Farm Survey, Mechanization Consequences.

Table 11. Economic characteristics of farmer cooperators in Sidrap and Pinrang districts, South Sulawesi, 1979.

Environment/ characteristic	Non-mechanized	Mechanized
Rainfed	Land operated (ha)	
Owner (75% or more)	1.32 (62)	1.32 (28)
Part owner (25-75%)	1.43 (3)	1.78 (4)
Share (25% or less owned)	1.62 (19)	2.06 (15)
Average (total)	1,43 (84)	1.58 (48)
	US$	
Non-farm income	102.00	314.75
Farm implements	40.00	40.00
Consumer durables	123.20	172.80
Irrigated	Land operated (ha)	
Owned (75% or more)	0.94 (29)	1.18 (37)
Part owner (25-75%)	2.96 (4)	1.71 (4)
Share (25% or less owned)	1.29 (49)	1.20 (34)
Average (total)	1.25 (82)	1.22 (76)
	US$	
Non-farm income	52.41	163.31
Farm implements	44.80	28.80
Consumer durables	99.20	102.40

*Number in parenthesis ( ) indicates average of number of farmer respondents in each category.

*Exchange rate US$1 = Rp 625.

Source: Farm Survey, Mechanization Consequences.

Table 12. Output (yield) and factors associated with yield differences of farm cooperators, South Sulawesi, 1979 (WS).

Environment	Non-mechanized	Mechanized
Rainfed (no.)	75	48
Yield (kg/ha)	508	768
Fertilizer (kg/ha)	47.7	90.1
Crop failure (%)	31	19
Irrigated (no.)	63	66
Yield (kg/ha)	1099	1551
Fertilizer (kg/ha)	65.0	144.4
Crop failure (%)	12.8	6.0

Source: Farm survey, Mechanization Consequences project.

Table 13. Number of Farm Machines and Animals, 8 villages in Pinrang and Sidrap, South Sulawesi, 1979.

Village[c]	Farm Machines					Animal				
	2 wheel Tractors	4 wheel Tractors[b]	Pump Irrigation	Threshers	Rice mills	Cows	Buffalo carabou	Horses	Goats	Poultry[a]
PDKL	-	10	-	-	10	860	125	32	106	4838
MD	-	8	-	-	12	792	35	64	49	11568
TMS	1	12 (13)	-	-	12	710	63	66	87	16282
MTG	3 (4)	6	-	-	24	856	505	75	119	10063
Pinrang	4 (5)	36 (37)	-	-	58	3218	728	237	361	42751
RP	-	15	-	-	13	816	57	121	98	28262
WTS	-	27 (32)	3	-	27	832	310	97	123	10015
LC	-	14 (18)	-	-	23	1070	31	110	31	18709
TT	-	11	-	-	38	1809	330	277	55	15653
Sidrap	-	67 (76)	3	-	101	4527	728	605	307	72639
Total	4 (5)	103 (113)	3	-	159	7745	1456	842	668	115390

[a]Poultry includes: ducks, chickens, geese.

11 tractors as an addition.

[b]Number in parenthesis includes tractors added after census.

[c]PDKL = Padakkalawa
MD = Mattiro Deceng
TMS = Temmasarange
MTG = Matongang-tongang
RP = Rappang
WTS = Watang Sidenreng
LC = Lancirang
TT = Tanru-Tedong

Table 14. Number of Institutional Facilities, 8 villages in Pinrang and Sidrap, South Sulawesi, 1979.

Village[a]	Market	Banks (BRI)	Ext. Workers (PPL)	Farm Storage Facilities	Schools	Bus Stations	Farm Cooperatives	Health Centers	Repair Shop		Gas Pump	Fertilizer Storage Facilities	Electricity
									Tractors	Motor cycle			
PDKL	1	1	3	-	5	-	2	1	-	2	-	2	1
MD	2	1	3	-	6	-	1	1	-	1	-	2	-
TMS	2	1	3	-	6	-	-	-	-	1	-	2	1
MTG	1	1	3	-	6	-	1	-	-	1	-	4	1
Pinrang	6	4	12	-	23	-	4	2	-	5	-	10	3
RP	2	1	4	-	15	1	2	2	1	7	-	1	1
WTS	1	2	3	-	5	-	1	1	-	-	-	1	1
LC	1	1	3	2	7	-	1	1	-	8	-	2	1
TT	2	1	3	1	14	1	3	1	-	12	-	1	1
Sidrap	6	5	10	3	41	2	7	5	1	27	-	5	4
Total	12	9	22	3	64	2	11	7	1	31	-	15	7

[a]PDKL = Padakkalawa
MD = Mattiro Deceng
TMS = Temmasarange
MTG = Matongang-tongang
RP = Rappang
WTS = Watang Sidenreng
LC = Lancirang
TT = Tanru-Tedong

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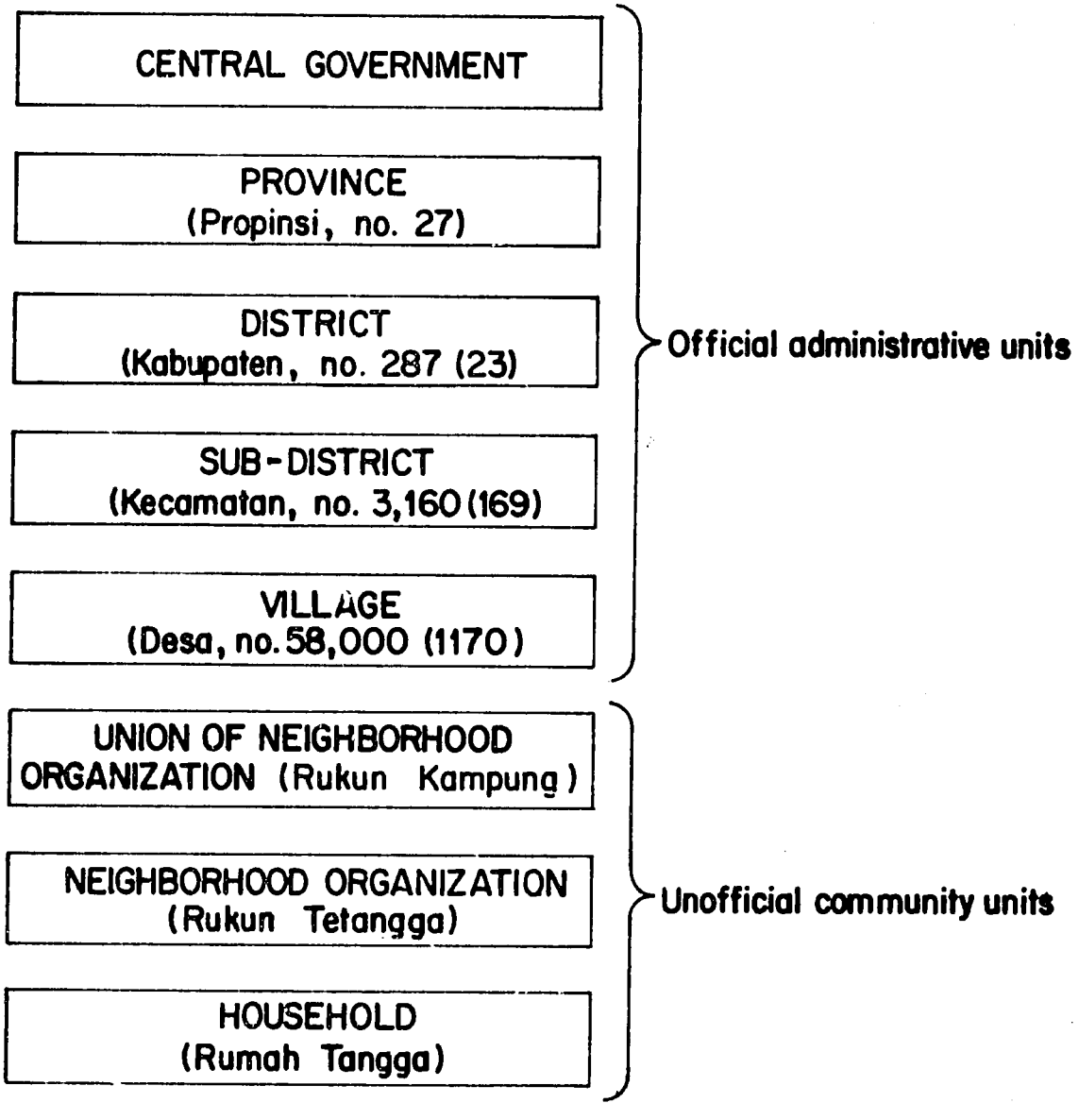

Fig. 1 The structure of administrative units in Indonesia.

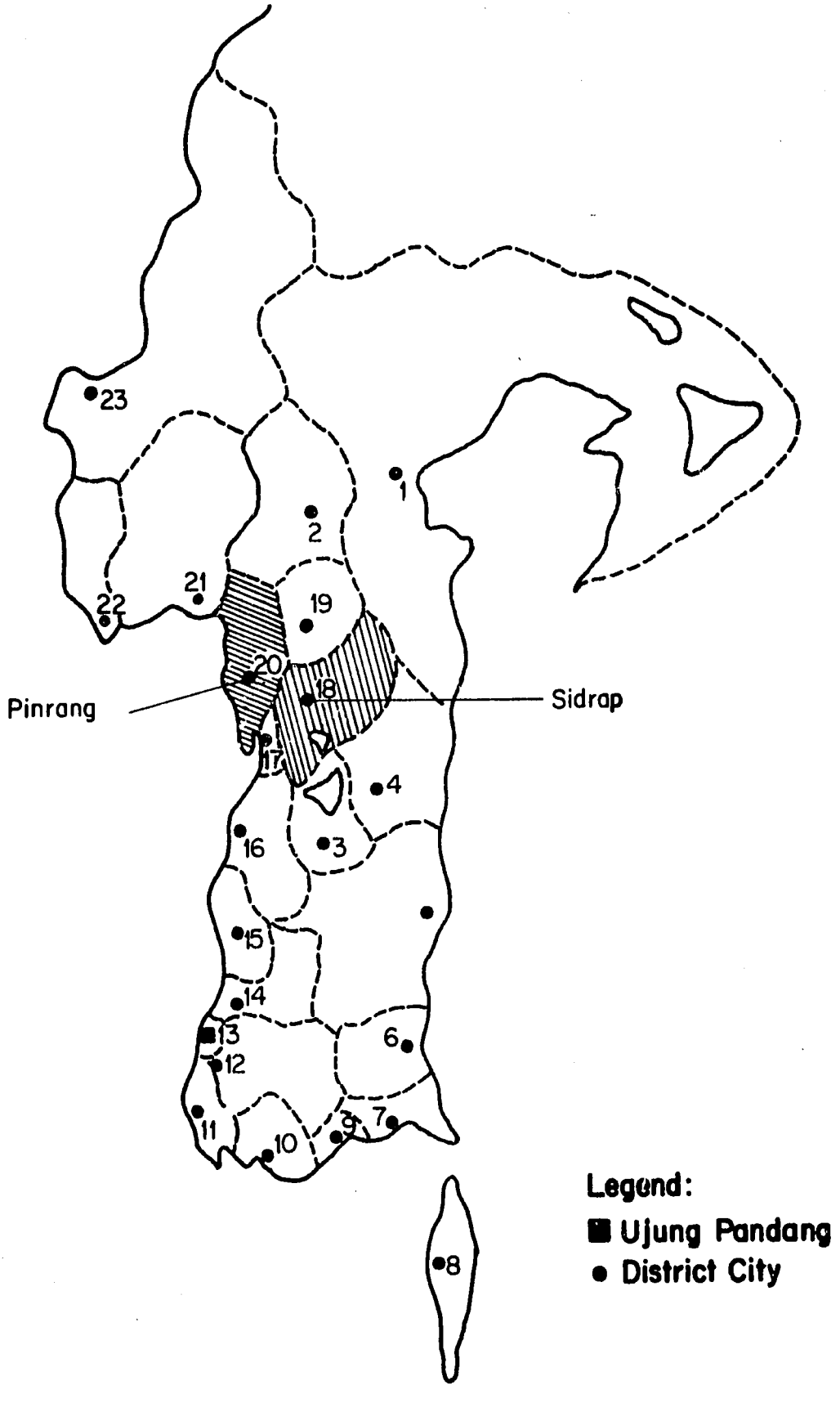

Fig. 2 MAP OF SOUTH SULAWESI.

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