TABLE C-2-15 FLOODED AND FLOOD DAMAGED AREA OF PADDY RICE
(AVERAGE OF LATEST FIVE YEARS, 1973/74 - 1977/78)

(unit : thousand acre)

Block	Sown Area	Flooded				Flood Damaged			
		1974/75		Ave. 5 Years		1974/75		Ave. 5 Years	
		Area	% of Sown Area	Area	% of Sown Area	Area	% of Sown Area	Area	% of Sown Area
Prome	258.9	21.9	8.5	7.5	2.9	5.2	2.0	1.5	0.1
Padaung	82.2	16.0	19.5	9.0	10.9	5.0	6.1	2.5	3.0
Myitmaka, Upper	310.7	40.9	13.2	13.3	4.3	6.1	2.0	1.5	0.1
Myitmaka, Middle	335.7	87.2	26.0	24.6	7.3	25.4	7.6	8.7	2.6
Capital	350.2	80.3	22.9	39.5	11.3	3.8	1.1	0.9	0.0
Bassein	423.3	139.5	33.0	105.8	25.0	62.3	14.7	16.9	4.0
Delta	441.9	142.4	32.2	44.4	10.0	72.8	16.5	17.2	3.9
Total	2,202.9	528.2	24.0	244.1	11.1	180.6	8.2	49.2	2.2

Source: AC

Generally, the farmers in the Survey Area have empirically selected the suited paddy cropping method out of the following three, depending upon the flooding conditions in their paddy fields.

Type of Paddy Cropping	Flooding Depth	Paddy Cropping Method
A	Below 60 cm deep	Planting with short-culmed varieites such as HYV.
B	60-120 cm deep	Deeper-flooded areas with long submergency, planted with local variety or improved local variety.
C	120-180 cm deep	Deepest-flooded areas with longer submergency, planted with flood resistant local variety in extensive farming due to severe flooding.

The present drainage condition at comparatively low level limits the areas available for practising Type A paddy cropping. Under the situation Type B method has been forced to be carried out in most of the Survey Area. The Type C paddy cropping is a critical method for paddy cultivation with yield low and unstable.

In the upper stream blocks such as the Prome block, considerable acreage of paddy field has suffered from drought, although the irrigation system are provided with to supplement the water for rainy season paddy cropping.

In the Myitmaka Upper block and the Myitmaka Middle block, the annual average yield had been about 12 percent higher than the average yield of the whole Survey Area 1970/71 through 1977/78. These blocks are said to be one of the most stable rice producers in Burma, most of their paddy fields extend in the farm-terrace complex. The main reason why the stable paddy production has been secured in these zones is that the paddy cropping in the blocks has been free from drought and flood damages. And the good soil conditions as secondary factor help the paddy cropping to be stable in the blocks.

c) Sown Area and Production of HYV

The HYV cropping acreage in the Survey Area occupies about 10 percent of the total area sown and its production occupies about 16 percent of the total production of paddy in the Survey Area in 1977/78. (Refer to Table C-2-16 - Table C-2-19). The HYV cropping acreage and its production in the whole country occupied about 16 percent and 21 percent, respectively, in 1977/78. It is learned from the above that the difusion rate of HYV in the Survey Area is comparatively low with the national level.

The major varieties of HYV sown in the Survey Area are Yakaw 2 (IR-5), which are cropped in about 74 percent of the HYV sowing acreage in the Survey Area, mutant of IR-5, IR-20, IR-24, and C4-63. Besides the above, Sein-ta-lay, Ngwetow and Schewe-ta-soke which have been bred in Burma are sown in some areas. Generally, however, there are a very few HYV varieties found suitable to the local conditions because the breeding in the HYV strains has been little advanced in the country. Furthermore, the government supply of these HYV seeds tends to be short in amount.

The blocks with high sowing rate of HYV are limited in the areas downstream from the Myitmaka Middle block. This has resulted from the HYV cropping conditions which require the paddy field having sufficient rainfall for its growing.

d) Farming Practices

In HYV paddy growing, usually 25-day to 35-day old seedlings are transplanted during a period from the beginning of July to the middle of August and the crops are harvested during a period from the beginning of November to the beginning of December after about four-month growing period.

The representative local strains sown in the Survey Area are Ngasein and Emata. The Emata, a major export-oriented strain,

TABLE C-2-16 PADDY SOWN AREA BY VARIETIES (1977/78)

(unit:1,000 ac)

Variety	Prome	Padaung	Myitmaka, Upper	Myitmaka, Middle	Capital	Bassein	Delta	Total
1 HYV								
(a) Yakyaw (1) (IR-8)	0.1	-	0.0	-	-	-	-	0.1
(b) Yakyaw (2) (IR-5)	4.3	0.5	15.3	45.5	20.5	31.2	44.1	161.4
(c) Ngwetoe	-	0.2	0.2	0.4	0.5	0.0	0.0	1.3
(d) C_4-63	0.2	0.3	0.0	0.0	0.3	1.8	0.4	3.0
(e) Schwe-wa-hnan (IR-20)	-	-	-	-	0.0	-	-	0.0
(f) Schwe-wa-yin (IR-24)	-	-	-	-	0.2	-	0.0	0.2
(g) Sein-ta-lay	2.9	0.2	0.2	0.6	1.2	0.1	0.0	5.2
(h) Sinapu	-	-	-	-	-	-	-	-
(i) Schwe-ta-soke	-	-	-	-	13.2	0.0	2.2	15.4
(j) Schwe-wa-tun (IR-5,M)	0.2	0.2	3.0	5.3	14.9	4.9	3.0	31.5
(k) Lone-thwai-schwewa	-	-	-	-	-	0.1	-	0.1
Sub-total (% of total)	7.7 (3.0)	0.9 (1.1)	18.7 (6.1)	51.8 (15.5)	50.8 (14.4)	38.1 (9.1)	49.7 (11.2)	217.7 (9.9)
2 Other Varieties	247.9	79.4	285.9	281.6	303.1	382.3	392.1	1,972.3
3 Total	255.6	80.3	304.6	333.4	353.9	420.4	441.8	2,190.0

Source: Land Record and Settlement Dept.

TABLE C-2-17 PADDY MATURED AREA BY VARIETIES (1977/78)

(unit:1,000 ac)

Block	Prome	Padaung	Myitmaka, Upper	Myitmaka, Middle	Capital	Bassein	Delta	Total
1 HYV								
(a) Yakyaw (1) (IR-8)	0.1	-	0.0	-	-	-	-	0.1
(b) Yakyaw (2) (IR-5)	2.7	0.4	14.7	44.9	20.3	26.8	41.9	151.7
(c) Ngwetoe	-	0.2	0.2	0.4	0.5	0.0	0.0	1.3
(d) C_4-63	0.2	0.2	0.0	0.0	0.3	1.0	0.3	2.0
(e) Schwe-wa-hnan (IR-20)	-	-	-	0.0	-	-	-	0.0
(f) Schwe-wa-yin (IR-24)	-	-	-	-	0.2	-	0.0	0.2
(g) Sein-ta-lay	2.3	0.2	0.2	0.6	1.2	0.1	0.0	4.6
(h) Sinapu	-	-	-	-	-	-	-	-
(i) Schwe-ta-soke	-	-	-	-	12.8	0.0	1.8	14.6
(j) Schwe-wa-tun (IR-5,M)	0.2	0.1	3.0	5.3	14.5	4.3	2.8	30.2
(k) Lone-thwai-schwewa	-	-	-	-	-	0.1	-	0.1
Sub-total	5.5	1.1	18.1	51.2	49.8	32.3	46.8	204.8
2 Other Varieties	219.1	76.1	274.7	269.4	296.0	363.3	387.7	1,886.3
3 Total	224.6	77.2	292.8	320.6	345.8	395.6	434.5	2,091.1

Source: Land Record and Settlement Dept.

TABLE C-2-18 PADDY YIELD BY VARIETIES (1977/78)

(unit:basket/ac)

Variety	Prome	Padaung	Myitmaka, Upper	Myitmaka, Middle	Capital	Bassein	Delta	Total
1 HYV								
(a) Yakyaw (1) (IR-8)	42.0	-	0.0	-	-	-	-	63.0
(b) Yakyaw (2) (IR-5)	34.9	56.3	74.0	66.3	66.2	67.8	70.6	67.9
(c) Ngwetoe	-	37.5	18.0	49.3	39.4	0.0	0.0	41.3
(d) C_4-63	38.5	57.0	0.0	0.0	61.3	93.0	61.0	75.4
(e) Schwe-wa-hnan (IR-20)	-	-	-	-	-	-	-	0.0
(f) Schwe-wa-yin (IR-24)	-	-	-	-	57.5	-	0.0	68.5
(g) Sein-ta-lay	53.9	50.0	73.0	60.3	61.8	67.0	0.0	57.9
(h) Sinapu	-	-	-	-	-	-	-	-
(i) Schwe-ta-soke	-	-	-	-	71.9	0.0	81.7	73.3
(j) Schwe-wa-tun (IR-5,M)	43.0	62.0	73.5	62.0	75.7	64.5	68.6	70.6
(k) Lone-thwai-schwewa	-	-	-	-	-	57.0	-	57.0
Sub-total	43.4	52.4	73.4	65.7	70.0	68.2	70.9	67.2
2 Other Varieties	39.4	37.0	44.3	44.8	37.2	37.5	40.6	40.3
3 Total	39.5	37.2	46.1	48.1	41.9	40.0	43.9	43.1

Source: Land Record and Settlement Dept.

TABLE C-2-19 PADDY PRODUCTION BY VARIETIES (1977/78)

(unit:1,000 basket)

Variety	Prome	Padaung	Myitmaka, Upper	Myitmaka, Middle	Capital	Bassein	Delta	Total
1 HYV								
(a) Yakyaw (1) (IR-8)	4.2	-	2.1	-	-	-	-	6.3
(b) Yakyaw (2) (IR-5)	94.1	22.5	1,087.2	2,979.1	1,344.1	1,816.5	2,957.9	10,301.4
(c) Ngwetoe	-	7.5	3.6	19.7	19.7	1.7	1.5	53.7
(d) C_4-63	7.7	11.4	0.1	1.8	18.4	93.0	18.3	150.7
(e) Schwe-wa-hnan (IR-20)	-	-	-	-	2.5	-	-	2.5
(f) Schwe-wa-yin (IR-24)	-	0.0	-	-	11.5	-	2.2	13.7
(g) Sein-ta-lay	123.9	10.0	14.6	36.2	74.1	6.7	1.0	266.5
(h) Sinapu	-	-	-	-	-	-	-	-
(i) Schwe-ta-soke	-	-	-	-	920.2	2.5	147.0	1,069.7
(j) Schwe-wa-tun (IR-5,M)	8.6	6.2	220.4	328.6	1,097.7	277.3	192.1	2,130.9
(k) Lone-thwai-schwewa	-	-	-	-	-	5.7	-	5.7
Sub-total (% of total)	238.5 (2.7)	57.6 (2.0)	1,328.0 (9.8)	3,365.4 (21.8)	3,488.2 (24.1)	2,203.4 (13.9)	3,320.0 (17.4)	14,001.1 (15.6)
2 Other Varieties	8,634.8	2,817.7	12,158.8	12,059.8	10,998.4	13,616.9	15,736.4	76,022.8
3 Total	8,873.3	2,875.3	13,486.8	15,425.2	14,486.6	15,820.3	19,056.4	90,023.9

Source: Land Record and Settlement Dept.

has been sown mainly in the left bank areas upstream from Gyobingauk along the Irrawaddy River, and the Ngasein is sown commonly in the areas other than the specified above. Both the Ngasein and the Emata belong to Kauklat type which requires a growing period ranging from 150 to 170 days.

In the Survey Area, most of the farmers have adopted the transplanting method and the ratio of transplanting area and broadcasting area is 93:7. In the Capital block and the Delta block, the ratio of broadcasting area becomes 29 and 7, respectively.

In these two blocks, there are considerably wide deep-flooding areas extending. In the deep flooding areas, inability to carry out proper farming practices has compelled the farmers to adopt the broadcasting method with flood-resistant varieties in the fields with deep and long-lasting floodings. Some problems, however, exist in the paddy cropping by this method because the plants growing from broadcasting are weak to flood in their early stage of growing and some red kernels of indigenous plants may be easily mixed in the broadcasted paddy.

In growing local variety paddy, usually the 35-day to 40-day older seedlings are transplanted in a period from the beginning of July to the end of August, and when transplanted, the plant leaves growing exceedingly long are cut off at their tops and the seedlings are planted rather deeply.

The older seedlings and deep-planting reduce the number of tiller buds to result in low yield, but the farmers have to practise the paddy cropping by this method, because the ill-drained paddy fields with frequent flooding are prevailing and possibly much rainfall should be stored in these rainfed fields by providing high ridges. Furthermore, the deep planting would be unavoidable to prevent the transplanted paddy plants from floating up in flooding

and from dying in shortage of water. The harvest season of these local varieties, depending upon number of growing days for each variety, commonly lasts from the beginning of Novemver to the end of January.

In considering the fact that the plants growing from broadcasting are weak to floodings in their early stage of growing, the broadcasting would be halted when the flooding starts. However, in the early part of rainy season, the areas where the braodcasting paddy can be sown are very limited in acreage because the land soaking and other land preparation works will be still under way.

In the areas with irrigation facilities, mainly around the Prome block, irrigation can be made only for supplementing the water for rainy season paddy cropping in depending on the unstable natural discharge of the small rivers. Under the situation, there seems to be the similar conditions to cropping in the rainfed fields in the other downstream blocks in taking into account the fact that some of these fields often have suffered from low yield or sometimes no harvest.

Therefore, the paddy cropping, whether irrigated or not, in the Survey Area can be said to largely depend upon the rainfall and the cropping season is liable to shifting as the rainfall pattern changes year by year. In the upstream blocks such as the Prome block, shortage in rainfall sometimes restrains the plants to full ripening to cause the low yield.

Generally speaking, the local varieties should be transplanted by the middle of July, at the latest, in the whole Lower Burma in order to increase the yield. For instance, however, in 1979/80 the amount of rainfall up to August was so small that transplanting works were finished only for an extremely limited areas by that time. Furthermore, yearly shifting cropping season has prevented paddy cropping from planned farming practices and management, and kept it on the extensive basis as well as on the case-by-case basis.

Recently, the Government has tried to difuse the straight-row transplanting of paddy. In the Whole Towhship Paddy Production Development Projects the straight-row transplanting is one of the essential factor to carry out paddy cropping. In this case, the planting density is determined by 8" x 6" for HYV, 8" x 7" for LIV and 8" x 8" for local varieties.

In most cases, the extensive farming practices and management have been carried out and only a few farmers practice weed control at the time of replanting of seedlings.

Reaping is made by saw-teeth sickle in cutting stems about 20-40 cm above ground, and the harvested panicles are sun-dried for a few days on the stubble in the fields. Threshing is commonly carried out by cattle-treading in the fields where reaping is finished. After wind-winnowing, the paddy is sun-dried on the ground.

2) Jute

Almost 98 percent of the jute produce in Burma are from the Irrawaddy and the Pegu Divisions. The Survey Area, one of the major jute producing areas in Burma, produces about 41 percent of the national total production. (Refer to Table C-2-20)

The jute growing includes the pre-monsoon cropping and the monsoon cropping, and the pre-monsoon cropping covers 44 percent and the monsoon cropping covers the remaining 56 percent of the total cropping acreage of 55 thousand acres in the Survey Area. (Refer to Table C-2-23).

In the Survey Area, about 95 percent of the total jute cropping acreage concentrates in the downstream block of the Myitmaka Upper block, although jute is cropped more or less in every block.

TABLE C-2-20 CROP PRODUCTION DATA, JUTE (PRE-MONSOON + MONSOON)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	1.2	4.2	4.1	1.7	1.4	0.9	1.0	1.9	2.1
	2. Padaung	4.6	7.7	9.3	5.9	3.1	2.1	1.6	2.5	4.6
	3. Myitmaka, Upper	15.4	28.7	37.6	32.7	25.6	20.9	19.2	24.0	25.5
	4. Myitmaka, Middle	1.0	3.6	6.6	7.5	3.0	1.7	2.7	3.5	3.7
	5. Capital	2.9	5.9	8.3	8.4	3.6	1.1	3.0	4.7	4.7
	6. Bassein	2.7	8.8	11.4	13.4	4.7	5.7	5.9	5.9	7.3
	7. Delta	13.7	26.6	39.1	44.0	25.2	23.6	21.6	27.5	27.7
	Total	41.5	85.5	116.4	113.6	66.6	56.0	55.0	70.0	75.6
	(% of Total Union)	(36.1)	(37.8)	(40.4)	(39.0)	(40.1)	(37.8)	(40.4)	(39.8)	(38.9)
	B. Total Union	115	226	288	291	166	148	136	176	193.3
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.8	2.7	3.6	1.6	0.6	0.8	0.6	0.9	1.5
	2. Padaung	4.5	7.2	8.9	5.2	1.8	1.6	1.3	2.1	4.1
	3. Myitmaka, Upper	13.7	26.6	36.6	30.6	7.1	17.9	13.3	20.2	20.8
	4. Myitmaka, Middle	0.4	2.3	6.0	7.0	1.0	1.1	1.3	1.8	2.6
	5. Capital	2.7	5.7	8.0	7.8	1.6	0.7	2.5	3.2	4.0
	6. Bassein	2.3	6.9	9.6	10.9	3.5	4.5	3.4	5.1	5.8
	7. Delta	12.1	24.8	36.9	34.5	19.0	18.1	14.5	24.6	23.1
	Total	36.5	76.2	109.6	97.6	34.6	44.7	36.9	57.9	61.8

(Cont'd)

TABLE C-2-20 CROP PRODUCTION DATA, JUTE (PRE-MONSOON + MONSOON)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (viss/ac)	A. M/P Area by Block									
	1. Prome	116.3	101.0	159.4	175.4	87.1	189.1	168.3	175.8	146.6
	2. Padaung	171.3	157.9	165.8	141.7	87.4	139.7	218.6	234.8	164.7
	3. Myitmaka, Upper	173.8	211.2	229.2	226.3	47.5	216.3	240.8	290.7	204.5
	4. Myitmaka, Middle	57.9	120.3	187.5	223.5	65.8	133.9	277.0	292.1	169.8
	5. Capital	138.6	133.8	177.5	145.9	84.1	113.4	195.4	207.2	149.5
	6. Bassein	145.0	157.2	163.7	168.4	136.2	179.6	172.4	207.3	166.2
	7. Delta	170.1	203.9	211.1	171.7	167.8	174.2	214.6	226.0	192.4
	Total	170.4	184.0	203.1	187.0	164.8	187.0	220.4	247.5	195.5
	(% of Total Union)	(96.8)	(89.9)	(95.4)	(87.5)	(77.6)	(85.3)	(107.7)	(103.9)	(93.0)
	B. Total Union	176.0	204.6	212.9	213.8	212.3	219.1	104.6	238.2	210.2
4. Production (1,000 viss)	A. M/P Area by Block									
	1. Prome	139.6	424.3	653.6	298.1	122.0	170.2	101.0	158.2	258.4
	2. Padaung	788.1	1,216.2	1,542.4	835.9	271.0	293.3	284.2	493.1	715.5
	3. Myitmaka, Upper	2,380.5	6,060.4	8,616.3	7,399.4	1,216.5	4,520.5	3,203.3	5,872.7	4,908.7
	4. Myitmaka, Middle	57.9	433.0	1,237.7	1,676.6	197.4	227.6	360.1	525.8	589.5
	5. Capital	402.0	789.2	1,473.1	1,225.3	302.7	124.7	488.4	663.0	683.6
	6. Bassein	391.5	1,383.1	1,866.0	2,256.7	640.3	1,023.5	586.3	1,057.1	1,150.6
	7. Delta	2,058.8	5,422.5	8,254.4	7,553.6	4,229.3	4,110.9	3,111.0	5,560.3	5,037.6
	Total	6,218.4	15,728.7	23,643.5	21,245.6	6,979.2	10,470.7	8,134.3	14,330.2	13,343.8
	(% of Total Union)	(36.3)	(39.5)	(43.9)	(44.5)	(29.2)	(46.2)	(49.2)	(42.5)	(41.4)
	B. Total Union	17,146	39,804	53,889	47,765	23,882	22,658	16,534	33,680	31,919.8

Note : One viss = 3.6 lbs. Source : LRSD

TABLE C-2-21 CROP PRODUCTION DATA, PRE-MONSOON JUTE

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	-	-	0.2	0.0	0.0	0.0	0.0	-	0.0
	2. Padaung	0.0	0.1	0.1	0.2	0.1	0.0	0.1	0.0	0.1
	3. Myitmaka, Upper	0.1	0.6	1.2	1.1	0.5	0.3	0.4	0.5	0.6
	4. Myitmaka, Middle	0.1	0.5	2.6	3.7	1.4	0.9	0.8	1.3	1.4
	5. Capital	2.5	5.3	7.4	7.3	2.7	0.9	2.3	3.8	4.0
	6. Bassein	1.6	5.0	7.5	10.9	3.7	4.5	3.5	4.3	5.1
	7. Delta	10.1	21.1	31.9	37.4	21.2	21.8	16.9	25.0	23.2
	Total	14.4	32.6	50.9	60.6	29.6	28.4	24.0	34.9	34.4
2. Natured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0
	2. Padaung	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0
	3. Myitmaka, Upper	0.1	0.7	1.2	1.0	0.4	0.1	0.4	0.5	0.6
	4. Myitmaka, Middle	0.1	0.5	2.5	3.6	0.9	0.7	0.5	0.8	1.2
	5. Capital	2.4	5.2	7.3	7.0	1.5	0.6	2.0	3.0	3.6
	6. Bassein	1.5	4.7	6.9	9.1	3.2	4.0	2.1	3.8	4.4
	7. Delta	9.5	20.5	31.0	29.3	16.6	16.8	12.0	22.3	19.8
	Total	13.6	31.6	49.1	50.1	22.6	22.2	17.1	30.4	29.6

(cont'd)

CROP PRODUCTION DATA, PRE-MONSOON JUTE

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (viss/ac)	A. M/P Area by Block									
	1. Prome	-	-	30.3	-	-	-	-	-	30.3
	2. Padaung	-	-	-	228.0	-	-	106.0	-	167.0
	3. Myitmaka, Upper	337.0	311.7	340.8	286.6	263.3	-	323.3	387.0	321.4
	4. Myitmaka, Middle	189.0	130.4	279.7	288.2	209.8	228.0	302.2	342.1	246.2
	5. Capital	154.9	141.7	192.5	163.6	196.8	189.2	210.5	210.0	182.4
	6. Bassein	178.1	230.9	216.0	215.5	190.3	234.3	191.5	222.0	209.8
	7. Delta	178.5	230.3	233.3	228.8	230.3	231.8	225.0	232.8	223.9
	Total	175.8	216.5	230.0	222.8	222.6	233.6	223.2	234.9	219.9
4. Production (1,000 viss)	A. M/P Area by Block									
	1. Prome	-	-	30.3	1.8	7.2	2.5	1.8	-	8.7
	2. Padaung	3.8	14.9	28.0	22.8	2.3	1.0	10.6	7.6	11.4
	3. Myitmaka, Upper	33.7	218.2	409.0	286.6	105.3	78.5	129.3	193.5	181.8
	4. Myitmaka, Middle	18.9	65.2	699.2	1,037.5	188.8	159.6	151.1	273.7	324.3
	5. Capital	371.8	736.6	1,404.9	1,145.1	295.2	113.5	421.0	629.9	639.8
	6. Bassein	267.2	1,085.2	1,490.4	1,961.1	608.9	937.3	402.1	843.7	949.5
	7. Delta	1,695.4	4,721.9	7,231.4	6,705.2	3,823.1	3,894.6	2,700.0	5,191.6	4,495.4
	Total	2,390.8	6,842.0	11,293.2	11,160.1	5,030.8	5,187.0	3,815.9	7,140.0	6,607.5

Note: One viss = 3.6 lbs. Source: LRSD

TABLE C-2-22 CROP PRODUCTION DATA, MONSOON JUTE

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1876/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	1.2	4.2	3.9	1.7	1.4	0.9	1.0	1.9	2.0
	2. Padaung	4.6	7.6	9.2	5.7	3.0	2.1	1.5	2.5	4.5
	3. Myitmaka, Upper	15.3	28.1	36.4	31.6	25.1	20.6	18.8	23.5	24.9
	4. Myitmaka, Middle	0.9	3.1	4.0	3.8	1.6	0.8	1.9	2.2	2.3
	5. Capital	0.4	0.6	0.9	1.1	0.9	0.2	0.7	0.9	0.7
	6. Bassein	1.1	3.8	3.9	2.5	1.0	1.2	2.4	1.6	2.2
	7. Delta	3.6	5.5	7.2	6.6	4.0	1.8	4.7	2.5	4.5
	Total	27.1	52.9	65.5	53.0	37.0	27.6	31.0	35.1	41.2
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.8	2.7	3.5	1.6	0.6	0.8	0.6	0.9	1.4
	2. Padaung	4.5	7.2	8.8	5.1	1.8	1.6	1.2	2.1	4.0
	3. Myitmaka, Upper	13.6	25.9	35.4	29.6	6.7	17.8	12.9	19.7	20.2
	4. Myitmaka, Middle	0.3	1.8	3.5	3.4	0.1	0.4	0.8	1.0	1.4
	5. Capital	0.3	0.5	0 7	0.8	0.1	0.1	0.5	0.2	0.4
	6. Bassein	0.8	2.2	2.7	1.8	0.3	0.5	1.3	1.3	1.4
	7. Delta	2.6	4.3	5.9	5.2	2.4	1.3	2.5	2.3	3.3
	Total	22.9	44.6	60.5	47.5	12.0	22.5	19.8	27.5	32.2

(Cont'd)

CROP PRODUCTION DATA, MONSOON JUTE

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (viss/ac)	A. M/P Area by Block									
	1. Prome	174.5	157.1	178.1	185.2	191.3	209.6	165.3	175.8	179.6
	2. Padaung	174.2	166.8	172.1	159.4	149.3	182.7	228.0	231.2	183.0
	3. Myitmaka, Upper	172.6	225.6	231.8	240.3	165.9	249.6	238.3	288.3	226.6
	4. Myitmaka, Middle	130.0	204.3	153.9	188.0	86.0	170.0	261.3	252.1	180.7
	5. Capital	100.7	105.2	97.4	100.3	75.0	112.0	134.8	165.5	111.4
	6. Bassein	155.4	135.4	139.1	164.2	104.7	172.4	141.7	164.1	147.1
	7. Delta	139.8	162.9	173.4	163.2	169.3	166.4	164.4	160.3	162.5
	Total	167.1	199.3	204.1	212.3	162.4	234.8	218.1	261.5	207.5
4. Production (1,000 viss)	A. M/P Area by Block									
	1. Prome	139.6	424.3	623.3	296.3	114.8	167.7	99.2	158.2	252.9
	2. Padaung	784.3	1,201.3	1,514.4	813.1	268.7	292.3	273.6	485.5	704.2
	3. Myitmaka, Upper	2,346.8	5,842.2	8,207.3	7,112.8	1,111.2	4,442.0	3,074.0	5,679.2	4,726.9
	4. Myitmaka, Middle	39.0	367.8	538.5	639.1	8.6	68.0	209.0	252.1	265.3
	5. Capital	30.2	52.6	68.2	80.2	7.5	11.2	67.4	33.1	43.8
	6. Bassein	124.3	297.9	375.6	295.6	31.4	86.2	184.2	213.4	201.1
	7. Delta	363.4	700.6	1,023.0	848.4	406.2	216.3	411.0	368.7	542.2
	Total	3,827.6	8,886.7	12,350.3	10,085.5	1,948.4	5,283.7	4,318.4	7,190.2	6,736.4

Note: One viss = 3.6 lbs.

Source: LRSD

TABLE C-2-23 SOWN AREA, DESTROYED AREA AND YIELD OF JUTE, PRE-MONSOON AND MONSOON CROPPINGS

Year	Sown Area (%)		Destroyed Area (%)		Yield (viss/acre)		
	Pre-monsoon	Monsoon	Pre-monsoon	Monsoon	Pre-monsoon (1)	Monsoon (2)	(1)/(2)x100
1970/71	34.7	65.3	5.6	15.4	175.8	167.1	105.2
1971/72	38.1	61.9	3.0	15.7	216.5	199.3	108.6
1972/73	43.7	56.3	3.5	7.6	230.0	204.1	112.7
1973/74	53.3	46.7	17.3	10.4	222.8	212.3	104.9
1974/75	44.4	55.6	23.6	67.6	222.6	162.4	137.1
1975/76	50.7	49.3	21.8	18.5	233.6	234.8	99.5
1976/77	43.6	56.4	28.8	36.1	223.2	218.1	102.3
1977/78	50.0	50.0	12.9	21.7	234.9	261.5	89.8
Average	44.8	55.2	14.6	24.1	219.9	207.5	106.0

Source: See Table C-2-21 and C-2-22.

Among the downstream blocks, the Myitmaka upper, the Delta and the Bassein blocks are the major jute producers in the Survey Area. The jute growing requires those conditions to provide high temperature and humidity in the areas free from cyclon with fertile alluvial sandy soils as well as swampy lands for retting the harvested plants to take out fibers.

The Government, designating the jute as one of the production increase crops for export and domestic consumption, has supplied seeds, fertilizers as well as preferentially provided services for lending small-size pump for irrigation and rental operation of tractors, and also compulsorily purchased the products.

For the pre-monsoon jute growing, land preparation and sowing are carried out in the fields irrigated by small-size pump from streams and creeks in February to March and the plants are harvested in July to August. The Corchorus Capsulutis type of jute, humidity and flood-resistant variety, has been sown in the pre-monsoon. The irrigation is the essential factor for growing the pre-monsoon jute. Since the pre-monsoon jute plants grow to some extent before the heavy rainfall in the rainy season comes, the plants can stand against heavy rainfall or flooding and result in bringing about considerably high yield with little damage.

For the monsoon jute growing, land preparation and sowing are carried out in April-May when the rainfall comes. The type of plant sown is Corchorus Olitorius. The plants matured are harvested in August to September.

It is recommended to convert the monsoon cropping to the pre-monsoon cropping if irrigation available, because the monsoon cropping yield is low with no harvest areas to some extent and its production is unstable in spite that the growing period is about 40 days, shorter than that of the pre-monsoon cropping. No harvest in jute growing seems to result from the facts that after jute germination

weeds grow thickly in the fields under heavy rainfall, the jute plants have little resistance to heavy rainfall during their growing period and the plant death rate by flooding or excessive water in the fields is considerably high. These unfavorable phenomena take place more often in the monsoon jute growing than in the pre-monsoon jute growing.(Refer to Appendix C-2-2)

3) Groundnut

The main groundnut growing area in Burma is the Upper Burma, which occupies more than 70 percent of the national total cropping acreage of the groundnut. The Survey Area produces 18.6 percent of the national total production of groundnut with 36 percent higher yield than the national average, although the acreage sown with groundnut in the Project Area occupies only 12.8 percent of the national total in 1977/78. (Refer to Table C-2-24).

The groundnut as well as the sesame is processed to secure the self-sufficiency of food oil at the local level, and every block in the Survey Area crops the groundnut in average five percent of its total acreage sown. In the past eight years since 1970/71, the acreage sown with groundnut and its yield had shown increasing tendency, though no so much.

There are the rainy season cropping and the winter season cropping in the groundnut growing. The rainy season cropping occupies only about 10 percent of the total acreage sown with groundnut and most of all groundnut is cropped in the winter season. The rainy season groundnut is shown in Ya-lands during May through July and harvested during September through November. But its yield reaches only 60 percent of that of the winter cropping due to much rainfall. (Refer to Table C-2-25 and Table C-2-26).

The winter season groundnut in Kaing-lands is sown during October through December and harvested during February through April.

TABLE C-2-24 CROP PRODUCTION DATA, GROUNDNUT (RAINY + WINTER)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	15.8	14.9	13.1	16.6	17.2	15.5	16.0	19.0	16.0
	2. Padaung	9.9	10.5	10.7	10.9	11.8	11.8	10.0	12.0	11.0
	3. Myitmaka, Upper	21.2	20.3	20.2	21.5	20.5	15.6	12.2	22.8	19.3
	4. Myitmaka, Middle	28.6	29.5	26.1	36.1	36.9	23.7	21.5	44.0	30.8
	5. Capital	7.4	7.3	6.6	7.9	7.2	7.4	6.6	8.8	7.4
	6. Bassein	52.5	48.4	40.2	45.4	48.0	40.1	41.4	45.0	45.1
	7. Delta	34.7	34.2	26.6	29.8	31.0	32.3	29.4	38.5	32.1
	Total	170.1	165.1	143.5	168.2	172.6	146.4	137.1	190.1	161.1
	(% of Total Union)	(9.8)	(9.9)	(9.2)	(10.3)	(10.4)	(8.6)	(9.1)	(12.8)	(10.0)
	B. Total Union	1,735	1,674	1,563	1,638	1,666	1,696	1,507	1,481	1,620
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	15.6	14.8	12.9	16.4	16.5	15.2	15.5	18.9	15.7
	2. Padaung	9.9	10.5	10.7	10.8	11.6	11.7	9.9	11.8	10.9
	3. Myitmaka, Upper	21.0	20.2	20.1	21.3	20.2	14.3	11.6	22.7	18.9
	4. Myitmaka, Middle	28.5	29.5	26.1	36.1	36.7	23.5	21.5	43.9	30.7
	5. Capital	7.4	7.3	6.6	7.8	7.1	7.3	6.5	8.6	7.3
	6. Bassein	52.5	48.4	40.2	45.4	47.9	40.1	41.3	44.2	45.0
	7. Delta	34.7	34.2	26.5	22.5	31.0	32.3	29.4	37.8	31.1
	Total	169.6	164.9	143.1	160.3	171.0	144.4	135.7	187.9	159.6

(cont'd)

CROP PRODUCTION DATA, GROUNDNUT (RAINY + WINTER)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (basket/ac)	A. M/P Area by Block									
	1. Prome	35.1	34.7	34.0	31.3	29.9	26.7	35.3	32.6	32.5
	2. Padaung	39.6	42.0	37.3	39.9	40.4	26.8	44.1	40.4	38.8
	3. Myitmaka, Upper	48.8	47.8	44.4	42.1	43.7	25.9	53.7	51.2	44.7
	4. Myitmaka, Middle	41.3	37.1	36.1	31.9	34.8	31.6	45.1	50.3	38.5
	5. Capital	33.9	32.7	32.5	28.5	33.6	31.0	34.1	35.0	32.7
	6. Bassein	35.0	36.2	34.0	34.2	33.4	25.2	35.3	34.6	33.5
	7. Delta	32.9	31.8	28.9	30.7	30.0	26.2	38.3	32.3	31.4
	Total	37.7	36.9	35.1	33.9	34.4	27.1	39.7	40.0	35.6
	(% of Total Union)	(138.1)	(141.9)	(156.0)	(147.4)	(136.5)	(122.1)	(150.4)	(136.1)	(141.1)
	B. Total Union	27.3	26.0	22.5	23.0	25.2	22.2	26.4	29.4	25.3
4. Production (1,000 basket)	A. M/P Area by Block									
	1. Prome	547.6	516.9	445.4	519.6	514.1	413.8	546.8	616.9	515.1
	2. Padaung	391.9	440.5	399.0	434.7	476.4	316.3	436.8	476.2	421.5
	3. Myitmaka, Upper	1,035.5	970.9	896.2	905.8	895.7	403.9	623.3	1,162.1	861.7
	4. Myitmaka, Middle	1,180.1	1,095.2	942.5	1,152.9	1,284.3	749.5	969.7	2,209.9	1,198.0
	5. Capital	250.5	238.8	214.7	225.5	241.7	229.3	221.5	300.9	215.4
	6. Bassein	1,838.1	1,750.9	1,368.3	1,551.3	1,601.4	1,009.7	1,458.9	1,529.3	1,513.5
	7. Delta	1,142.1	1,086.4	768.5	914.7	931.5	845.9	1,125.7	1,220.2	1,004.4
	Total	6,385.8	6,099.6	5,034.6	5,704.5	5,945.1	3,968.4	5,382.7	7,515.5	5,754.5
	(% of Total Union)	(13.9)	(14.5)	(15.1)	(16.0)	(14.7)	(11.1)	(14.7)	(18.6)	(14.8)
	B. Total Union	45,944	42,152	33,245	35,714	40,476	35,626	36,684	40,300	38,767.6

Note: One basket = 25 lbs. Source: LRSD

TABLE C-2-25 CROP PRODUCTION DATA, RAINY GROUNDNUT

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	4.1	4.8	3.0	4.3	4.7	4.5	4.9	6.5	4.6
	2. Padaung	1.5	1.3	1.4	1.3	1.3	1.4	1.2	1.5	1.4
	3. Myitmaka, Upper	2.3	1.5	1.1	1.8	1.6	1.6	1.3	1.6	1.6
	4. Myitmaka, Middle	1.7	0.9	0.8	2.2	1.4	0.6	1.3	2.1	1.4
	5. Capital	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.5	0.1
	6. Bassein	7.2	5.9	5.3	5.7	5.6	5.6	4.7	4.1	5.5
	7. Delta	0.6	0.1	0.0	0.1	0.0	0.0	0.1	0.2	0.1
	Total	17.5	14.6	11.6	15.5	14.6	13.7	13.6	16.5	14.7
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	4.0	4.7	2.9	4.1	4.0	4.5	4.5	6.5	4.4
	2. Padaung	1.5	1.3	1.4	1.3	1.1	1.4	1.1	1.5	1.3
	3. Myitmaka, Upper	2.1	1.4	1.1	1.6	1.3	1.6	1.1	1.6	1.5
	4. Myitmaka, Middle	1.7	0.9	0.8	2.3	1.2	0.4	1.3	2.1	1.3
	5. Capital	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.5	0.1
	6. Bassein	7.2	5.9	5.3	5.7	5.5	5.6	4.6	4.1	5.5
	7. Delta	0.6	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1
	Total	17.2	14.4	11.5	15.1	13.1	13.5	12.8	16.4	14.3

(cont'd)

CROP PRODUCTION DATA, RAINY GROUNDNUT

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (basket/ac)	A. M/P Area By Block									
	1. Prome	18.4	19.2	22.6	21.9	22.5	20.3	21.9	27.3	21.8
	2. Padaung	22.2	22.7	21.5	20.5	21.1	19.9	18.1	24.0	21.3
	3. Myitmaka, Upper	23.2	27.5	27.4	30.0	23.8	25.3	24.9	28.6	26.3
	4. Myitmaka, Middle	25.4	20.7	27.9	27.9	20.9	22.3	22.6	24.7	24.1
	5. Capital	18.0	13.0	-	-	-	-	25.0	19.8	19.0
	6. Bassein	21.3	22.6	21.9	21.9	21.3	22.1	21.6	24.4	22.1
	7. Delta	33.8	22.0	-	18.0	-	-	13.0	29.0	23.2
	Total	21.8	21.8	23.0	23.6	21.3	21.7	21.7	25.8	22.6
4. Production (1,000 basket)	A. M/P Area by Block									
	1. Prome	73.4	90.2	65.4	90.1	81.9	91.4	98.4	177.4	96.0
	2. Padaung	33.3	29.5	30.1	26.6	23.2	27.8	19.9	36.0	28.3
	3. Myitmaka, Upper	48.8	38.5	30.1	48.0	31.0	40.5	27.4	45.8	38.8
	4. Myitmaka, Middle	43.1	18.6	22.3	64.1	25.1	8.9	29.4	51.9	32.9
	5. Capital	1.8	1.3	0.2	0.7	0.5	0.4	2.5	9.9	2.2
	6. Bassein	153.5	133.3	116.1	124.6	117.2	124.0	99.2	100.0	121.0
	7. Delta	20.3	2.2	0.6	1.8	0.4	0.6	1.3	2.9	3.8
	Total	374.2	313.6	264.8	355.9	279.3	293.6	278.1	423.9	322.9

Note: One basket = 25 lbs. Source: LRSD

TABLE C-2-26 CROP PRODUCTION DATA, WINTER GROUNDNUT

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	11.7	10.1	10.1	12.3	12.5	11.0	11.1	12.5	11.4
	2. Padaung	8.4	9.2	9.3	9.6	10.5	10.4	8.8	10.5	9.6
	3. Myitmaka, Upper	18.9	18.8	19.1	19.7	18.9	14.0	10.9	21.2	17.7
	4. Myitmaka, Middle	26.9	28.6	25.3	33.9	35.5	23.1	20.2	41.9	29.4
	5. Capital	7.3	7.2	6.6	7.8	7.2	7.4	6.5	8.3	7.3
	6. Bassein	45.3	42.5	34.9	39.7	42.4	34.5	36.7	40.9	39.6
	7. Delta	34.1	34.1	26.6	29.7	31.0	32.3	29.3	38.3	31.9
	Total	152.6	150.5	131.9	152.7	158.0	132.7	123.5	173.6	146.9
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	11.6	10.1	10.0	12.3	12.5	10.7	11.0	12.4	11.3
	2. Padaung	8.4	9.2	9.3	9.5	10.5	10.3	8.8	10.3	9.5
	3. Myitmaka, Upper	18.9	18.8	19.0	19.7	18.9	12.7	10.5	21.1	17.5
	4. Myitmaka, Middle	26.8	28.6	25.3	33.8	35.5	23.1	20.2	41.8	29.4
	5. Capital	7.3	7.2	6.6	7.8	7.1	7.3	6.4	8.1	7.2
	6. Bassein	45.3	42.5	34.9	39.7	42.4	34.5	36.7	40.1	39.5
	7. Delta	34.1	34.1	26.5	22.4	31.0	32.3	29.3	37.7	30.9
	Total	152.4	150.5	131.6	145.2	157.9	130.9	122.9	171.5	145.4

(cont'd)

CROP PRODUCTION DATA, WINTER GROUNDNUT

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (basket/ac)	A. M/P Area by Block									
	1. Prome	40.9	42.2	38.0	34.9	34.6	30.1	40.8	35.4	37.1
	2. Padaung	42.7	44.7	39.7	43.0	43.2	28.0	47.4	42.7	41.4
	3. Myitmaka, Upper	52.2	49.6	45.6	43.5	45.8	28.6	56.8	52.9	46.9
	4. Myitmaka, Middle	42.4	37.6	36.4	32.2	35.5	32.1	46.5	51.6	39.3
	5. Capital	34.1	33.0	32.5	28.8	34.0	31.4	34.2	35.9	33.0
	6. Bassein	37.2	38.1	35.9	35.9	35.0	25.7	37.0	35.6	35.1
	7. Delta	32.9	31.8	29.0	40.8	30.0	26.2	38.4	32.2	32.7
	Total	39.4	38.4	36.2	36.8	35.9	28.1	41.5	41.4	37.2
4. Production (1,000 basket)	A. M/P Area by Block									
	1. Prome	474.2	426.7	380.0	429.5	432.2	322.4	448.4	439.5	419.1
	2. Padaung	358.6	411.0	368.9	408.1	453.2	288.5	416.9	440.2	393.2
	3. Myitmaka, Upper	986.7	932.4	866.1	857.8	864.7	363.4	595.9	1,116.3	822.9
	4. Myitmaka, Middle	1,137.0	1,076.6	920.2	1,088.8	1,259.2	740.6	940.3	2,158.0	1,165.1
	5. Capital	248.7	237.5	214.5	224.8	241.2	228.9	219.0	291.0	238.2
	6. Bassein	1,684.6	1,617.6	1,252.2	1,426.7	1,484.2	885.7	1,359.7	1,429.3	1,392.5
	7. Delta	1,121.8	1,084.2	767.9	912.9	31.1	845.3	1,124.4	1,217.3	1,000.6
	Total	6,011.6	5,786.0	4,769.8	5,348.6	5,665.8	3,674.8	5,104.6	7,091.6	5,431.6

Note: One basket = 25 lbs. Source: LRSD

The soils suitable to groundnut growing is the medium to light loam textured soils; hence, the groundnut growing in the paddy fields has been carried out in the field with similar natured soils to the above.

Almost of all groundnut growing has been made without irrigation, and delay in sowing has resulted in low yield due to drying-up of the soils. Therefore, sowing at proper time and adequate rainfall in November or December have enabled to have a good harvest. For instance, the drought year of 1972/73 brought a low yield.

The groundnut has a large demand at free market, being excluded of the farm products the Government purchases compulsorily. The groundnut is one of the crops that farmers are willing to grow because it benefits the farmers much more than other crops purchased by the Government.

Harvested groundnut with shell is sold to middle-men after reserving some for seeds and family consumption. However, since the seed groundnuts are difficult to be stored by the farmers during the rainy season, the seeds for the winter season cropping have been supplied from the Upper Burma at considerably high cost.

The records prepared by the Extension Division, AC, reveals that the oil yield by extraction is 40 percent of oil, 55 percent of oil cake and five percent of dregs, and the cost for extraction is K 2.5/54 lbs (fruit weight).

4) Sesame

The Upper Burma is the main producer of sesame in Burma, holding more than 90 percent of the total acreage sown with sesame in the country. The Survey Area occupies only 1.7 percent of the national total acreage sown and 4.5 percent of the national total production, respectively. The average sesame yield of the Survey Area is 3.9 basket/acre, which is 39 percent higher than the national average of

2.8 basket/acre; in other words, the sesame production in the Survey Area occupies a rather larger share in the national total production, while the sown acreage is not so large. (Refer to Table C-2-27).

In the past eight years since 1970/71, the sown acreage with sesame in the Survey Area had been increased by 1.3 times and the production had been increased by 1.5 times with constant increase in yield.

The sesame cropping include two types, the early sesame cropping and the late sesame cropping. In the Survey Area, the both types have been carried out at equal rate. The early sesame cropping has been carried out mainly in the Upperstream blocks, while the late sesame cropping mainly in the downstream blocks.

The early sesame cropping is carried out in the Ya-land in the Upperstream blocks, followed by the late sesame cropping as the second cropping, and sometimes cotton is inter-cropped between the early sesame cropping so as to protect the fields from erosion taking place in the rainy season. The sowing season is May to August and harvesting season is August to November about three months after sowing.

The late sesame is cropped either in the Kaing-lands or in the paddy fields after harvesting of the rainy season paddy, the latter of which has been carried out throughout the Survey Area.

The yields of both the early and the late sesame croppings are almost equal with a very few areas with no harvest.

The sesame, which has adoptability to a wide range of soil properties and good resistance to drought, has seemed to increase in its yield as the amount of fertilizers is increased.

TABLE C-2-27 CROP PRODUCTION DATA, SESAME (EARLY + LATE)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	12.3	12.2	11.7	13.7	13.6	13.5	14.6	17.8	13.7
	2. Padaung	1.4	1.0	1.2	1.3	2.4	1.6	2.2	2.9	1.8
	3. Myitmaka, Upper	4.2	3.2	4.3	7.2	6.6	6.6	8.4	8.1	6.0
	4. Myitmaka, Middle	1.4	1.2	1.6	1.8	2.0	3.3	4.2	4.2	2.5
	5. Capital	1.4	1.3	1.7	2.8	2.8	3.3	3.7	3.8	2.6
	6. Bassein	2.6	2.6	3.3	3.1	2.8	4.3	4.8	4.9	3.6
	7. Delta	1.2	1.2	1.8	2.0	2.6	3.1	3.5	3.5	2.4
	Total	24.5	22.7	25.6	31.9	32.8	35.7	41.4	45.2	32.5
	(% of Total Union)	(1.0)	(1.0)	(1.1)	(1.2)	(1.3)	(1.4)	(1.6)	(1.7)	(1.3)
	B. Total Union	2,510	2,292	2,256	2,660	2,609	2,464	2,630	2,696	2,514.6
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	11.0	11.3	11.4	13.4	12.3	12.7	13.7	17.1	12.9
	2. Padaung	1.4	1.1	1.2	1.3	1.2	1.6	2.2	2.9	1.6
	3. Myitmaka, Upper	4.1	3.1	4.1	7.1	5.0	6.0	8.1	7.8	5.7
	4. Myitmaka, Middle	1.4	1.1	1.5	1.5	1.8	3.3	4.1	4.2	2.4
	5. Capital	1.4	1.3	1.7	2.5	2.8	3.2	3.7	3.8	2.6
	6. Bassein	2.6	2.6	3.3	3.1	2.8	4.3	4.8	4.8	3.5
	7. Delta	1.2	1.1	1.7	2.0	2.6	3.1	3.5	3.5	2.3
	Total	23.1	21.6	24.9	30.9	28.5	34.2	40.1	44.1	30.9

(cont'd)

CROP PRODUCTION DATA, SESAME (EARLY + LATE)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (basket/ac)	A. M/P Area by Block									
	1. Prome	3.5	3.5	4.2	4.7	3.4	4.0	3.8	4.4	3.9
	2. Padaung	3.8	3.1	3.8	3.8	3.8	3.7	3.9	4.6	3.8
	3. Myitmaka, Upper	4.1	3.8	4.0	4.5	4.0	4.2	4.6	5.9	4.4
	4. Myitmaka, Middle	4.6	4.7	4.7	4.3	5.1	5.5	5.8	5.7	5.1
	5. Capital	3.3	3.5	3.4	3.3	3.3	3.2	3.5	3.6	3.4
	6. Bassein	2.7	2.8	3.1	2.7	3.0	3.0	3.1	3.1	2.9
	7. Delta	3.3	3.2	3.2	3.5	3.4	3.4	3.5	3.5	3.4
	Total	3.6	3.5	3.9	4.2	3.6	3.9	4.0	4.5	3.9
	(% of Total Union)	(128.6)	(129.6)	(162.5)	(131.3)	(150.0)	(118.2)	(153.8)	(150.0)	(139.3)
	B. Total Union	2.8	2.7	2.4	3.2	2.4	3.3	2.6	3.0	2.8
4. Production (1,000 basket)	A. M/P Area by Block									
	1. Prome	38.1	39.7	47.9	62.5	42.3	50.4	51.8	75.6	51.0
	2. Padaung	5.3	3.4	4.5	4.9	4.5	5.9	8.6	13.4	6.3
	3. Myitmaka, Upper	16.9	11.9	16.3	31.7	20.2	25.4	37.4	46.0	25.7
	4. Myitmaka, Middle	6.4	5.2	7.0	6.4	9.2	18.1	23.7	24.1	12.5
	5. Capital	4.6	4.5	5.8	8.3	9.3	10.3	13.0	13.6	8.7
	6. Bassein	7.1	7.4	10.2	8.4	8.5	12.8	15.0	15.0	10.6
	7. Delta	4.0	3.5	5.5	6.9	8.9	10.6	12.1	12.1	8.0
	Total	82.4	75.6	97.2	129.1	102.9	133.5	161.6	199.8	122.8
	(% of Total Union)	(1.6)	(1.7)	(3.5)	(2.1)	(2.7)	(2.5)	(4.3)	(4.5)	(2.9)
	B. Total Union	5,308	4,532	2,817	6,207	3,838	5,389	3,716	4,451	4,532.3

Note: One basket = 54 lbs. Source: LRSD

TABLE C-2-28 CROP PRODUCTION DATA, EARLY SESAME

Item	Year	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	12.0	11.9	11.4	13.3	13.1	12.8	13.3	16.5	13.0
	2. Padaung	0.9	0.7	0.8	0.9	2.0	1.0	1.3	1.9	1.2
	3. Myitmaka, Upper	3.1	2.5	2.9	5.4	4.9	4.7	5.4	6.6	4.4
	4. Myitmaka, Middle	-	-	-	-	0.0	0.1	-	-	0.1
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	16.0	15.1	15.1	19.6	20.0	18.6	20.0	25.0	18.7
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	10.7	11.0	11.1	13.1	11.8	12.0	12.4	15.9	12.3
	2. Padaung	0.9	0.8	0.9	0.9	0.8	1.0	1.3	1.9	1.1
	3. Myitmaka, Upper	3.0	2.4	2.8	5.4	3.5	4.2	5.2	6.4	4.1
	4. Myitmaka, Middle	-	-	-	-	0.0	0.1	-	-	0.1
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	14.6	14.2	14.8	19.4	16.1	17.3	18.9	24.2	17.4

(cont'd)

CROP PRODUCTION DATA, EARLY SESAME

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Yield (basket/ac)	A. M/P Area by Block									
	1. Prome	3.4	3.5	4.2	4.7	3.4	4.0	3.8	4.4	3.9
	2. Padaung	3.6	2.9	3.7	3.7	3.4	3.4	3.7	4.6	3.6
	3. Myitmaka, Upper	4.0	3.8	4.0	4.5	3.9	4.0	4.5	4.8	4.2
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	3.6	3.4	4.2	4.6	3.5	4.0	4.0	4.6	4.0
4. Production (1,000 basket)	A. M/P Area by Block									
	1. Prome	36.9	38.6	47.0	61.4	40.5	47.8	47.0	70.6	48.7
	2. Padaung	3.2	2.3	3.3	3.3	2.7	3.4	4.8	8.7	4.0
	3. Myitmaka, Upper	12.1	9.2	11.2	24.5	13.5	17.0	23.2	31.0	17.7
	4. Myitmaka, Middle	-	-	-	-	0.0	0.4	-	-	0.1
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	52.2	50.1	61.5	89.2	56.7	68.6	75.0	110.3	70.5

Note: One basket = 54 lbs.

Source: LRSD

TABLE C-2-29 CROP PRODUCTION DATA, LATE SESAME

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.3	0.3	0.3	0.4	0.5	0.7	1.3	1.3	0.6
	2. Padaung	0.5	0.3	0.4	0.4	0.4	0.6	0.9	1.0	0.6
	3. Myitmaka, Upper	1.1	0.7	1.4	1.8	1.7	1.9	3.0	1.5	1.6
	4. Myitmaka, Middle	1.4	1.2	1.6	1.8	2.0	3.2	4.2	4.2	2.5
	5. Capital	1.4	1.3	1.7	2.8	2.8	3.3	3.7	3.8	2.6
	6. Bassein	2.6	2.6	3.3	3.1	2.8	4.3	4.8	4.9	3.6
	7. Delta	1.2	1.2	1.8	2.0	2.6	3.1	3.5	3.5	2.4
	Total	8.5	7.6	10.5	12.3	12.8	17.1	21.4	20.2	13.8
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.3	0.3	0.3	0.3	0.5	0.7	1.3	1.2	0.6
	2. Padaung	0.5	0.3	0.3	0.4	0.4	0.6	0.9	1.0	0.6
	3. Myitmaka, Upper	1.1	0.7	1.3	1.7	1.5	1.8	2.9	1.4	1.6
	4. Myitmaka, Middle	1.4	1.1	1.5	1.5	1.8	3.2	4.1	4.2	2.4
	5. Capital	1.4	1.3	1.7	2.5	2.8	3.2	3.7	3.8	2.6
	6. Bassein	2.6	2.6	3.3	3.1	2.8	4.3	4.8	4.8	3.5
	7. Delta	1.2	1.1	1.7	2.0	2.6	3.1	3.5	3.5	2.3
	Total	8.5	7.4	10.1	11.5	12.4	16.9	21.2	19.9	13.5

(cont'd)

CROP PRODUCTION DATA, LATE SESAME

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (basket/ac)	A. M/P Area by Block									
	1. Prome	4.0	3.7	3.0	3.7	3.6	3.7	3.7	4.2	3.7
	2. Padaung	4.2	3.7	4.0	4.0	4.5	4.2	4.2	4.7	4.2
	3. Myitmaka, Upper	4.4	3.9	3.9	4.2	4.5	4.7	4.9	10.7	5.2
	4. Myitmaka, Middle	4.6	4.7	4.7	4.3	5.1	5.5	5.8	5.7	5.1
	5. Capital	3.3	3.5	3.4	3.3	3.3	3.1	3.5	3.6	3.4
	6. Bassein	2.7	2.8	3.1	2.7	3.0	3.0	3.1	3.1	2.9
	7. Delta	3.3	3.2	3.2	3.5	3.4	3.4	3.5	3.5	3.4
	Total	3.6	3.4	3.5	3.5	3.7	3.8	4.1	4.5	3.8
4. Production (1,000 basket)	A. M/P Area by Block									
	1. Prome	1.2	1.1	0.9	1.1	1.8	2.6	4.8	5.0	2.3
	2. Padaung	2.1	1.1	1.2	1.6	1.8	2.5	3.8	4.7	2.4
	3. Myitmaka, Upper	4.8	2.7	5.1	7.2	6.7	8.4	14.2	15.0	8.0
	4. Myitmaka, Middle	6.4	5.2	7.0	6.4	9.2	17.7	23.7	24.1	12.5
	5. Capital	4.6	4.5	5.8	8.3	9.3	10.3	13.0	13.6	8.7
	6. Bassein	7.1	7.4	10.2	8.4	8.5	12.8	15.0	15.0	10.6
	7. Delta	4.0	3.5	5.5	6.9	8.9	10.6	12.1	12.1	8.0
	Total	30.2	25.5	35.7	39.9	46.2	64.9	86.6	89.5	52.3

Note: One basket = 54 lbs.

Source: LRSD

According to the records prepared by the Extension Division, AC, the yield of sesame oil extraction is 40 percent of oil, 50 percent of oil cakes and 10 percent of dregs, respectively, and the extraction cost is K 5/54 lbs (fruit weight). (Refer to Appendix C-2-4)

5) Pulses

Various kinds of pulses are grown in the areas of 7.6 percent of the net area sown in the Survey Area, which cover the second largest acreage sown to the paddy cropping acreage in the Survey Area. (Refer to Table C-2-9).

The Upper Burma also is the largest pulses producing area in the country. The acreages sown with pulses in totalling those of the Irrawaddy and the Pegu Divisions occupied 17.8 percent of the total acreage sown with pulses in the country in 1974/75. (Refer to Table C-2-30). The total acreage sown with pulses in the Survey Area was 204 thousand acres in 1975/76, which occupied about 12 percent of the national total of the same.

Table C-2-31 shows that in the Irrawaddy and the Pegu Divisions the acreages sown with Matpe, Bocate and Pulum occupy comparatively large shares in the national total by 73 percent, 80 percent and 33 percent, respectively.

The total acreages sown with the above three kinds of pulses in the Survey Area occupied 58.4 percent, 36.0 percent and 17.8 percent of the national total of the same, respectively in 1974/75. These pulses in the Survey Area have been increasing in their acreages sown and yields since 1970/71. (Refer to Tables C-2-32, C-2-33 and C-2-34). In comparison of their production in 1970/71 with 1977/78, Matpe was produced about 2.0 times, Bocate about 2.5 times and Pelum about 2.0 times, respectively.

Matpe is one of the major export-oriented pulses in Burma, and the acreages sown with Matpe in the Delta block occupy about

TABLE C-2-30 PULSES CROPPING AREA IN MAIN PULSE PRODUCING DIVISIONS (1971/72 ~ 1974/75)

(unit : %)

Division/State	1971/72	1972/73	1973/74	1974/75
Sagaing	38.2	34.8	32.6	30.5
Mandalay	27.3	27.3	27.8	28.3
Magwe	17.1	17.2	18.3	19.8
Irrawaddy	9.7	10.7	11.6	11.1
Pegu	4.5	5.9	5.6	6.7

Note ; Pulses cropping area in Total Union = 100%

Source ; Agricultural Statistics, 1973/74 to 1975/76

TABLE C-2-31 CROPPING AREA OF PULSES IN MAJOR PRODUCING DIVISION/STATE FOR RESPECTIVE PULSES (1974/75)

(unit : %)

Kind	Area Coverage					
	Division/state	%	Division/state	%	Division/state	%
Matpe	Irrawaddy	63	Sagaing	21	Pegu	10
Gram (Chick pea)	Sagaing	49	Mandalay	24	Magwe	15
Htwabutpe (Lima bean)	Mandalay	52	Sagaing	38	Magwe	13
Pesingon (Pigeon pea)	Mandalay	48	Sagaing	39	Magwe	17
Peyaza (Lentil)	Sagaing	87	Mandalay	13	Chin	1
Green Matpe	Sagaing	72	Magwe	13	Mandalay	8
Soy bean	Shan	43	Mandalay	23	Irrawaddy	9
Pegyi (Lablab bean)	Magwe	50	Mandalay	18	Pegu	11
Peyin (India rice bean)	Magwe	50	Mandalay	20	Irrawaddy	13
Sadawpe (Garden pea)	Sagaing	61	Magwe	24	Shan	7
Pelum (Cow pea)	Irrawaddy	33	Magwe	22	Mandalay	12
Bocate (Cow Pea)	Irrawassy	57	Pegu	23	Karen	6

Source ; Agricultural Statistics, 1973/74 to 1975/76

TABLE C-2-32 CROP PRODUCTION DATA, MATPE

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
	2. Padaung	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3. Myitmaka, Upper	1.4	3.9	5.1	3.2	1.7	0.3	0.3	3.7	2.5
	4. Myitmaka, Middle	0.4	2.4	3.3	1.0	3.2	1.3	0.4	1.9	1.7
	5. Capital	3.4	3.6	3.8	3.4	2.9	3.4	0.9	3.2	3.1
	6. Bassein	6.7	6.8	6.2	6.1	5.5	5.2	2.9	7.0	5.8
	7. Delta	52.2	61.6	64.6	68.0	82.5	54.9	39.7	62.5	60.8
	Total	64.2	78.3	83.0	81.7	95.8	65.1	44.2	78.5	73.9
	(% of Total Union)	(47.6)	(41.4)	(45.1)	(49.8)	(58.4)	(53.8)	(50.2)	(47.9)	(48.9)
	B. Total Union	135	189	184	164	164	121	88	164	151.1
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2. Padaung	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3. Myitmaka, Upper	0.7	3.2	4.5	2.3	0.8	0.2	0.2	3.3	1.9
	4. Myitmaka, Middle	0.2	2.0	3.2	1.0	3.2	1.3	0.4	1.8	1.6
	5. Capital	3.4	3.6	3.2	3.4	2.7	2.9	0.5	3.0	2.8
	6. Bassein	3.8	5.1	4.8	4.5	2.8	3.2	1.2	5.4	3.9
	7. Delta	47.3	54.3	59.9	54.1	58.8	42.0	21.1	59.1	49.6
	Total	55.4	68.2	75.6	65.3	68.3	49.6	23.4	72.6	59.8

(cont'd)

CROP PRODUCTION DATA, MATPE

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (basket/ac)	A. M/P Area by Block									
	1. Prome	-	-	-	-	-	-	-	-	-
	2. Padaung	-	-	-	-	-	-	-	-	-
	3. Myitmaka, Upper	6.4	7.5	7.5	5.7	6.0	5.5	9.0	7.6	6.9
	4. Myitmaka, Middle	7.0	7.5	7.6	7.2	5.2	7.7	10.5	8.1	7.6
	5. Capital	6.0	5.1	4.3	4.1	4.8	4.9	4.0	6.6	5.0
	6. Bassein	4.9	5.5	5.7	6.5	6.0	4.6	6.9	7.4	5.9
	7. Delta	5.3	5.7	6.9	6.3	6.2	5.3	5.7	8.1	6.2
	Total	5.3	5.8	6.8	6.2	6.1	5.3	5.9	8.0	6.2
	(% of Total Union)	(96.4)	(101,8)	(107.9)	(105.1)	(103.4)	(106.0)	(89.4)	(114.3)	(103.0)
	B. Total Union	5.5	5.7	6.3	5.9	5.9	5.0	6.6	7.0	6.0
4. Production (1,000 basket)	A. M/P Area by Block									
	1. Prome	0.0	0.2	0.0	0.0	0.1	0.1	0.1	1.1	0.2
	2. Padaung	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1
	3. Myitmaka, Upper	4.5	24.0	33.6	13.2	4.8	1.1	1.8	25.0	13.5
	4. Myitmaka, Middle	1.4	14.9	24.2	7.2	16.5	10.0	4.2	14.6	11.6
	5. Capital	20.4	18.5	13.9	14.1	13.0	14.1	2.0	19.7	14.5
	6. Bassein	18.7	28.3	27.5	29.1	16.9	14.6	8.3	39.8	22.9
	7. Delta	249.6	308.8	413.1	338.2	362.1	220.9	120.9	481.4	311.9
	Total	294.6	394.8	512.4	401.9	413.5	260.9	137.3	581.6	374.6
	(% of Total Union)	(45.8)	(44.4)	(52.3)	(54.7)	(58.7)	(56.8)	(37.4)	(55.9)	(51.5)
	B. Total Union	643	888	980	735	704	459	367	1,041	727.1

Note: One basket = 72 lbs.

Source: LRSD

TABLE C-2-33 CROP PRODUCTION DATA, BOCATE

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.1	0.2	0.4	0.4	0.4	0.3	0.5	0.5	0.4
	2. Padaung	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1
	3. Myitmaka, Upper	1.0	1.1	1.9	1.9	2.8	2.1	2.2	2.0	1.9
	4. Myitmaka, Middle	2.0	2.7	3.4	3.4	3.5	3.5	6.1	6.0	3.8
	5. Capital	0.4	0.3	0.5	0.4	0.4	0.3	0.4	0.4	0.4
	6. Bassein	1.2	1.4	2.0	2.4	2.4	2.1	2.4	2.3	2.0
	7. Delta	4.5	4.4	6.1	5.7	7.7	6.8	7.6	6.9	6.2
	Total	9.2	10.1	14.3	14.2	17.3	15.3	19.4	18.3	14.8
	(% of Total Union)	N.A	N.A	N.A	(34.6)	(36.0)	N.A	N.A	N.A	(35.3)
	B. Total Union	N.A	N.A	N.A	41	48	N.A	N.A	N.A	44.5
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.1	0.2	0.3	0.4	0.4	0.3	0.4	0.4	0.3
	2. Padaung	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1
	3. Myitmaka, Upper	1.0	1.0	1.9	1.7	2.7	1.9	2.2	1.9	1.8
	4. Myitmaka, Middle	2.0	2.7	3.4	3.3	3.5	3.4	6.1	6.0	3.8
	5. Capital	0.4	0.3	0.5	0.4	0.4	0.3	0.4	0.4	0.4
	6. Bassein	1.1	1.3	2.0	2.4	2.4	2.0	2.4	2.3	2.0
	7. Delta	4.1	4.4	6.1	5.7	7.7	6.7	7.3	6.9	6.1
	Total	8.7	9.9	14.2	13.9	17.2	14.8	19.0	18.1	14.5

(cont'd)

CROP PRODUCTION DATA, BOCATE

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (basket/ac)	A. M/P Area by Block									
	1. Prome	4.0	5.5	5.7	5.3	5.5	6.0	5.3	5.3	5.3
	2. Padaung	-	-	-	-	10.0	5.5	6.5	6.5	7.1
	3. Myitmaka, Upper	7.5	7.9	7.7	6.6	7.1	6.9	9.1	8.8	7.7
	4. Myitmaka, Middle	8.8	7.4	7.3	6.8	9.3	10.1	11.5	12.2	9.2
	5. Capital	4.0	4.7	4.4	4.5	4.5	3.7	4.8	4.5	4.4
	6. Bassein	8.7	8.0	7.9	8.3	8.9	6.7	9.3	7.8	8.2
	7. Delta	7.1	6.7	6.9	6.9	6.5	6.2	11.8	7.6	7.5
	Total	7.6	7.1	7.1	7.0	7.4	7.2	10.8	9.1	7.9
4. Production (1,000 basket)	A. M/P Area by Block									
	1. Prome	0.4	1.1	1.7	2.1	2.2	1.8	2.1	2.1	1.7
	2. Padaung	0.2	0.1	0.2	0.2	1.0	1.1	1.3	1.3	0.7
	3. Myitmaka, Upper	7.5	7.9	14.6	11.3	19.3	13.2	20.1	16.7	13.8
	4. Myitmaka, Middle	17.6	20.1	24.9	22.4	32.4	34.5	70.4	73.2	36.9
	5. Capital	1.6	1.4	2.2	1.8	1.8	1.1	1.9	1.8	1.7
	6. Bassein	9.6	10.4	15.7	19.9	21.3	13.3	22.4	17.9	16.3
	7. Delta	29.1	29.5	41.8	39.2	50.1	41.4	86.5	52.4	46.3
	Total	66.0	70.5	101.1	96.9	128.1	106.4	204.7	165.4	117.4
	(% of Total Union)	N.A	N.A	N.A	(32.0)	(34.9)	N.A	N.A	N.A	(33.5)
	B. Total Union	N.A	N.A	N.A	303	367	N.A	N.A	N.A	335.0

Note: One basket = 72 lbs.
N.A: no available data

Source: LRSD

TABLE C-2-34 CROP PRODUCTION DATA, PELUM

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.3	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2
	2. Padaung	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
	3. Myitmaka, Upper	0.8	0.5	1.9	0.2	1.0	0.9	0.6	1.3	0.9
	4. Myitmaka, Middle	0.8	1.0	-	0.0	1.4	1.4	1.2	1.2	1.0
	5. Capital	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0
	6. Bassein	0.9	1.6	1.7	-	2.0	2.0	1.7	1.7	1.7
	7. Delta	3.1	2.6	3.7	0.5	4.0	4.9	6.7	5.0	3.2
	Total	6.0	6.0	7.8	1.1	8.9	9.7	10.7	9.6	7.5
	(% of Total Union)	N.A	N.A	N.A	(2.3)	(17.8)	N.A	N.A	N.A	(10.1)
	B. Total Union	N.A	N.A	N.A	47	50	N.A	N.A	N.A	48.5
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.3	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2
	2. Padaung	0.1	0.1	0.1	0.0	0.2	0.2	0.2	0.2	0.1
	3. Myitmaka, Upper	0.7	0.5	1.7	0.2	0.8	0.3	0.6	1.3	0.8
	4. Myitmaka, Middle	0.8	0.8	-	0.0	1.0	1.3	1.1	1.2	0.9
	5. Capital	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0
	6. Bassein	0.8	1.6	1.7	-	2.0	1.3	1.7	1.7	1.5
	7. Delta	3.0	2.6	3.4	0.5	3.9	4.3	6.4	4.7	3.6
	Total	5.7	5.8	7.3	0.9	8.2	7.7	10.3	9.3	6.9

(cont'd)

Note: N.A no available data

CROP PRODUCTION DATA, PELUM

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (basket/ac)	A. M/P Area by Block									
	1. Prome	6.0	8.0	7.8	6.0	9.0	7.0	6.0	8.0	7.2
	2. Padaung	7.0	5.0	6.0	-	7.0	6.5	7.5	7.5	5.8
	3. Myitmaka, Upper	11.1	11.0	9.7	6.5	9.9	10.7	11.2	12.0	10.3
	4. Myitmaka, Middle	9.3	10.5	-	-	10.3	10.2	10.9	10.9	10.4
	5. Capital	-	-	-	-	4.0	3.0	3.0	-	3.3
	6. Bassein	10.3	9.9	9.5	-	8.9	5.4	8.0	8.6	8.7
	7. Delta	6.7	6.9	7.1	3.2	7.2	6.6	9.4	8.8	7.0
	Total	8.1	8.6	8.2	5.0	8.3	7.1	9.3	9.7	8.0
4. Production (1,000 basket)	A. M/P Area by Block									
	1. Prome	1.8	1.6	3.1	1.2	1.8	1.4	1.2	1.6	1.7
	2. Padaung	0.7	0.5	0.6	-	1.4	1.3	1.5	1.5	1.1
	3. Myitmaka, Upper	7.8	5.5	16.5	1.3	7.9	3.2	6.7	15.6	8.1
	4. Myitmaka, Middle	7.4	8.4	-	0.3	10.3	13.3	12.0	13.1	9.3
	5. Capital	0.1	0.1	0.2	0.1	0.4	0.3	0.3	0.2	0.2
	6. Bassein	8.2	15.8	16.1	-	17.8	7.0	13.6	14.6	13.3
	7. Delta	20.2	18.0	24.2	1.6	28.1	28.5	60.4	43.8	28.1
	Total	46.2	49.9	60.7	4.5	67.7	55.0	95.7	90.4	58.8
	(% of Total Union)	N.A.	N.A.	N.A.	(2.3)	(30.2)	N.A.	N.A.	N.A.	(16.3)
	B. Total Union	N.A.	N.A.	N.A.	196	224	N.A.	N.A.	N.A.	210.0

Note: One basket= 72 lbs Source: LRSD

90 percent of the total acreage sown with the same in the Survey Area. The acreages sown with Bocate and Pelum in the Delta block also occupy the largest portion in the Survey Area.

The pulses, major crops growing in the Kaing-lands, are sown in general in September to October after flood water recedes and harvested four months later.

The pulses, having suitability to more clayey soils, appear to be cropped in comparatively large areas as the second crops of the rainy season paddy cropping.(Refer to Appendix C-2-5)

6) Cotton

The Upper Burma is also the main cotton producer in the country, holding more than 98 percent of the national total of the cotton cropping acreages in 1974/75. The acreages sown with cotton in the Survey Area occupies only 1.5 percent of the national total. In the Survey Area, the cotton cropping areas extend in the very limited area of the Prome and its surrounding areas upper stream of the Irrawaddy River.

Up to the latter half of 1960s, Burma had been an exporter of cotton, but currently the cotton production with little expansion of cropping acreage can not cope with increase in domestic demand. Under such critical situation, the Government has taken a policy of emergency production increase of cotton, and according to the Third Four-Year Development Plan, in the Survey Area, the acreages sown with cotton shall be increased to 33 thousand acres in the Prome block and its surrounding areas and a cotton spinning plant is now under construction in Shwedaung Township.

In the Survey Area, the cotton cropping acreages in three blocks centering of the Prome block were about 10 thousand acres in 1977/78 and the major varieties cropped therein are those local varieties of Wagyi (shrub) and Wagale (herb). (Refer to Tables C-2-35, C-2-36

TABLE C-2-35 CROP PRODUCTION DATA, COTTON (LOCAL + L.S.C.)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	5.1	4.7	5.8	6.1	5.7	5.7	5.8	7.2	5.8
	2. Padaung	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5
	3. Myitmaka, Upper	0.9	0.9	1.4	2.0	1.9	2.0	2.0	2.0	1.6
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total (% of Total Union)	6.6 (1.4)	6.1 (1.1)	7.7 (1.4)	8.7 (1.7)	8.1 (1.5)	8.2 (1.6)	8.3 (2.1)	9.8 (2.4)	7.9 (1.7)
	B. Total Union	467	554	532	527	542	514	402	405	492.9
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	5.1	4.7	5.7	6.1	5.7	5.8	5.7	7.1	5.7
	2. Padaung	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5
	3. Myitmaka, Upper	0.9	0.9	1.4	2.0	1.9	2.0	2.0	1.9	1.6
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	6.6	6.1	7.6	8.6	8.1	8.3	8.2	9.6	7.9

(cont'd)

CROP PRODUCTION DATA, COTTON (LOCAL + L.S.C.)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (viss/ac)	A. M/P Area by Block									
	1. Prome	80.0	81.4	81.8	83.3	82.1	571.1	88.2	202.7	158.8
	2. Padaung	97.0	99.0	93.6	106.0	103.6	108.2	90.6	88.2	98.3
	3. Myitmaka, Upper	83.2	83.9	79.4	84.4	84.7	83.8	89.7	91.3	85.1
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total (% of Total Union)	82.0 (124.1)	83.2 (142.0)	82.1 (128.5)	84.9 (154.1)	84.0 (135.3)	573.4 (966.9)	88.7 (141.2)	205.3 (258.6)	160.5 (256.3)
	B. Total Union	66.1	58.6	63.9	55.1	62.1	59.3	62.8	79.4	63.4
4. Production (1,000 viss)	A. M/P Area by Block									
	1. Prome	498.3	382.7	469.7	508.1	470.6	467.0	504.9	588.2	474.9
	2. Padaung	58.2	49.5	46.8	53.1	51.8	54.1	45.3	52.9	51.5
	3. Myitmaka, Upper	74.9	75.8	115.2	170.3	161.0	167.7	180.2	173.4	139.8
	4. Myitmaka, Middle	-	-	0.7	0.3	-	-	-	1.8	0.9
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total (% of Total Union)	541.4 (3.2)	508.0 (1.3)	632.4 (1.2)	731.8 (1.5)	683.4 (2.9)	688.8 (3.0)	730.4 (4.4)	816.3 (2.4)	666.6 (2.5)
	B. Total Union	17,146	39,804	53,889	47,765	23,882	22,658	16,534	33,680	31,919.8

Note: One viss=3.6lbs Source: LRSD

TABLE C-2-36 CROP PRODUCTION DATA, COTTON (LOCAL)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block	5.1	4.7	5.7	6.1	5.7	5.6	5.7	6.9	5.7
	1. Prome	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5
	2. Padaung	0.9	0.9	1.4	2.0	1.0	2.0	2.0	2.0	1.6
	3. Myitmaka, Upper	-	-	-	-	-	-	-	-	-
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	6.6	6.1	7.6	8.6	8.1	8.1	8.2	8.2	7.9
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	5.1	4.7	5.7	6.1	5.7	5.7	5.7	6.9	5.7
	2. Padaung	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5
	3. Myitmaka, Upper	0.9	0.9	1.4	2.0	1.9	2.0	2.0	1.9	1.6
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capitla	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	6.6	6.1	7.6	8.6	8.1	8.2	8.2	9.4	7.9

(cont'd)

CROP PRODUCTION DATA, COTTON (LOCAL)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (viss/ac)	A. M/P Area by Block									
	1. Prome	80.0	81.4	81.8	83.3	82.1	81.1	88.2	81.7	82.5
	2. Padaung	97.0	99.0	93.6	106.0	103.6	108.2	90.6	88.2	98.3
	3. Myitmaka, Upper	83.2	83.9	79.4	84.4	84.7	83.8	89.7	91.3	85.1
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	82.0	83.2	82.1	84.9	84.0	83.4	88.7	84.3	84.1
4. Production (1,000 viss)	A. M/P Area by Block									
	1. Prome	408.3	382.6	466.2	508.1	467.7	462.1	502.9	564.0	470.2
	2. Padaung	58.2	49.5	46.8	53.0	51.8	54.1	45.3	52.9	51.5
	3. Myitmaka, Upper	74.9	75.5	111.1	168.9	161.0	167.7	179.3	173.4	139.0
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	541.4	507.6	624.1	730.0	680.5	683.9	727.4	792.1	660.9

Note: One viss=3.6lbs

Source: LRSD

TABLE C-2-37 CROP PRODUCTION DATA, COTTON (L.S.C.)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
1. Sown Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.3	0.1
	2. Padaung	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
	3. Myitmaka, Upper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.3	0.1
2. Matured Area (1,000 ac)	A. M/P Area by Block									
	1. Prome	0.0	0.0	0.0	-	0.0	0.1	0.0	0.2	0.0
	2. Padaung	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0
	3. Myitmaka, Upper	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0

(cont'd)

CROP PRODUCTION DATA, COTTON (L.S.C.)

Item		1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Mean
3. Yield (viss/ac)	A. M/P Area by Block									
	1. Prome	-	-	-	-	-	490.0	-	121.0	305.5
	2. Padaung	-	-	-	-	-	-	-	-	-
	3. Myitmaka, Upper	-	-	-	-	-	-	-	-	-
	4. Myitmaka, Middle	-	-	-	-	-	-	-	-	-
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	490.0	-	121.0	305.5
4. Production (1,000 viss)	A. M/P Area by Block									
	1. Prome	-	0.1	3.5	-	2.9	4.9	2.1	24.2	6.3
	2. Padaung	-	-	-	0.1	-	-	-	-	0.1
	3. Myitmaka, Upper	-	0.3	4.1	1.4	-	-	0.9	-	1.7
	4. Myitmaka, Middle	-	-	0.7	0.3	-	-	-	-	0.5
	5. Capital	-	-	-	-	-	-	-	-	-
	6. Bassein	-	-	-	-	-	-	-	-	-
	7. Delta	-	-	-	-	-	-	-	-	-
	Total	-	0.4	8.3	1.8	2.9	4.9	3.0	24.2	6.5

Note: One viss=3.6 lbs

Source: LRSD

and C-2-37). The staples of these local varieties are short with less than 1/2 inch long lint, being unavailable for weaving the cloth for dresses, and now the Government plans to introduce the high yielding varieties with long staple and encourage the farmers to grow the long staple cotton.

The Government has formulated a project for long-staple cotton production increase in a part of the North Nawin Irrigation Project Area located in the Master Plan Survey Area. The said project aims to increase in long staple cotton production in the paddy fields after harvesting the rainy season paddy as the second crop.

Cotton is grown under the government supply of seeds, fertilizer and rental service of tractors rendered with preference, and the harvested cotton is compulsorily purchased by the Government as well as jute.

7) Yields and Productions of Respective Major Crops

The yields and productions of the respective major crops sown in the Survey Area were estimated to be shown in Table C-2-38.

In the above estimation, the sown areas for the respective crops were based on the records in 1976/77 and the matured areas were adjusted from the average ratio of sown areas and matured areas for 1970/71 through 1977/78. The related yields were taken by average values for 1973/74 through 1977/78 on the basis of the matured areas.

Thereby, the yields on the basis of matured areas and productions of the respective crops were obtained as follows; 42.3 basket/acre (2.2 ton/ha) for paddy yield and 89,722 thousand baskets (1,872 thousand tons) of total paddy production,

TABLE C-2-38 PRESENT YIELD AND PRODUCTION

Crop	Sown Area 1/ (1,000ac)	Matured Area 2/ (1,000ac)	Production Unit	Yield per ac	Production 3/ (x 1,000)	Sown Area Base per ac	Sown Area Yield ton/ha
1 Paddy							
-HYV	218.2	209.2	basket	67.2	14,058	63.6	3.28
-Others	1,982.1	1,910.7	(46ℓbs)	39.6	75,664	38.2	1.97
Total	2,200.3	2,119.9		42.3	89,722	40.7	2.10
2 Jute							
-Pre-monsoon	24.0	20.6	viss	226.1	4,658	194.1	0.78
-Monsoon	31.0	24.2	(3.6ℓbs)	212.5	5,143	165.9	0.70
Total	55.0	44.8			9,801		
3 Groundnut							
-Rain	13.6	13.2	basket	22.9	302	22.2	0.62
-Winter	123.5	103.5	(25ℓbs)	36.3	3,757	30.4	0.85
Total	137.1	116.7			4,059		
4 Sesame							
-Early	20.0	18.6	basket	4.1	76	3.8	0.23
-Late	21.9	21.4	(54ℓbs)	4.1	88	4.0	0.24
Total	41.9	40.0			164		
5 Pulses							
-Matpe	44.2	35.8	basket	6.3	226	5.1	0.41
-Bocate	19.4	15.4	(72ℓbs)	8.4	129	6.6	0.53
-Pelum	10.7	9.8		7.9	77	7.2	0.58
-Others	129.9	121.7		7.6	925	7.1	
Total	204.2	182.7			1,357		
6 Cotton							
-L.S.C.	0.1	0.1	viss	121.0	12	121.0	0.49
-Local	8.2	8.2	(3.6ℓbs)	85.2	699	85.2	0.34
Total	8.3	8.3		85.7	711		

Note: 1/ In the crop year in 1976/77

2/ Adjusted from the average ratio of sown areas and matured area for respective crops for 1970/71 through 1977/78

3/ Average yield in matured area base in 1973/74 through 1977/78

and the production of jute, groundnut, sesame, pulses and cotton were computed as 9,801 thousand viss (16.0 thousand tons), 4,059 thousand baskets (46.0 thousand tons), 164 thousand baskets (4.0 thousand tons), 925 thousand baskets (44.3 thousand tons), and 711 thousand viss (1.2 thousand tons), respectively.(Refer to Table C-2-38)

II.5. Farm Input Use

1) Seeds

The seeds of paddy and jute which were supplied to farmers in the Survey Area in 1976/77 were estimated at 20 thousand basket and 3 thousand viss, respecdtively. (Refer to Table C-2-39).

As mentioned in II-8, 2) Seed Farm, the HYV paddy seeds to be required per annum were estimated at 109 thousand baskets on the basis of the acreages sown with HYV in 1977/78 in the Master Plan Survey Area. Hence, the above-quoted 21 thousand basket seeds supplied are equivalent only to about 1/5 of the seeds required in the Area, even if all of those seeds were of HYV strains.

The total paddy seed producing capacity by existing seed farms (including Hmawbi Central Farm) was estimated at 920 thousand baskets, on which a detailed discussion will be made in II-8, 2) Seed Farm.

The existing seed farms have not been operated in full-scale production. Furthermore, the seed production capacity should be increased to cope with expected increase in demand of HYV and LIV seeds as the irrigation areas are expanded in future.

On the other hand, the quality check system should be established as well as the seed sorting facilities should be provided at every seed farm, so that the quality seeds can be supplied to the farmers concerned.

TABLE C-2-39 ESTIMATED AMOUNT OF FARM INPUTS DISTRIBUTED BY GOVERNMENT (1976/77)

Item	Ten Township										Total	Ave. Amount per 1,000ac	Whole M/P Area[3/]
	Paukkaung	Prome	Paungde	Theon	Shwedaung	Gyobingauk	Minhla	Kyangin	Myanaung	Zalun			
1 Sown Area of Major Crops (1,000 ac)													
(a) Paddy	43.9	69.4	68.2	90.0	55.3	79.6	69.1	41.3	124.9	81.3	723.2		2,200.3
(b) PreMonsoon Jute	-	0.0	-	-	-	0.0	0.2	0.1	0.3	8.5	9.1		24.0
(c) Monsoon Jute	-	0.3	1.3	0.3	0.5	2.5	1.0	0.1	0.2	1.3	7.5		31.0
(d) Groundnut, Rain	0.2	0.8	0.6	0.5	3.4	0.0	0.2	0.8	3.8	0.0	10.3		13.6
(e) Groundnut, Winter	0.6	0.9	1.2	1.6	7.9	0.8	6.5	2.2	8.2	9.2	39.1		123.5
(f) Sesame, Early	8.2	3.8	3.6	1.0	0.2	0.2	-	-	-	-	17.0		20.0
(g) Sesame, Late	0.0	-	9.1	0.2	1.0	0.1	0.5	0.0	3.2	0.0	14.1		21.9
(h) Pulses	3.8	3.3	4.0	1.0	0.9	18.4	1.7	0.3	5.7	22.7	61.8		204.2
(i) Cotton, LSC	0.0	0.1	-	0.0	-	-	-	-	-	-	0.1		0.1
(j) Cotton, Local	5.3	0.3	2.0	0.0	-	-	-	-	-	-	7.6		8.2
Total	62.0	78.9	90.0	94.6	69.2	101.6	79.2	44.8	146.3	123.0	889.8		2,646.8
2 Distributed Seeds by Government													
(a) Paddy (basket)	60	539	2,198	313	309	806	1,766	N.A.	51	327	6,369	9.3[1/]	20,463
(b) Jute (viss)	-	60	39	8	-	42	115	N.A.	4	733	1,001	60.3[2/]	3,317
(c) Groundnut (basket)	-	-	-	-	-	-	-	N.A.	-	-	-		
(d) Matpe (basket)	-	-	-	-	-	-	-	N.A.	-	-	-		
3 Distibuted Fertilizers by Government (ton)													
(a) Urea	218	389	799	836	358	480	555	185	727	416	4,963	5.6[2/]	14,822
(b) Triple Super Phosphate	70	131	134	175	141	235	103	13	175	57	1,234	1.4[2/]	1,246
(c) Muriate of Potash	-	6	8	1	-	12	20	2	-	-	49	0.6[2/]	534
4 Insecticides													
(a) Powder (lbs)	16	1,120	1,586	2,352	9	6,000	130	704	224	1,710	13,851	15.6[2/]	41,290
(b) Lizuid (galon)	13	30	10	40	6	120	70	35	55	62	441	0.5[2/]	1,323

Note: 1/ Calculated as inputs amount divided by the sown area of paddy or jute

2/ Calculated as inputs amount divided by the total sown area of all major crops

3/ Calculated as average inputs amount per 1,000 acre multiplied by the sown area of respective crops in M/P Area

Source: AC

Regarding the production of various seeds other than paddy seeds, improvements should be made in many respects such as breeding, introduction of superior seeds, quality seed production, sorting, etc.

In this connection, the UNDP/FAO-aided Seeds Development Project and Crops Development Project have been executed at the Central Farm and the seed farms located in the Survey Area. Along with the directions of these projects, the distribution system as well as extension organization should be established to supply quality seeds produced to the farmers in each of every block in the Survey Area.

2) Fertilizers and Agri-chemicals

The amount of fertilizers supplied by the Government in 1976/77 is shown in Table C-2-39, which indicates the respective amounts supplied as about 14,800 tons of urea, 1,200 tons of TSP (Triple Super Phosphate) and 500 tons of Potash muriate, respectively.

The fertilizers consumption rate per hectare was estimated as follows on the basis of the total acreage sown with major crops in the Survey Area; about 13.8 kg of urea, 3.5 kg of TSP, and 1.5 kg of potash muriate.

These amounts applied can be converted into the respective ingredients as follows: 6.2 kg/ha of N, 1.6 kg/ha of P_2O_5 and 2.1 kg/ha of K_2O, respectively. The above amounts of fertilizers applied are considered to be very small. That is not only because the Government has no adequate capacity to supply sufficient fertilizers to the farmer but because the said figures are the average ones estimated on the basis of total acreages sown with the major crops in the Survey Area whereas the Government supply of fertilizers has been made concentratively to the particularly-designated crops such as HYV paddy, jute, and cotton.

For reference, the Third Four-Year Economic Plan has set up a considerably high target of the fertilizer supply to these designated

crops in both the objective acreages and the supply rate per unit area. (Refer to I-3, Farm Input Use, 2) Fertilizer).

The MAF has provided the supply targets of the respective fertilizers on the basis of the above designed amounts, and according to the Five-Year Agricultural Development Plan prepared by MAF, the target amounts of fertilizers to be supplied to 26 townships in the Survey Area, are broken down as follows: 39,212 tons of urea, 7,542 tons of TSP and 1,204 tons of potash muriate. These targets amounts are about 2.6 times as much as for urea, to compare to the actual results of the Survey Area in 1976/77, about 6.4 times as much for TSP and about 2.4 times as much for potash muriate. The suppliable amounts in 1980/81, the last year of the Third Four-Year Economic Plan are expected to reach about 5.7 times for urea, about 9.1 times for TSP and about 4.0 times for potash muriate as compared with those actual results in 1976/77.

Practically, however, it is deemed extremely difficult to accomplish the targets because the Government supply capacity is very small as mentioned in I-3 Farm Input Use of this report.

The amount of insecticides supplied to the Area in 1976/77 was estimated at 41,200 lbs in powder and 1,300 galons in liquid, respectively. (Refer to Table C-2-39). Input amounts of the insecticides per acre were compured on the basis of the acreages sown with major crops in the Master Plan Study Area as follows: 0.017 kg/ha in powder and 5.6 cc in liquid. The insecticides are usually applied to those fields where the designated crops are grown and only when severe damages take place due to large-scale occurrence of harmful insects.

The necessary farm inputs are distributed by the way mentioned in the section of I-6 Agricultural Institution, 4) Farm Input Supply System.

II.6. Farm Mechanization

1) Mechanized Farming in the Survey Area

In the Survey Area, there are 11 Tractor Stations under AMD as shown in Table C-2-40. These stations provide 331 tractors (50-60 Hp-size). These machines were operated for 188 thousand acre-turns on the contract basis in 1977/78. The tractor contract-base services have been rendered mainly for growing of the designated crops such as jute and cotton other than paddy covering about 159 thousand acre-turns (84.5% of total acre-turns). (Refer to Table C-2-40)

In taking a complete land preparation work by one plowing and two harrowings by tractors, the net acreage covered by tractors in growing crops other than paddy was estimated at 53 thousand acres.

On the other hand, the AMD has sold total of 511 tractors to the village cooperative societies in the Survey Area since 1968/69 (refer to Table C-2-43), and about 2/3 of them in numbers are assumed to be operable. However, there are no data available regarding the acreages covered by tractors held by these cooperative societies.

Thereby, in taking the same area coverage per tractor to the rate as that obtained from the above AMD case, the net acreage covered by tractors of cooperative societies was estimated as follows:

511 tractors x 2/3 x 0.19* thousand acres/tractor
≒ 65 thousand acres

* acreage covered by one tractor (estimated in the AMD case as 188 thousand acre-turn ÷ 0.331 thousand tractors ÷ 3)

Therefore, the total acreage covered by tractors owned by both of the AMD and the village cooperative societies was computed as 108 thousand acres for the fields sown with crops other than paddy as follows: 53 thousand acre + 65 thousand acre x 0.845 ≒ 108 thousand acre.

Capital C-2-40 UTILIZATION OF TRACTORS OWNED BY AMD IN THE MASTER PLAN SURVEY AREA
(As of 1978-79 Budget year)

Sr. No.	Tractor Station	No. of Agriculture Tractor (Serviceable) (Nos.	Utilization of Tractor			Ave. Field Hours per Tractor (hr)	Total Tilage Acre-turn			Ave. Acre turn per Tractor (acre-turn)
			Field Horus (hr)	Road Hours (hr)	Total (hr)		Crops Exclusive of Paddy Rice (acre-turn)	Paddy Rice (acre-turn)	Total (acre-turn)	
	Pegu Division									
1.	Prome	40	20,686	4,732	25,418	517	20,570	1,518	22,089	552
2.	Padaung	19	7,747	1,959	9,706	408	4,339	294	4,633	244
3.	Gyobingauk	23*	20,652	8,728	29,380	598	13,799	206	14,005*	554
4.	Monyo	20**	37,908	6,606	44,514	495	20,316	-	20,316**	448
5.	Tharrawaddy	40	18,120	6,952	25,072	543	14,353	441	14,794	370
	Rangoon Division									
1.	Taikkyi	30	12,155	2,281	14,436	405	9,712	2,444	12,156	405
	Irrawaddy Division									
1.	Myanaung	11	5,980	225	6,205	544	5,108	521	5,629	512
2.	Yegyi	25	14,117	1,092	15,209	565	10,338	4,291	14,629	585
3.	Henzada	30	18,903	703	19,606	630	11,290	6,528	17,818	594
4.	Zalun	60	39,022	5,516	44,538	650	30,138	6,224	36,362	606
5.	Danubyu	33	25,467	798	26,265	772	18,755	6,712	25,467	772
	Total	331	220,757	39,592	260,349	667	158,718	29,180	187,898	568

Note: *(1) In Gyobingauk nearly 2,000 acre turn had done by assisted tractors from Head Quarter Reserve Station.
**(2) In Monyo over, 6,000 acre turn had done by assisted tractors from Head Quarter Reserve Station.

Capital C-2-41 NOS. OF TRACTORS AND ITS ATTACHMENTS OWNED BY AMD TRACTOR STATIONS

(As of 31st March 1979)

Sr. No.	Tractor Station	Nos. of Tractor			Nos. of Major Attachments of Tractors					
		Total	More Than 50 HP	50 HP	Disc Plow	Disc Harrow	Bottum Plow	Spike Harrow	Trailer	Others
	Pegu Division									
1.	Prome	40	2	38	20	24	-	-	13	-
2.	Padaung	19	-	19	21	11	-	-	4	-
3.	Gyobingauk	23	-	23	20	18	-	-	3	-
4.	Monyo	20	19	20	56	14	-	-	4	-
5.	Tharrawaddy	40	-	40	30	30	-	-	4	-
	Rangoon Division									
1.	Taikkyi	30	-	30	4	27	-	-	2	-
	Irrawaddy Division									
1.	Myanaung	11	-	11	21	14	-	-	6	-
2.	Yegyi	25	-	25	12	25	-	-	2	-
3.	Henzada	30	12	18	30	39	-	-	7	-
4.	Zalun	60	19	41	68	64	-	-	5	-
5.	Danubyu	33	-	33	21	24	-	-	1	-
	Total	331	33	298	283	290	-	-	51	-

Capital C-2-42 PRESENT ORGANIZATION OF AMD IN THE MASTER PLAN SURVEY AREA

(As on 31st March 1979)

Sr. No.	Office/Tractor Station	No. of Staff (Permanent) Admin.	Eng.	Mech. Dip.	Agri. Dip.	Tractor Operator	Others	Townships Covered by Station
	Pegu Division							
1.	Division Office	1	-	-	-	-	12	Office is located in Pegu.
2.	Prome Tractor Station	1	-	1	1	42	29	(1) Prome (2) Pauk Kahung (3) Paungde (4) Thegon (5) Shwedaung
3.	Padaung Tractor Station	-	-	-	1	21	18	(1) Padaung
4.	Gyobingauk Tractor Station	1	-	1	1	38	21	(1) Gyobingauk (2) Zegon (3) Nattalin (4) Okpo
5.	Monyo Tractor Station	1	-	2	-	23	23	(1) Monyo
6.	Tharrawaddy Tractor Station	1	-	1	1	45	28	(1) Tharrawaddy (2) Letpadan (3) Minhla (4) Okpo
	Rangoon Division							
1.	Division Office	1	-	-	-	-	8	Office is located in Rangoon.
2.	Taikkyi Tractor Station	1	-	1	-	43	23	(1) Taikkyi
	Irrawaddy Division							
1.	Division Office	1	-	-	-	-	8	Office is located in Bassein.
2.	Myanaung Tractor Station	-	-	1	1	12	20	(1) Myanaung (2) Kyangin
3.	Yegyi Tractor Station	1	-	1	-	28	16	(1) Yegyi (2) Kyonpyaw
4.	Henzada Tractor Station	1	-	1	1	28	20	(1) Henzada (2) Lemyethna
5.	Zalun Tractor Station	1	-	1	-	59	34	(1) Zalun
6.	Danubyu Tractor Station	1	-	1	1	32	22	(1) Danubyu

Note: All administrators are Bsc. Engineer (Mech).

TABLE C-2-43 SALES OF FARM MACHINERY TO VILLAGE CO-OPERATIVE SOCIETIES AND INDIVIDUAL FARMERS
(by AMD 1968/69 - 1978/79)

Sr. No.	Township	Tractor	Disc Plow	Harrow	Trailer	Roter cultivator	Rotary slasher	Water pump (High-lift)	Water pump (Low-Lift)	Power Tiller	Thresher	Paddy Drier	Others	Remarks
	Pegu Division													
1.	Paukkaung	1	1	1	-	-	-	-	35	-	-	-	-	
2.	Prome	5	5	5	1	-	-	-	116	-	-	-	-	
3.	Padaung	12	12	12	2	-	-	-	104	3	-	-	-	
4.	Paungde	18	16	18	6	-	-	-	99	-	-	-	-	
5.	Thegon	11	11	11	4	-	-	-	45	-	-	-	-	
6.	Shwedaung	5	5	5	1	-	-	2	77	-	-	-	-	
7.	Nattalin	22	13	22	6	-	-	-	131	-	-	-	-	
8.	Zigon	2	2	2	1	-	-	-	59	-	-	-	-	
9.	Gyobingauk	11	11	11	1	-	-	-	72	-	-	-	-	
10.	Monyo	33	32	3]	5	-	-	3	183	3	-	-	-	
11.	Okpo	22	13	22	2	-	-	3	117	-	1	-	-	
12.	Minhla	35	35	35	-	-	-	1	166	-	-	-	-	
13.	Letpadan	45	42	45	1	-	-	2	216	-	3	-	-	
14.	Tharrawaddy	34	33	38	1	-	-	-	123	-	3	-	-	
	Sub-total	256	231	259	31	-	-	11	1,543	6	7	-	-	
	Rangoon Division													
15.	Taikyi	48	38	46	10	-	-	1	705	26	-	-	-	
16.	Hlegu	16	12	16	5	-	-	1	239	7	-	-	-	
17.	Hmawbi	15	13	15	9	-	-	1	111	5	-	-	-	
	Sub-total	79	63	77	24	-	-	3	1,055	38	-	-	-	
	Irrawaddy Division													
18.	Kyangin	2	2	2	2	-	-	-	49	6	1	-	-	
19.	Myanaung	12	12	12	-	-	-	4	142	2	6	-	-	
20.	Ingabu	21	21	21	2	-	-	-	217	8	-	-	-	
21.	Lanyethna	13	13	13	-	-	-	3	433	3	-	-	-	
22.	Yegyi	56	24	56	2	-	-	1	538	5	1	-	-	
23.	Henzada	14	14	14	-	-	-	3	391	3	6	-	-	
24.	Zalun	11	11	11	-	-	-	-	1,140	3	2	-	-	
25.	Kyonpyaw	31	18	31	2	-	-	1	978	2	1	-	-	
26.	Danubyu	16	16	17	-	-	-	2	1,061	6	2	-	-	
	Sub-total	176	131	177	8	-	-	14	4,949	38	19	-	-	
	Total	511	425	513	63	-	-	28	7,547	82	26	-	-	

Note: (1) Tractor, disc plow, harrow, trailer and rotay thresher have been sold to cooperative societies only and others have been sold to both of cooperative societies and individual farmers.

Among the above total acreage, 24 thousand acres sown with pre-monsoon jute were considered as the acreage fully covered by tractors. As a result, the net acreage covered by tractors in the upland cropping in the dry season was estimated at 84 thousand acres.

The acreage sown with upland crops in the dry season in 1976/77 was estimated at 164 thousand acres for the paddy fields after paddy harvest and 208 thousand acres for the Kaing-lands or Ya-lands, respectively. (Refer to Table C-2-12).

Among the above, the tractor operation is essentially required for the areas after paddy harvest so as to keep the sowing time proper for the following upland cropping. At present, however, the number of tractors operable can cover only a half of the said acreage.

As for the power tillers, the AMD has sold 495 machines to the village cooperative societies or individual farmers since 1968/69.

In taking the number of machines operable by 2/3 of the above and the machine coverage in one cropping season by 25 acres, the power tillers could cover only eight thousand acres per season which is extremely small as compared with the tractor's coverage.

The machine coverage rate to the total acreage sown of 2,686 thousand acres in 1976/77 was estimated at only 3.7 percent on the following data:

Machine	Acreage covered by machine per annum (thousand acres)
Tractors held by AMD (311 units)	63
Tractors held by V.C.S. (511 x 2/3 unit)	65 (estimated on the basis of AMD case)
Power tillers (495 x 2/3 unit)	17 (area coverage: 50 ac/unit/
Total	145

The above described only about the land preparation works by farming machines. In addition to the above farming machineries, about 8,000 units of small-size irrigation pumps are used for pre-monsoon jute growing and 495 units of threshers are operated for paddy harvesting in the Survey Area.

These facts indicate that almost of all farm labors in the Survey Area have been carried out by manpower or animal power.

Table C-2-40 shows that one tractor held by AMD operated 787 hours per annum on an average (field hour + road hour) for 568 acre-turns (one plowing, two harrowings for 189 acres of net coverage). The major causes to reduce the operation efficiency of the tractors in the Survey Area are in shortage of spare parts supply and insufficiency in number of workshops and facilities. However, the essential problem is that the present conditions of the fields have prevented the machines from their smooth operation; the existing fields have few farm roads and drains, and irregular shapes with area below one acre. It is considered very difficult, therefore, to raise the operation efficiency of the large-size tractors in such unfavorable field conditions.

Actually, the tractors cannot be operated in or around the rainy season in the ill-drained fields which occupy most of the fields in the Master Plan Survey Area. Under the situation, the tractor operation is only available in the dry season or in some well-drained fields, and the power tillers seem to be more applicable to the fields in the Area than the tractors.

However, there are such problems existing in adopting the power tillers that the supply capacity of the said machines is very limited in Burma, the machines are too expensive for individual farmers to buy, and repair service can not be rendered in the rural zones.

In the Survey Area, the expansion of acreages sown in the fields after paddy harvesting is essential for increasing the land use ratio. In order to meet the requirement, it is necessary to carry out smooth harvesting of the rainy season paddy with quick drying of the paddy as well as smooth sowing at proper time for the upland crops as the second crops.

For smoothening the harvesting works of paddy, mechanization of reaping, threshing and drying would be quite necessary not only as temporary measures but as the measures to be taken for effective progress of the Irrawaddy River Basin Integrated Agriculture Development with irrigation/drainage facilities completed for more intensive farming.

The AMD has launched the land consolidation projects in Okpo and Takkyi Townships in the Master Plan Survey Area in 1979/80 and implemented the one acre-one plot method land consolidation for 1,000 acres and 2,000 acres, in the respective townships for modernized paddy cropping with such machines as reapears and threshers and dryers. For the dryers, the AMD and the AC cooperate with each other in conducting various tests and experiments to determine the best suited type of machines to the local conditions.

It is essentially required to established the most suitable mechanized farming system including land consolidation to the condition prevailing in the Master Plan Survey Area along with direction indicated in the above project.

II.7. Research and Extension

1) Research

There exists only one Central Farm in the Survey Area as the Hmawbi Central Farm. It is considered necessary to strengthen the existing central farm and to provide other Central Farms in the areas where no such facilities exist at present in order to cope with the progress in agricultural development, particularly irrigated

agriculture, in the Master Plan.

The Hmawbi Central Farm provides the paddy fields of net 336 acres for foundation seeds production and experimental use, out of which 80 acres fields are irrigated and the remaining is rainfed. Only eight staff are engaged in the research works and there are very few experimental equipment and instrument provided.

The experiments and researches to have been conducted there up to date aimed mainly at developing the rainfed paddy growing techniques; however, as the irrigated agriculture is developed in the Master Plan Survey Area, the Hmawbi Central Farm would have to take up various subjects regarding the irrigated farming techniques such as irrigated paddy farming and upland cropping, and cropping patterns under "Paddy and Upland Crops" or "Paddy and Paddy" for establishing an effective multiple cropping system.

2) Seed Farm

The existing seed farms in the Survey Area are in Paunge, Letpadan and Henzada Townships, exclusively producing the paddy seeds from the 256 acres paddy fields in total. Therefore, the foundation seeds production has been carried out in the total 581 acres paddy fields, including 325 acre fields in Hmawbi Central Farm (as of 1977/78), in the Master Plan Survey Area.

The total of the foundation seeds produced in the Survey Area was estimated at 35,000 baskets in taking a yield of 60 baskets/acre produced in Paunge Seed Farm as the basis figure. The suppliable seed amount to the farmers in the Area can be computed as follows, in assuming that the above foundation seeds are propagated by the trust farmers.

The acreages available for seed propagation (trust farmers) = 35,000 acres (in case of using 1.0 basket of seeds per acre).

Estimated seeds produced by the trust farmers = 35,000 acres x 40 baskets/acre = 1,400 thousand baskets.

The annual seeds production available would be about 1,400 thousand baskets.

On the other hand, the annual requirement of HYV seeds in the Survey Area was estimated at 109 thousand baskets on the basis of the total acreage sown with HYV by 218 thousand acres (1977/78) if the seed renewal is carried out once every three years and the seed requirment is 1.5 basket/acre.

In 1979/80, the Whole Township Paddy Development Projects have been executed in 10 Townships in the Survey Area, whose total acreage sown with paddy is about 458 thousand acres. When the HYV paddy has been sown in the acreage at about 30 percent of the above total acreage, the necessary amount of HYV seeds for the Whole Township Paddy Development Projects are estimated at 69 thousand baskets. Then, 178 thousand baskets of HYV Paddy seeds is required, including 109 thousand baskets of HYV Paddy seeds.

It is absolutely required to strengthen the quality seed production system in the Master Plan Survey Area to cope with a large demand to be expected by the irrigated agricultural development.

Since the paddy fields used for the above foundation seed production are all rainfed and ill-drained, unstable yields and insect damages caused therefrom would prevent the successful production, and the seed propagation in the trust farmers would face more difficulties than in the seed farms.

In addition to the above unfavorable conditions, no provision of standards for seed selection and processing facilities for seeds

produced by the trust farmers have caused failure in producing standardized quality seeds and mixture of foreign species with the paddy seeds. These facts are considered as one of the reasons of the low yield in the paddy production in the Survey Area.

The foundation seeds of crops other than paddy have been produced only in the 30 acre fields in the Hmawbi Central Farms under the more inadequate production system than that of the paddy seeds.

2) Extension

The extension services rendered in Master Plan Survey Area are quite similar to those carried out generally throughout the country as discussed in I-6 "Extension", Agricultural Institution of this report. In other words, the shortage in number of extension staff has caused difficulty in promoting effective and efficient extension services due to inability to keep close and functional relations to the research organizations. Therefore, it is considered necessary to take a measure for improvement of the present situation by the same means as mentioned in the previous paragraph. The proposed plan on extension services aims at improving the current status of the extension activities in the Master Plan Survey Area so as to cope with the development of irrigated agriculture under the intensive farming practices.

There are about 520 of existing extension staff (AC Village Manager) in Master Plan Survey Area, based on average number of Village Managers in each of selected townships in the Area. Therefore, the estimated area coverage of extension staff is 5,000 acres (2,000 ha) per staff on an average.

III. Proposed Agricultural Development

III.1. Proposed land use

Under the 25 proposed irrigation schemes about 390 thousand hectares (about 968 thousand acres) existing paddy fields would be converted from rainfed fields to irrigation field, occupying about 40 percent of the total acreage of the existing paddy fields. These proposed irrigation areas could be cultivated under multiple cropping with proper irrigation facilities provided, and the cropping intensity would reach 170 percent in these lands. About 530 thousand hectares (about 1.3 million acres) of the rainfed paddy fields other than those specified in the above, would raise the cropping intensity up to 115 percent from 110 percent at present under multiple cropping by introduction of the mechanized farming. (Refer to Table C-3-1)

The future land use of the Ya-land and the Kaing-lands would remain unchanged as what they are now. The Ya-lands and the Kaing lands, which extend under unfavourable topographical conditions for water utilization, could be fully developed when the national level projects such as Flood Control Project of the Irrawaddy River would be completed.

About 240 thousand hectares (about 690 thousand acres) of the cultivable waste lands, most of which are sporadically located in the existing cultivated areas, have not been studied in details due to lacking of the data showing their actualities. These lands, however, could be converted to areas to be sown by executing the land consolidation works in the above said irrigation scheme arears and included in the proposed irrigation areas. Such measures, if taken, will enable to convert abort 40 thousand hectares of cultivable waste lands to the areas to be sown.

In implementing land consolidation works, however, 10-15 percent of lands should be reserved as rights-of-ways; hence, the above acreage to be converted from the cultivable waste land would

be offset with the said acrege for rights-of-ways. About 120 thousand hectares (abort 300 thousand acres) of the uncultivale lands are expected to be converted to cultivable lands by drainage improvement works (the proposed swamp reclamation projects).

The proposed net-sown areas total about 1.2 million hectares (about 3.0 million acres), which include newly developed area of about 120 thousand hectares (about 300 thousand acres) by the proposed swamp reclamation projects. As a result, 1,088 thousand hectares (about 2,686 thousand acrers) of present net-sown areas will be increased by 120 thousand hectares (296 thousand acres). Furthermore, the acreage to be sown will be increased by 395 thousand hectares (976 thousand acres) by introducing multiple cropping and implementing swamp reclamation works, and the total acreage to be sown will reach about 1.6 million hectares (about 3.9 million acres). (Refer to Table C-3-1)

III.2. Crop selection and cropping pattern

1) Crop selection

The major crops designated for production increase along with the agricultural development policy in Burma are export-oriented crops such as rice, jute, pulses, and domestic consumptive crops such as cotton, oil-seed crops (groundnut, sesame, and sunflower), rubber, tobbaco and sugarcane.

The rice export has been reduced in its amount from 3.0 million tons in the pre-war time to 600 thousand tons in the post-war time due to rapid demand increase by explosive population growth after the war. Burma might lose its surplus power for rice export unless the production measures currently taken would be improved. (FAO Data 1976) The Government has given a vital role to rice as major foreign exchange earner, and taken necessary measures for rice production increase by the Whole Township Paddy Production Develop-

TABLE C-3-1 PROPOSED CROPPING ACREAGE

(Unit: Thousand ac)

Land Category	Net Sown Area	Wet Season		Dry Season		Annual Crops	Cropped Area
		Paddy	Others	Paddy	Others		
1. Paddy							
A. Irrigable Area							
Proposed Irrigation Proejct	808	808	-	69	479	-	1,356
South Nawin Project	97	83	12	-	86	2	183
North Nawin Project	63	57	6	-	58	-	121
Swamp Reclamation Project	29	29	-	-	29	-	58
Sub-total	997 (100%)	977	18	69	652	2	1,718 (172%)
B. Rainfed							
Swamp Reclamation Project	267	267	-	-	47	-	314
Others	1,318	1,318	-	-	198	-	1,516
Sub-total	1,585	1,585	-	-	245	-	1,830
Total	2,582	2,562	18	69	897	2	3,548
2. Ya	29	-	29	-	15	-	44
3. Kaing	193	-	-	-	193	-	193
4. Garden	163	-	-	-	-	163	163
5. Dani	3	-	-	-	-	3	3
6. Shifting	12	-	12	-	-	-	12
Total	400	-	41	-	208	166	415
Grand Total	2,982	2,562	59	69	1,105	168	3,963

ment Projects or others. Furthermore, several fodder crops such as corn and grain sorghum, and sugarcane can be considered to be export-oriented products in the near future.

On the other hand, the Government has been trying to encourage the production increase in domestic use industrial crops through the long-term or medium-term development plan such as 20-year Plan and 4-year Plan. Besides these domestic consumptive crops, wheat, vegetable, fruit, spice crops, etc. should be also increased in their production to meet the growing demand in future; particularly, wheat production increases is a urgent matter because it is now one of the import items.

The Area is the main paddy producing area in the country, blessed with the favourable natural conditions for the paddy cropping. The Government's long-range strategy for agricultural development has place a stress the paddy production increase in the Lower Burma including the Area.

Furthermore, the production increase should be promoted in specially designated crops of jute, groundnut, sesame and pulses as the second crops for paddy cropping in the Area. The long-staple cotton, which is one of the crops specially designated should be grown in the northern part of the Area, where the annual rainfall is as small as below 1,400 mm. The demands for groundnut, sesame and pulses are forcasted to exceed their supply in the target year of 2000 (Refer to Annex K Economy); hence, the production increase in these crops is urgently required.

Cassaba, which can be an export-oriented crop as fodder and industrial crops, should be increased in production; however, the general farmers in the Area who cultivate the lands of 1.6-2.0 ha (4-5 ac) do not want to crop cassaba, which has comparatively low profitability. Therefore, cassaba should be grown in the newly reclaimed lands where a large-scale farming could be practised.

However, since there are few newly reclaimed lands available in the Master Plan Survey Area, cassaba production increase in the Area has not been contemplated. Corn, sorghum, soy bean, etc. are taken into consideration as the second crops for paddy cropping.

Estimate on economic net production value (ENPV) revealed that soy bean, corn, and sorghum, which are less profitable crops than others, would not be suitable as the second crops for paddy cropping. ENPV of paddy is highest of all crops. On the other hand, the farm income estimate based on the controlled prices showed the groundnut and sesame are the crops more profitable than paddy. That is because these crops are out of the Government's price control. (Refer to Annex K Economy)

As a result, paddy and jute are considered as important crops for export, while pulses and oil-seeds crops such as groundnut and sesame as important crops for domestic consumption in terms of both national and farm economy. Production increase in these crops would greatly contribute to satisfying the domestic demand and power-up for export. The above crops should be introduced according to the guidline mentioned below.

a) Paddy

At present, about 10 percent of the paddy fields in the Survey Area are cropped with HYV. Strengthening of the research institutes and seed production system will allow the existing HYV to be further improved and the seed supply to be smoothened, resulting in rapid increase in HYV sown acreage in the Survey Area according to expansion of the irrigable areas.

There are only 12 HYV available in the Master Plan Survey Area, some of which are inferior in quality to the local varieties, and only a very few HYV are suited to the local natural conditions. Under the circumstances, the HYV of IR strains or other foreign

strains would be sown in the proposed irrigation areas for the time being.

In other rice-exporting countries in the Southeast Asia, breeding and difusion of quality HYV have been positively promoted for irrigated paddy cropping. Burma, which is developing the irrigable area in large scale, should take proper measures for breeding and difusion of quality HYV in the similar way to those other rice exporters do.

The existing export-oriented strain;"Emata" has been cropped in the the fields around Prome and Gyobingauk in the Area. For these fields, it is proposed to crop the improved local variety "Sein-ta-lay" which has a 145-day growth period, and for the fields other than the above, the short-maturing HYV with a 135-day growth period would be cropped. The specific features of the respective recommended varieties are tabulated in Table C-3-2.

There are four new varieties, including Sin-Shway-Wa (Masuri-M), which will be released to be difused in the near future after test results authorized. The specific features of these varieties are shown in Table C-3-3. Most of the improved varieties, excepting for Sein-ta-lay and some others, have about 135-day growth period.

b) Jute

The stable production of jute requires to provide various conditions such as provision of irrigation/drainage facilities, being located in lowlying lands for facilitating retting words, etc. Jute growing, therefore, is proposed to be carried out in the fertile irrigable lands with nonclayey soils in the swamp reclamation scheme areas. In low-lying areas along the Myitmaka river in the Letpadan, Tharrawaddy, and Monyo Township, the pre-monsoon jute would be grown for about 5,000 ha (about 12,000 ac) with drainage improved. The species suitable for pre-monsoon cropping have about 145-day growth period. (Refer to Table C-3-4)

TABLE C-3-2 CHARACTARISTICS OF PADDY HYV RECOMMENDED BY GOVERNMENT

Variety	Type	Growth Period (days)	Plant Height (cm)	Nos. of Effective Tillers	Transparency of Head Rice	Edible Quality
1. Sein-ta-lay (Yeboseim x $C_4$113)	A	145	130	10	Translucent with abdomental white	Good
2. Shwe-wa-htum (Mutant of IR-5)	A	145	120	10	Translucent white	Fair
3. Shwe-ta-soke	A	170	140	15	Translucent with abdomental white	Good
4. Ngwe-toe	C	172	109	12	-do-	Fair
5. C_4-63	A	135	100	12	Translucent white	Good
6. Ma-naw-ha-ri (Mashri)	B	145	135	10	Translucent with abdomental white	Good
7. Sein-lay ($C_4$113)	A	137	105	13	Translucent with head white	Good
8. Shwe-wa-lay (IR-28)	B	110	90	12	N.A	Fair
9. Shwe-wa-yin (IR-24)	B	124	95	9	Translucent white	Good
10. Ya-kyaw (IR-5)	C	135	110	15	Translucent with abdomental white	Poor
11. Shwe-wa-hnan (IR-20)	B	137	95	10	-do-	Fair
12. Lone-thwai-shwe-wa (IR-22)	B	135	95	10	Translucent white	Poor

Note: A = Emata, B = Letymezin, C = Ngasein

TABLE C-3-3 CHARACTARISTICS OF PADDY HYV UNDER INSPECTION FOR RELEASE

Variety	Type	Growth Period (days)	Plant Height (cm)	Nos. of Effective Tillers	Experimental Yield (basket/ac)	Rice Quality	Edible Quality
1. Sin-shway-wa (Masuri-M)	B	130 - 135	110	10 - 12	56 - 95	Translucent	Good
2. Sin-shwe-thwe (IR-34)	A	130 - 135	120	10 - 12	87 - 110	-do-	Good
3. Sin-thiri (B6-90-2)	A	130 - 135	110	8 - 10	62 - 93	-do-	Fair
4. Sin-theingi (BR51-91-6)	B	135 - 140	110	9 - 11	55 - 116	-do-	Good

Source: AC, ARD (Gyogon)

c) Oil-seed crops

Burma has imported food-oil due to shortage in its domestic production. Thereby, the production increase in oil-seed crops is urged to fill the demand-and-supply gap which is expected in future as well.

Groundnut is weak against excessive humidity and suitable to well-drained dry soils for its cropping. Groundnut grown on the clayey soils, which will be better nurished than that in the sandy soils, tends to show lower percentage of ripened pods at the latter period of the growing period, resulting in poor appearance in pod color and low yield. Groundnut being non-photosensitive, can be croppecd in the soils with medium to light loamy surface soils and PH ranging from 5 to 6. If blessed with rainfall in November and December, groundnut growing can produce yield of about 50 basket/ac even under the present conditions. The authorities concerned have been trying to introduce quality foreign seeds as well as to breed local varieties. The growth period of these quality varieties is generally 120 days or so. (Refer to Table C-3-4)

Sesame can be grown in considerably pluvial areas if the lands are well-drained. However, tne rainfall in the latter stage of growing period and harvesting season is unfavourable to good harvests. The most suitable soils to sesame cropping is clay loam to loam soils; however, a wide range of soil conditions will be allowable for its cultivation, only if the land is well-drained. The plant, which is non-photosensitive, take 90-110 day for full growth. In consideration of the above growing condition, sesame is expected to be introduced in the proposed cropping pattern as well-suited crop for multiple cropping. (Refer to Table C-3-4)

Sunflower, which has abort 100-day growth period and high adaptability to soils, can be grown in the lands with various soil features as sesame can be grown. The said three kinds of oil-seed crops can be grown in paddy fields as second crops.

TABLE C-3-4 GROWTH PERIOD OF CROPS TO BE INTRODUCED IN IRRIGATION AREA

Crop	Variety	Growth Period (days)	Remarks
1. HYV, High Quality	Sein-ta-lay	145	
2. HYV, Ordinary	Sin-shway-wa, etc.	135	
3. Groundnut	Sp121, M-9	120	
4. Sesame	Hybird, Hnanni	90 - 110	
5. Matpe	P 11 - 30, Henzada	100 - 130	
6. Gram	Shwe-din-ga	100	Photo-sensitive
7. Pegyi	Local varieties	120	
8. Bocate	-do-	110	
9. Pelum	-do-	130	
10. Jute	Shwe-ni	145	Photo-sensitive, Pre-monsoon crop.
11. L.S.C	Stoneville 213	150	

d) Pulses

The representative species of pulses now grown in the Survey Area are Matpe, Bocate, Pelum and Gram, which are grown in Kainglands or paddy fields as second crops after paddy cropping.

Only Gram of the above is photosensitive and should be sown before November. The growth period of these pulses range from 100 to 130 days and the average is about 120 days. (Refer to Table C-3-4)

The suitable soils to pulses cropping are clay loam and loam soils. Having higher adaptability to more clayey soils, the said pulses can be grown in paddy fields as second crops.

e) Others

The favourable conditions for cotton growing are that the cotton fields become dry with little rain in the latter half of its growth period. Cotton growing takes about six months including harversting.

Most parts other than the northern part of the Survey Area have monthly rainfall over 150 mm, 400-500 mm at maximum in some places, between May to October. In these pluvial area during that period, cotton can not be grown as the second crop after paddy harvesting. Then, cotton should be introduced in northern part of the Area.

On top of the above, tobacco, garlic, onion and vegetable can be growing in the irrigation areas in the Survey Area. But each of these crops will have smaller cropping area to compare to above said four major crops to be cropped in the Area.

2) Proposed cropping pattern

a) Cropping pattern with irrigation

The basic cropping pattern can be specified into the following three according to the kinds of the second crops to be grown.

A) Double cropping of paddy
B) Wet season paddy followed by diversified crops
C) Pre-monsoon jute followed by wet season paddy

In every case, the wet season paddy is grown in the Area, which has been and will be the major paddy growing area in the country because of being rich in rainfall as compared with the northern and middle parts of the country.

In priciple, the pattern A) would be applied to the pluvial central and southern parts of the Survey Area, where the clayey soils extend, the pattern B) would be applied to the northern and central parts of the Survey Area, which have less rainfall than the southern part of the Area and the soils with sandy series, and the Pattern C) would be applied to the lowlying areas where the drainage improvement will be executed.

A lag period more than 45 days is desirable for each pattern in terms of dispersing input of labour power, and economical utilization of animal power and machine operation. However, the lag period has to range as short as from 35 to 45 days in the proposed cropping patterns because the existing paddy varieties are used in the above cropping pattern. Therefore, it is hoped that the further variety improvement of paddy can shorten growth period by 10-15 days and result in expand the lag period to meet the conditions provided in the cropping pattern.

For wet season paddy cropping, plowing and sowing would be carried out during May throught June in considering rainfall conditions, sowing time of the second crops and working condition under high

temperature in April, and it is planned to do transplanting during June to July. In this schedule, there will be a problem in drying paddy after harvesting, but the problem would be solved by introducing the dryers and providing the storage facilities.

When the transplanting period shall be one month staggered to July-August, the harvesting season of the second crops will fall on April, the hottest season of the year. In this case, expected hard labour for second crop harvesting in the hottest season will discourage the farmers to expand their sown acreages of the second crops. In addition to the above, the sowing period and growing period of the second crops meet with the lowest temperature of the year in December and January. Hence, the yield of the second crops will be reduced in this schedule. Therefore, the cropping pattern was prepared to practise transplanting during June and July as shown in Fig. C-3-1, in taking into account the above matters.

In carrying out the pattern C), jute sowing should be practised by the middle of March at the latest in terms of photosensitivity of the plants.

The cropping patterns A) and B) can be further classified into four sub-patterns, A), A'), B), B'). For applying the respective cropping patterns, A) and B) shall be applied to the areas along the left bank of the Irrawaddy River from the Prome Township to the Gyobingauk Township, and A') and B') shall be applied to the areas other than the above as shown in Fig. C-3-2.

Since the pattern with "Wet season paddy followed by paddy" is applied to the clayey soil lands, the said applicable areas should be decided according to the results of further detailed soil survey to be conducted.

b) Cropping pattern without irrigation

The cropping pattern to be applied to the non-irrigated areas will have no remarkable modifications from the existing patterns though the cropping intensity in the paddy fields is expected to be increased by five percent from current rate of about 110 percent.
(Refer to Table C-3-5)

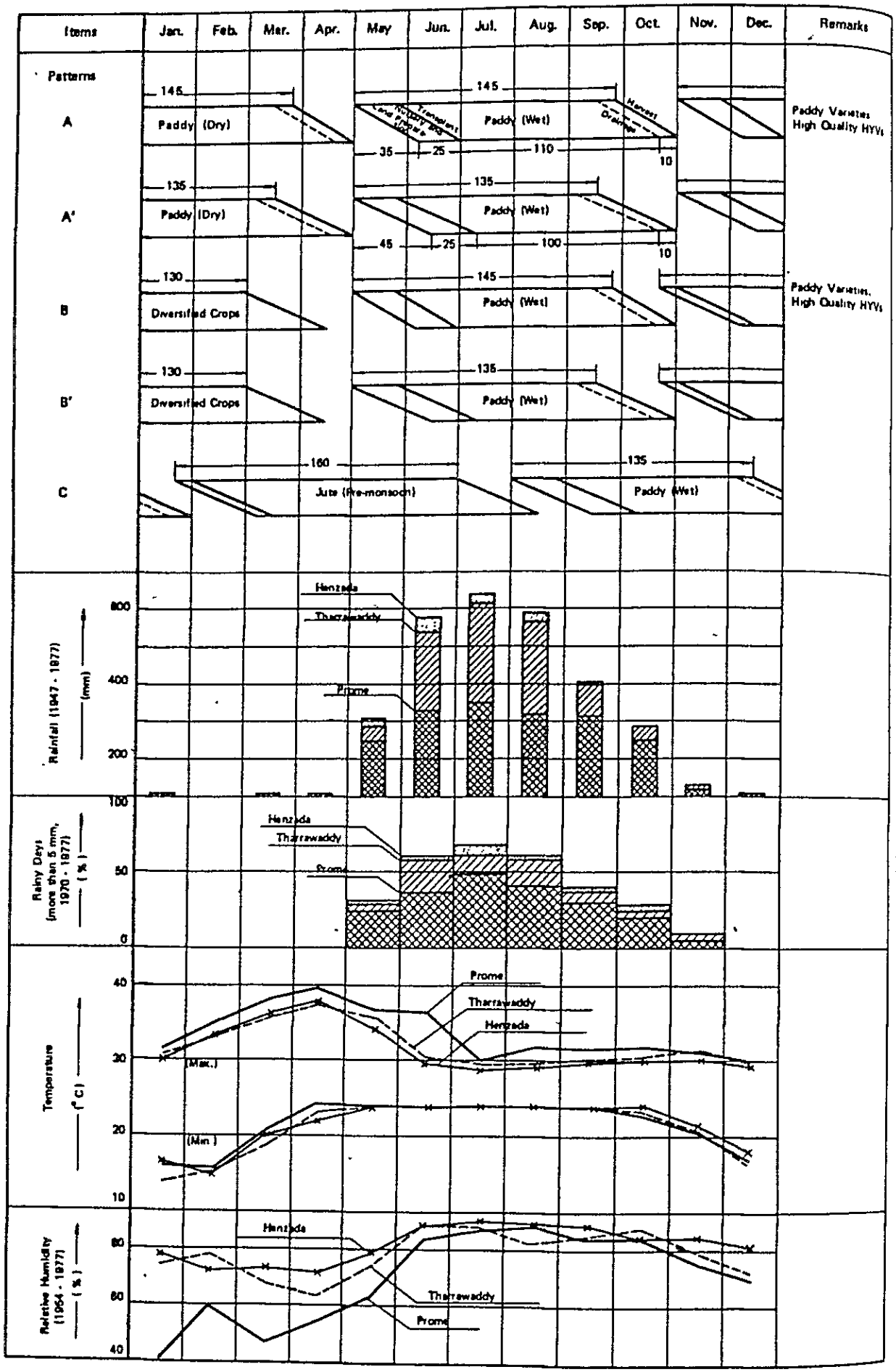

FIGURE C-31 PROPOSED CROPPING PATTERNS WITH IRRIGATION

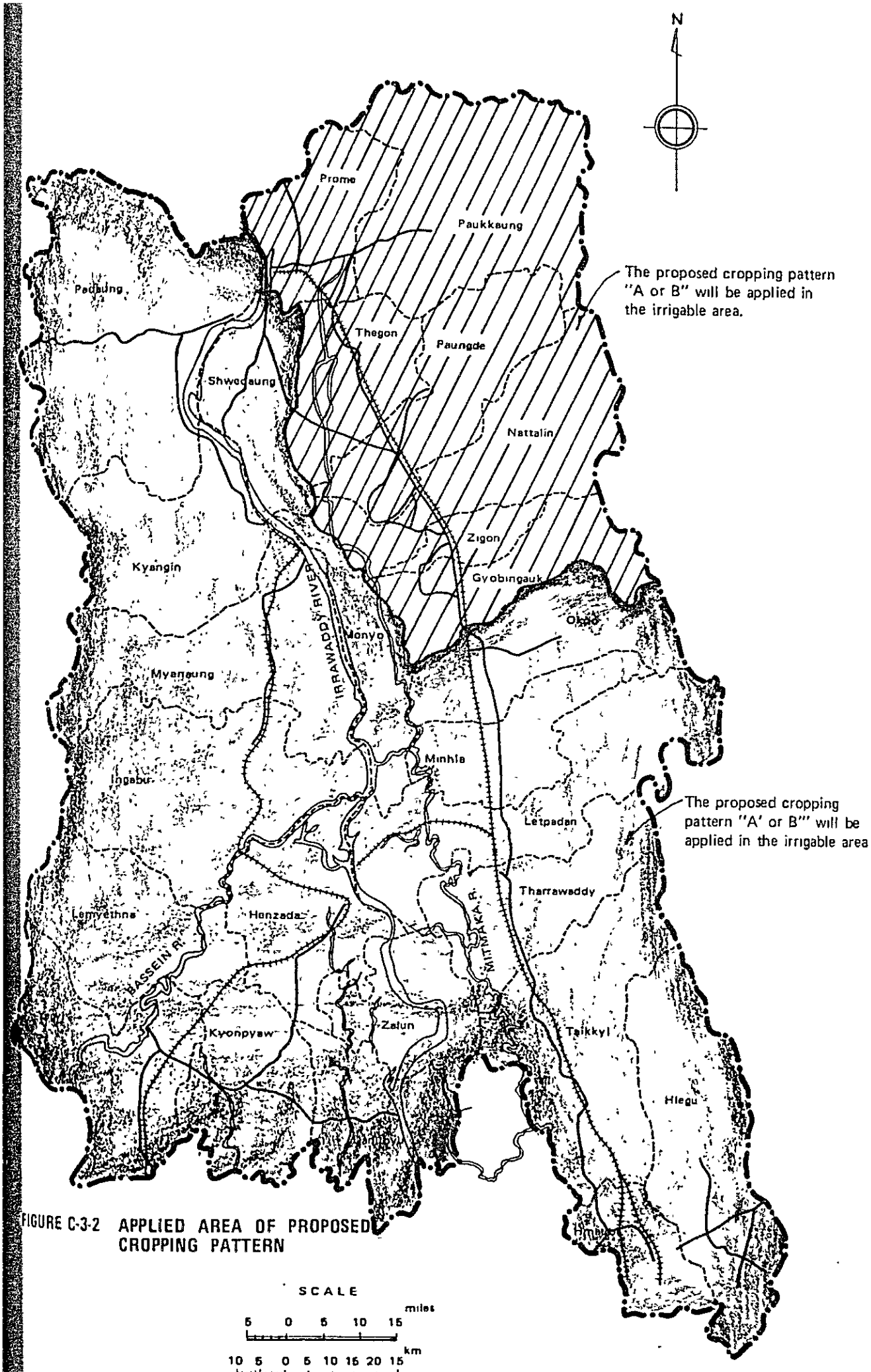

FIGURE C-3-2 APPLIED AREA OF PROPOSED CROPPING PATTERN

TABLE C-3-5 SOWN AREA BY CROP, WITHOUT IRRIGATION, IN FUTURE

(Unit; Thousand ac)

Item	Paddy	Ya	Kaing	Garden	Dani	Shifting	Total
1. Net Sown Area	1,585.0	29	193	163	3	12	1,985.0
2. Cropped Acreage							
- Wet Season							
Paddy	1,525.0	-	-	-	-	-	1,525.0
HYV	644.4	-	-	-	-	-	644.4
Other Varieties	880.6	-	-	-	-	-	880.6
Jute[1/]	95.0	-	-	-	-	-	95.0
Groundnuts (Rain)	-	13.6	-	-	-	-	13.6
Sesame (Early)	-	15.4	-	-	-	4.6	20.0
Other Crops	-	-	-	-	-	7.4	7.4
Sub-total	1,620.0	29.0	-	-	-	12.0	1,661.0
- Dry Season							
Groundnuts (Winter)	48.6	2.2	65.6	-	-	-	116.4
Sesame (Late)	8.6	0.4	11.6	-	-	-	20.6
Pulses	80.3	3.7	108.4	-	-	-	192.4
Cotton	-	8.3	-	-	-	-	8.3
Other Crops	5.5	0.4	7.4	-	-	-	13.3
Sub-total	143.0	15.0	193.0	-	-	-	351.0
- Perenial Crop	60.0	-	-	163.0	3.0	-	226.0
- Total Cropped Acreage	1,823.0	44.0	193.0	163.0	3.0	12.0	2,238.0
3. Cropping Intensity (%)	115.0	151.7	100.0	100.0	100.0	100.0	112.7

Note: 1/ Present sown area with jute (55 thousand acre) plus 40 thousand acre of jute cropping area in the poposed Swanp Reclamation Areas.

III.3. Target yield and crop production

1) Target yield

The present yield fluctuates largely in depending upon meteorological conditions. Thereby, the target yield was determined on the basis of the yield in 1976/77 as standard year which was obtained from the average yield for the recent five years. The target year for this target yield was taken at the year of 2000/01.

As a general rule, a target yield is established under the due consideration of various conditions such as seed breeding, fertilization, irrigation/drainage availability, and in most cases, the general trend of yield increase for each crop shows that there will be a natural increase by 0.5 to 1.0 percent per annum. Introduction of new HYV, increase in fertilization, etc., planned in various schemes will allow to largely increase the target yield with Project.

In general, a target yield for a project is estimated according to the data of the yield obtained from the nearby projects with similar nature. However, the Survey Area has not provided with any project of such kind in or around the Survey Area; therefore, the basic data for the target yield estimate were taken from the experimental farms in the coundry. This experimental yield seems to considerably low as compared with those prepared by International Rice Research Institute (IRRI) or with experimental yields set up in other countries, although it can not be said to make fair comparison in details because of having many differences in cropping varieties, growing conditions, etc., between them.

For instance, the experimental paddy yield in Burma has marked at 4.38 ton/ha (about 85 BKT/ac) with urea applied by about 60 Kg/ha (120 lbs/ac); (Refer to Table C-3-6), whereas that in the Maligaya Rice Research and training Centre, Bureau of Plant Industry, Philippines, has marked at 5.74-5.77 ton/ha with the same dosage of urea by IR-8 strain. There exist about 20 percent difference between the two.

TABLE C-3-6 EXPERIMENTAL YIELD OF WET SEASON PADDY

No.	Variety	Experiment Station	Dosage of Fertilizer(lbs/ac) Urea	TSP	MP	Yield (lbs/acre)
1.	Lontheweshwewa (IR 22)	Mandalay (1971/72)	0	0	0	2,515
			40	80	80	3,008
			60	80	80	3,787
			80	80	80	3,893
			100	80	80	3,512
2.	Yàkyaw-2 (IR-5)	Myaungmya (1970/71)	0	0	0	3,361
			30	30	30	3,791
			60	60	60	3,904
			90	90	90	4,162
3.	Schwewatun (Mutant of IR-5)	Myaungmya (1975/76)	0	100	90	2,666
			40	100	90	3,573
			80	100	90	3,572
			120	100	90	4,279
4.	Seintalay	Hmawbi (1975/76)	0	100	90	2,958
			40	100	90	3,417
			80	100	90	3,809
			120	100	90	3,910
5.	Ngwetoe	Mandalay (1970/71)	0	0	0	2,957
			30	30	30	3,376
			60	60	60	3,570
			90	60	60	4,152
			120	60	60	4,390
6.	Average		0	α	α	2,891 (63 BKT)
			30	"	"	3,584 (78 BKT)
			60	"	"	3,754 (85 BKT)
			90	"	"	4,157 (90 BKT)
			120	"	"	4,193 (91 BKT)

Source: AC, ARD (Gyogon)

In future, however, when the experimental cropping in Burma applies adequate fertilizer under proper techniques and water management to paddy growing, the experimental yield will be increased to fill the above gap.

The yield obtained by farmers is generally estimated by about 20 percent lower than that by the experimental farms. Under the circumstances, it is expected to raise the possible farmers' yield up to the present experimental yield level of 4.38 ton/ha by applying the advanced techniques in every respect, when the experimental yield would be increased to the level of IRRI's. Therefore, it is considered reasonable to set the present yield by 4.38 ton/ha (85 BKT/ac) under the condition of irrigated farming.

The present yields with irrigation for other crops are tabulated in Table C-3-7, based on the present experimental yields in Burma. In taking these as the standards, the target yields were estimated on the basis of annual increase rate of 0.75 percent for HYV paddy and 0.5 to 1.0 percent for other crops, and the results are shown in Table C-3-8.

To accomplish the above target yield with irrigation, it is required not only to provide the on-farm facilities under land consolidation but also to apply necessary farm inputs such as fertilizer, pesticides, and proper farming techniques. Failure of satisfying the above condition, even one of them, will not allow the target yield to be successfully accomplished.

2) Crop production

In 997 thousand acres of the proposed irrigable paddy fields, the irrigated double cropping under irrigation would be realized with 172 percent cropping intensity. The total area sown of 1,585 thousand acres, excepting for the irrigable paddy fields, would have a cropping intensity of about 113 percent, including non-irrigable

TABLE C-3-7 EXPERIMENTAL YIELDS OF SELECTED UPLAND CROPS

Crop	Experimental Station	Variety	Dosage of Fertilizer (ℓbs/ac) Urea	TSP	MP	Yield/ac Unit	
1. Groundnut							
- Rainy	Magwe, 1970~1974	SP-121, M-9, M-10	56	56	28	basket (25ℓbs)	30 ~ 40
- Winter	-do-	-do-	56	56	28		35 ~ 50
2. Sesame							
- Early	-do-	Hnan-ni 25/160, others	112	56	28	basket (72ℓbs)	8 ~ 10
- Late	-do-	Kyi-ma-Shaung	112	56	28		5 ~ 10
3. Sunflower							
- Monsoon	Tatkon, 1971~1976	Ma-ho-ya	112	84	56	basket (32ℓbs)	15 ~ 25
- Late monsoon	-do-	-do-	112	84	56		20 ~ 30
4. Long Staple Cotton							
- Pre-monsoon	Longyaw, 1973~1975	Stoneville-213 S.R.T.-1	84	56	28	viss (3.6ℓbs)	100~200
- Monsoon	-do-		84	56	28		100~120
- Late monsoon	-do-		84	56	28		150~250
5. Matpe (winter)	Tatkon (with complete land preparation)	P 11-30	56	56	28	basket (72ℓbs)	8 ~ 10
6. Gram (Winter)	Mandalay	Local	56	56	28	basket (72ℓbs)	10 ~ 12

Source: AC, ARD (Gyogon)

TABLE C-3-8 TARGET YEILD IN 2000/01

Crop	Unit	Present (1976/77) Rainfed	Present (1976/77) W/ Irrigation	Proposed (2,000/01) W/O Irrigation	Proposed (2,000/01) W/ Irrigation	Annual Increase Rate (%)
1. Paddy						
H.Y.V (Wet)	BKT/ac	63.6	85	75	100	0.75
H.Y.V (Dry)	"	-	90	-	110	"
Others	"	38.2	-	40	-	0.5
2. Jute						
Pre-monsoon	Viss/ac	194.1	320	240	400	1.0
Monsoon	"	165.9	-	210	-	"
3. Groundnuts						
Rain	BKT/ac	22.2	-	27.5	-	1.0
Winter	"	30.4	50	35	60	"
4. Sesame						
Early	BKT/ac	3.8	-	4.8	-	1.0
Late	"	4.0	10	5.0	12.5	1.0
5. Pulses						
Matpe	BKT/ac	5.1	10	6.3	12.4	1.0

paddy field with cropping intensity of 115 percent. In this case, the total acreage of the upland fields would remain in what they are now. (Refer to III.1. Proposed Land Use)

The crop-wise acreages sown in the proposed irrigable area are shown as follows:

i) The HYV paddy would be grown in the whole 977 thousand acres of the proposed irrigable area for the rainy season paddy cropping.

ii) In the expected irrigable areas of 29 thousand acres located in the proposed swamp reclamation project areas, paddy would be grown as the first crop and pre-monsoon jute as the second crop.

iii) As the second crops for 623 thousand acres of the proposed irrigable areas, groundnut, sesame, and pulses would be planned to grow for every one third of the above acreages. (Refer to Table C-3-9)

The crop-wise acreages sown excepting the proposed irrigable areas, will be broken down as shown in Table C-3-5 according to the present crop-wise acreages sown. In this case, however, the expected irrigable areas of 267 thousand acres contained in the swamp reclamation project area should be provided with well-functioning drainage facilities so that the HYV paddy can be grown in the whole area of the same. Furthermore, about 40 thousand acres, 15 percent of the above 267 thousand acres, would be grown with the HYV paddy as the first crop and jute as the second crop.

The crop-wise acreage sown, yields, and productions were estimated as shown in Table C-3-9. The crop-wise estimated productions and their comparison with those at present are shown in the following Table C-3-10.

TABLE C-3-9 CROP PRODUCTION (2000/01)

Crop	Sown Area (1,000 ac)	Production		
		Unit	Yield per ac	Production (in thousand)
I. With Irrigation				
1. Paddy				
- HYV, Wet Season	977	basket (46 ℓbs)	100.0	97,700
- HYV, Dry Season	69		110.0	7,590
2. Pre-monsoon Jute	29	viss (3.6ℓbs)	400.0	11,600
3. Groundnut, Winter	207	basket (25 ℓbs)	60.0	12,420
4. Sesame, Late	207	basket (54 ℓbs)	12.5	2,588
5. Pulseses, etc.	229	basket (72 ℓbs)	12.4	3,840
Total	1,718			
II. Without Irrigation				
1. Paddy				
- HYV, Wet Season	644	basket (46 ℓbs)	75.0	48,300
- Others, Wet Season	881		40.0	35,240
2. Jute				
- Pre-monsoon	41	viss (3.6ℓbs)	240.0	9,840
- Monsoon	54		210.0	11,340
3. Groundnut				
- Rain	14	basket (25 ℓbs)	27.5	385
- Winter	116		35.0	4,060
4. Sesame				
- Early	20	basket (54 ℓbs)	4.8	96
- Late	21		5.0	105
5. Pulses	192	basket (72 ℓbs)	6.3	1,210
6. Others	255		(Mainly Tree Crops)	
Total	2,238			
Total	3,956			

TABLE C-3-10 INCREASE OF CROP PRODUCTION

(Unit: thousand ton)

Crop	Present	Future			Increment
		With Irrigation	Without Irrigation	Total	
Paddy	1,872	2,197	1,743	3,940	2,068
Jute	16	19	35	54	38
Groundnut	46	141	50	191	145
Sesame	4	63	5	68	64
Pulses	44	125	40	165	121

III.4. Farm mechanization and labour balance

1) Necessity of farm mechanization

A farm mechanization plan was prepared aiming at saving farm labours in peak demand, filling up the shortage in animal power and increasing yields. In particular, the proposed double cropping requires to carry out the farming works at proper time, because the delay in farming works will cause the water management to be inefficient and the yield to be lowered.

The farming works now carried out mainly by manpower has pressed farmers under heavy burden to be harmful to their health and to discourage them to work. Promotion of farm mechanization would increase the labour poductivity and raise the farmers' income by converting the resulting surplus labour to the other kinds of works. A deep plowing and a thorough soil breaking by tractors will allow to widen the root-zone for crops resulting in good absorption of nutrients, increase in fertilization effect and high yielding. Also, timely pest control, provision of dryers and storage facilities will enable to reduce losses in harvests.

2) Labour balance without farm mechanization

The farm labour requirements generally have a large seasonal fluctuation. Land preparation, transplanting and harvesting require

the concentrative labour input for a limited short period. Taking the average farm management in the Survey Area by 1.6 ha (4 ac) and the relevant cropping intensity by 170 percent, the study for "without mechanization" was made on farm labour requirements with suppliable family labour under the following conditions. (Refer to Appendix C-2-7).

TABLE C-3-11 AVERAGE SCALE OF FARM MANAGEMENT

1.	Farm Size	: 4 ac	
2.	Monthly Family Labour Supply	: 65 man-day ÷ 2.5 man/family x 26 days	
3.	Cropping Area	:	
	(1) Wet Season	- paddy	4.0 ac
	(2) Dry Season	- paddy	0.4 ac
		- groundnut	0.8 ac
		- sesame	0.8 ac
		- pulses	0.8 ac
	Total		6.8 ac

The above study revealed that labour shortage would take place in March, June, and October. In October, the labour shortage will reach an amount equivalent to 30 percent of suppliable family labour. A daily basis labour shortage is expected to be larger the above estimated figures, and it will become difficult to practise a timely farming works (Refer to Fig. C-3-3). Judging from the distribution of labour shortage taking place throughout the year, it is deemed indispensable to introduce a mechanized farming for carrying out land preparation and harvesting of paddy at proper time.

The labour shortage in harvesting of diversified crops will be supplied by hiring surplus labour which is expected in the areas outside irrigable areas.

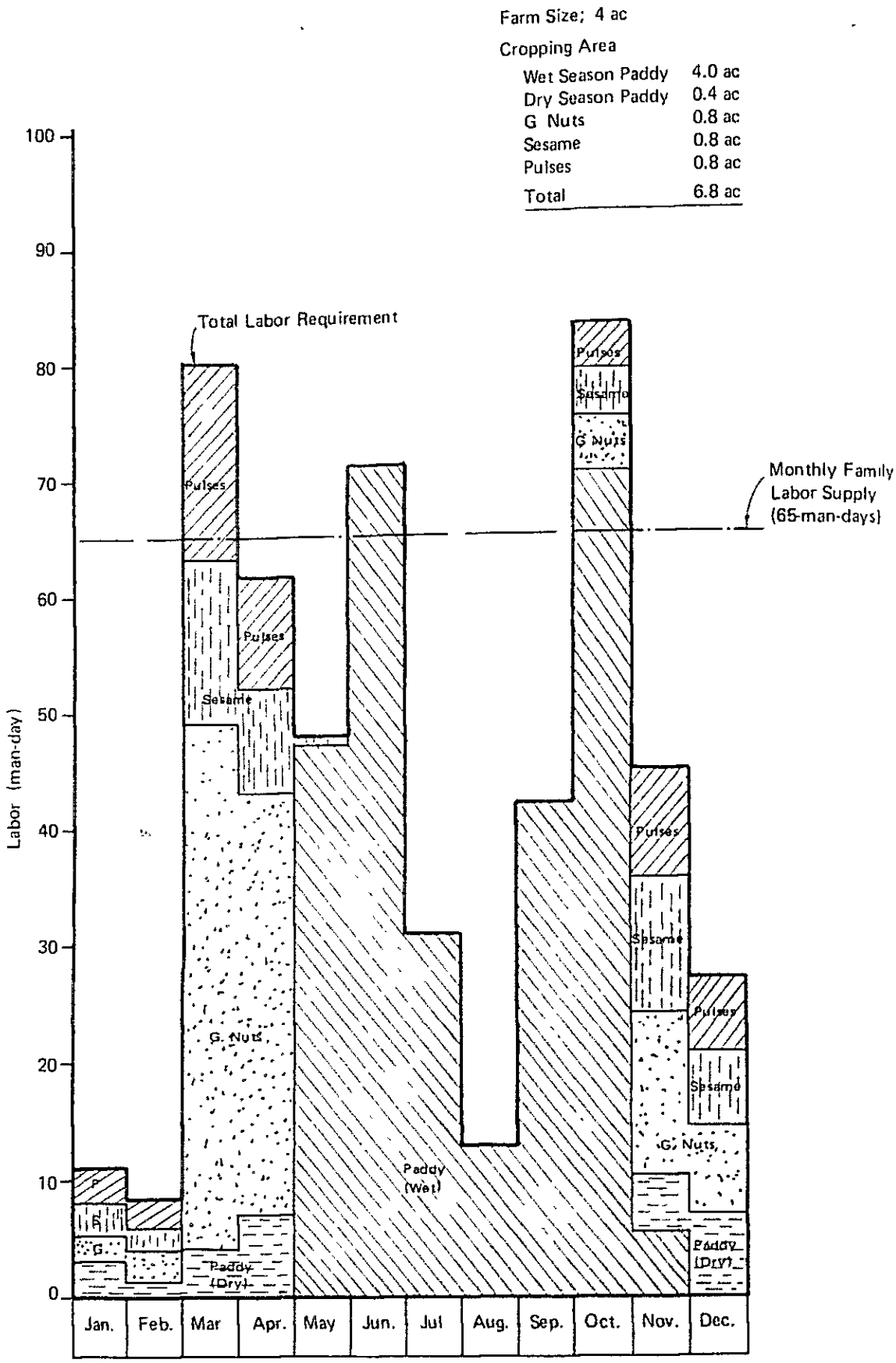

FIGURE C-3-3 FARM LABOR BALANCE WITHOUT MECHANIZATION

3) Farm mechanization plan

The full-scale farm mechanization will not always be the best suited way to the Survey Area from the economical viewpoint. On the other hand, effective farm mechanization can be secured only in the fields highly developed in farm plots, irrigation/drainage facilities and farm roads.

In consideration on the economical conditions and field conditions in the Survey Area, a farm mechanization plan was prepared on the minimum scale that the mechanized farming should be involved in the existing man and animal-power working system for mechanizing mainly the land preparation works.

a) Land preparation

Almost all of the AMD's machine-services have been rendered by 50-60 Hp tractors attached with disc plow or harrow for plowing (one turn) and soil breaking (two turn). However, the mechanized farming at this level has resulted in inadequate soil breaking and further works should be practised by draught power for harrowing and land levelling to a considerable extent. In other respect, the mechanized land preparation for dry season paddy may be difficult to be practised because the soil moisture contents will be rather high in the fields when the land preparation is started. Therefore, it is recommended to use power tillers with rotary for harrowing after applying the tractors so as to secure effectiveness and efficiency in these works, particularly for growing the upland crops after harvest of wet season paddy. Afterward, the animal power will be used in reducing the labour intensity of the farmers.

Plowing and soil breaking by 50-60 Hp tractors for rainy season paddy cropping would be carried out while the soils are in dry condition. When the power tillers with rotary are used for puddling, the sub-surface soils can be saved from being disturbed and the machine slip in the inundated condition can be avoided.

For dry season paddy cropping, the land preparation works are carried out in the fields with high soil moisture contents at the end of the rainy season, plowing, soil breaking and harrowing are carried out by power tillers with rotary, and the puddling works and further works will be practised by animal power. The power tillers will be prevented from abraision of their blades when operated in the wet condition of the fields.

b) Harvesting, threshing and drying

Labour-saving in harvesting and the post harvesting works will permit the time to be secured for land preparation and sowing of the second crops. In order to save the labour in harvesting and post-harvesting, reapers, power-threshers (or pedal-threshers) and flat-bed type dryers would be introduced. The staged introduction will be made for reapers and power-threshers so as to reduce the initial costs. The dryers should be introduced according to the proposed cropping pattern because rainfall sometimes takes place in the harvesting season of the rainy season paddy.

In general, the moisture content of paddy is about 26 percent when paddy harvested and reduced to some 14 percent when it is forwarded. However, since many dryers should be provided for reducing the moisture to 14 percent, the dryers should be use for reducing the paddy moisture from 24 percent to 18 percent and further reduction should be made by sun dry.

The reapers and the threshers in types available for upland cropping should be manufactured in Burma so as to raise their utilization efficiency.

c) Spraying

The cost of liquid pesticides is lower than that of powdered. Thereby, the portable-type power sprayers will be introduced so that the pest control can be made in the fields providing with few access roads.

d) Working capacity of farming machinery

The working capacity of the farming machinery mentioned above was estimated as follows in taking the respective working hours by eight hours per day. (Refer to Appendix C-2-8)

TABLE C-3-12 AREA COVERAGE OF MACHINERY PER UNIT (SET)

Machinery	Workability (ac/day)	Area Coverage (ac/season)
1. 4 Wheels Tractor with Attachments	3.03	151
2. Power Tiller with Attachments		
- For supplental work to 4 wheel tractor works (harrowing only)	2.00	100
- For plowing and soil breaking	0.66	36
3. Reaper	0.99	45
4. Thresher		
- Power Thresher	2.17	88
- Pedal Thresher	0.70	28
5. Dryer	1.20	58
6. Sprayer	7.7	154

e) Number of machines required

There is necessity to form a group to carry out the mechanized farming, the so-called the mechanized farming group, so that one group can work effectively for about 400 ha (about 1,000 ac) belonging to two or three villages. The number of the farming machines required for the works of the above group is estimated and listed in Table C-3-13 and C-3-14.

The machinery costs for farming works with these machines were estimated at about 154 Kyat/ac for the dry season paddy and about 177 Kyat/ac for the wet season paddy, both of which include the costs for all works land preparation, spraying, reaping, drying, etc. The machinery cost for diversified crops was estimated at about 120 Kyat/ac. (Refer to Appendix C-2-9)

TABLE C-3-13 REQUIRED NUMBER AND COST OF MACHINERY (PER 1,000 ACRES)

Machinery	Required Units	Total Cost	
		Price ('000 Kyats)	Cost ('000 Kyats)
1. 50 HP Class 4 Wheels Tractor w/ Attachments	4	63.4	254
2. 7-8 HP Class Power Tiller w/ Rotary	17	16.0	272
3. Power Sprayer (36 - 62 ℓ/min.)	7	9.0	63
4. Reaper (two rows)*	2	11.3	23
5. Power Thresher* (7 - 8 HP 1.22 m)	1	15.1	15
6. Pedal Thresher	32	0.5	16
7. Dryer* (Flat Type 2 to bin)	20	6.6	132
Total			775

* : Burma made machines are not available, but expected to be manufactured in future because of large demand for these machines.

TABLE C-3-14 REQUIRED NUMBER OF MACHINERIES PER GROUP (1,000 ACRES)

Item	Area (ac)	Tractor	Power Tiller	Reaper	Power Thresher	Pedal Thresher	Dryer	Power Sprayer
No. of Set		4	17	2	1	32	20	7
1. Wet Season								
a) Paddy	980	*151x4=604	*36x11=396	*45x2=90	*88x1=88	*28x32=896	*48x20 =960	*154x7 (=1,078) >998
b) Others	18		*100x6=600					
2. Dry Season								
a) Paddy	70			*45x2(=90) 70	*88x1(=88) >70	*28x3(=84) 70	*48x2(=96) >70	
b) Others	630	*151x4=604	*36x3(=108) >96					*154x7 (=1,078) >702
c) Annual crop	2		*100x6=600					
Total		1,208	1,692	160	158	966	1,030	1,700
Area Coverage (ac/sets)		302	99	80	158	30	52	243

*: Area coverage of farm machine (ac/set), refer to Table C-3-12.

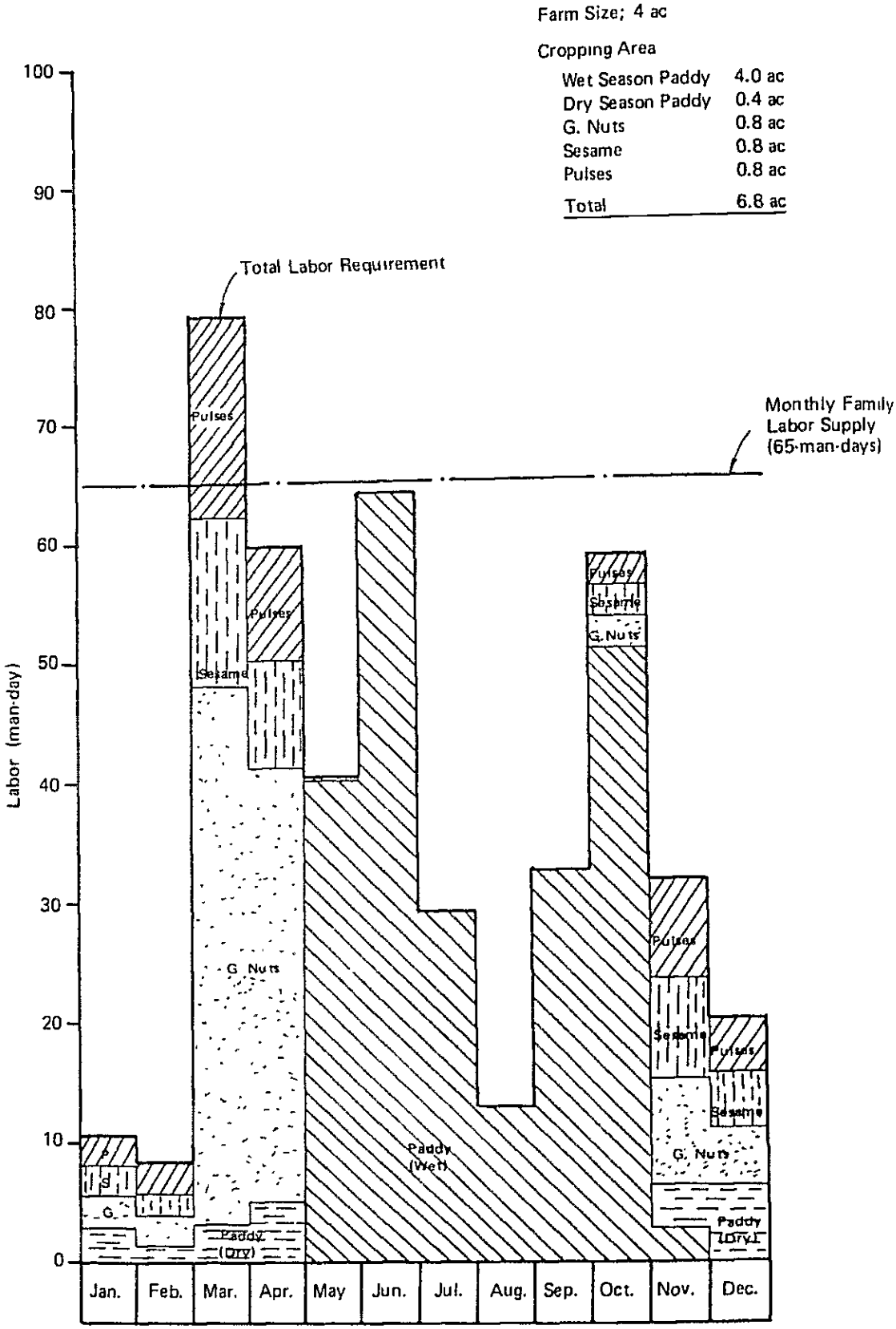

FIGURE C-3-4 FARM LABOR BALANCE WITH MECHANIZATION

4) Labor balance with farm mechanization

Fig. C-3-4 shows farm labor balance in the case of applying above said farm mechanization plan to same farm management as shown in 2) labor balance without farm mechanization. The labor requirement for 4 ac farm is suppliable from family labor throughout year except for the shortage in harvesting of diversified crops. (Refer to Appendix C-2-10)

III.5. Farm input requirements

1) Seeds

The seed requirements of the major crops were estimated as follows (Refer to Table C-3-15).

TABLE C-3-15 SEEDS REQUIREMENT

Crop	Unit	Seed Requirement ('000)		
		With Irrigation	Without Irrigation	Total
Paddy, HYV	basket(46ℓbs)	10,190	3,080	13,270
Paddy, Others	-do-	-	17,430	17,430
Jute	ℓbs	24	1,350	1,374
Groundnut	basket(25ℓbs)	42,848	34,944	77,792
Sesame	basket(54ℓbs)	4,134	636	4,770
Pulses	basket(72ℓbs)	3,712	2,688	6,400

It is desirable to renew the seeds of HYV paddy once three to four croppings. In making seed renewal once four cropping, 3,318 thousand baskets of HYV seeds would be required every year. The current supply capacity of HYV seeds in the Survey Area is 920 thousand baskets per annum. Therefore, the proper seed production and supply system should be established to meet the increasing requirements. Also, the seeds of other crops than paddy should be fully supplied under the proper production and supply system (Refer to Table C-3-16 and C-3-17).

TABLE C-3-16 SEEDS REQUIREMENT WITH IRRIGATION

Crop	Cropping Area (1,000 acre)	Required Amount Unit	per ac	Total (x1,000)
1. Paddy (Wet)	950	basket (46 ℓbs)	1	950
2. Paddy (Dry)	69	basket (46 ℓbs)	1	69
3. Jute	2	ℓbs	10	20
4. Groundnut	206	basket (25 ℓbs)	4	824
5. Sesame	206	basket (54 ℓbs)	1/8	26
6. Pulses (Matpe)	231	basket (72 ℓbs)	1/4	58

TABLE C-3-17 SEEDS REQUIREMENT, WITHOUT IRRIGATION

Crop	Cropping Area (1,000 acre)	Required Amount Unit	per ac	Total (x1,000)
1. Paddy, HYV (Wet)	205	basket (46 ℓbs)	1.5	308
2. Paddy, Others (Wet)	1,162	basket (46 ℓbs)	1.5	1,743
3. Jute	75	ℓbs	15	1,125
4. Groundnut	112	basket (25 ℓbs)	6	672
5. Sesame	34	basket (54 ℓbs)	1/8	4
6. Pulses (Matpe)	167	basket (72 ℓbs)	1/4	42

2) Fertilizer and agri-chemicals

According to the results of national level fertilizer application tests and the fertilizer application plan prepared by AC on the basis of the five year Agricultural Development Plan (1978/79-1981/82), the amount of fertilizers to be required for accomplishing the target yield was estimated, based on which further study was made to compute the requirements of chemical fertilizers in the Project Area, and the estimated amounts are shown in Table C-3-18, C-3-19 and C-3-20.

TABLE C-3-20 FERTILIZERS REQUIREMENT

(Unit; Ton)

Fertilizer	With Irrigation	Without Irrigation	Total
Urea	73,410	20,093	93,503
Triple Super Phosphate	47,806	10,161	57,967
Muriate of Potash	14,835	1,321	16,156

In the target year, the necessary amount of urea is estimated at about six times as much as that in 1976/77 in the Master Plan Study Area, triple super phosphate at about 50 times, and muriate of potash at about 32 times, respectively. However, the definite amount of fertilizers to be required with irrigation should be determined according to the results obtained from experimental cropping in the Project Area.

In irrigated farming, the multiple cropping generally tends to bring about the crop environments vulnerable to pests. Therefore, it will become necessary to apply the pesticides in minimum quantity as shown in Table C-3-21, C-3-22, C-3-23.

TABLE C-3-18 FERTILIZER REQUIREMENT, WITH IRRIGATION

Crop	Cropping Area ('000ac)	Urea per ac	Urea Total ('000bags)	T.S.P per ac	T.S.P Total ('000bags)	M.P per ac	M.P Total ('000bags)	F.Y.M per ac ('000lbs)	F.Y.M Total (x10^{6}lbs)
1. Paddy (Wet)[1/]	950	2.4 (134lbs)	2,280	0.6 (67lbs)	570	0.2 (22lbs)	190	1.3	1,235
2. Paddy (Dry)[2/]	69	2.6 (146lbs)	179	0.7 (78lbs)	48	0.3 (33lbs)	21	1.3	90
3. Jute	2	3 (168lbs)	6	0.5 (56lbs)	1	-	-	8.8	18
4. Groundnut[1/]	206	1 (56lbs)	206	0.5 (56lbs)	103	0.125 (14lbs)	26	8.8	1,813
5. Sesame	206	0.5 (28lbs)	103	0.5 (56lbs)	103	0.125 (14lbs)	26	8.8	1,813
6. Pulses (Matpe)[1/]	231	0.5 (28lbs)	116	0.5 (56lbs)	116	0.125 (14lbs)	29	8.8	2,033
Total	1,664		2,890		941		292		7,002

Note: 1/ Based on fertilizer requirement of "Government's Fertilizer Utilization Plan (1978/79 to 1981/82)

2/ Increased by 20 percent of the requirement for wet season paddy
Urea (bag = 56lbs), T.S.P = Triple Supper Phosphate (bag = 112lbs), M.P = Muriate of Potash (bag = 112lbs), F.Y.M = Farm Yard Manure

TABLE C-3-19 FERTILIZER REQUIREMENT, WITHOUT IRRIGATION

Crop	Cropping Area ('000ac)	Urea per ac	Urea Total ('000bags)	T.S.P per ac	T.S.P Total ('000bags)	M.P per ac	M.P Total ('000bags)	F.Y.M per ac ('000lbs)	F.Y.M Total ('000lbs)
1. Paddy, HYV (Wet)	205	2.0	410	0.5	103	0.125	26	0.6	123
2. Paddy, Others (Wet)	1,162	0.125	145	-	-	-	-	0.6	697
3. Jute									
- Pre-monsoon	33	2.0	66	0.3	10	-	-	4.4	145
- Monsoon	42	1.5	63	0.2	8	-	-	4.4	185
4. Groundnut	112	0.5	56	0.25	28	-	-	4.4	493
5. Sesame	34	0.25	9	0.25	9	-	-	4.4	150
6. Pulses (Matpe)	167	0.25	42	0.25	42	-	-	4.4	735
Total	1,755		791		200		26		2,528

Note: Urea (bag = 56lbs), T.S.P = Triple Supper Phosphate (bag = 112lbs), M.P = Muriate of Potash (bag = 112lbs), F.Y.M = Farm Yard Manure

TABLE C-3-22 AGRO-CHEMICALS REQUIREMENT, WITH IRRIGATION

Crop	Cropping Area (1,000ac)	Insecticides				Herbicides	
		Liquid		Powder		Liquid	
		per ac (gal/ac)	Total (1,000gal)	per ac (ℓbs/ac)	Total (1,000ℓbs)	per ac (gal/ac)	Total (1,000gal)
1. Paddy (Wet)	950	0.5	475	-	-	0.2	190
2. Paddy (Dry)	69	0.5	35	-	-	0.2	14
3. Jute	2	0.2	0	-	-	-	-
4. Groundnut	206	0.2	41	-	-	-	-
5. Sesame	206	0.2	41	-	-	-	-
6. Pulses	231	0.2	46	-	-	-	-
Total	1,664		638		-		204

TABLE C-3-23 AGRO-CHEMICALS REQUIREMENT, WITHOUT IRRIGATION

Crop	Cropping Area (1,000ac)	Insecticides				Herbicides	
		Liquid		Powder		Liquid	
		per ac (gal/ac)	Total (1,000gal)	per ac (bs/ac)	Total (1,000 bs)	per ac (gal/ac)	Total (1,000gal)
1. Paddy, HYV (Wet)	205	0.2	41	-	-	-	-
2. Paddy, Others (Wet)	1,162	-	-	-	-	-	-
3. Jute	75	-	-	-	-	-	-
4. Groundnut	112	-	-	-	-	-	-
5. Sesame	34	-	-	-	-	-	-
6. Pulses	167	-	-	-	-	-	-
Total	1,755		41		-		-

TABLE C-3-21 AGRO-CHEMICALS REQUIREMENTS

(Unit: 1,000 gallon)

Agro-chemicals	With Irrigation	Without Irrigation	Total
Pesticides	638	41	679
Herbicides	204	-	204

However, the chemicals to be used as pesticides should be changed to those with low toxicity from those with high toxicity currently used in Burma but banned in their use in most of other advanced countries.

III.6. Research, extension and training

When the traditional agriculture carried out mainly by rainfed farming is transitted to the modern irrigated agriculture, various applied researches should be conducted to seek for the best suited farming method. In this connection, it is urgently required to start the related applied researches to accumulate the necessary data for pursuing the best way of farming available in the Master Plan Survey Area. The said applied researches should be carried out by the respective central farms to cover the areas concerned according to various local conditions such as meteorology, soils, etc.

On the top of the existing Hmawbi Central Farm, therefore, another three central farms should be established at Prome, Letpadan, and Henzada by grading up the existing seed farms or by providing new farms. Hence, four central farms will serve to the study of the agriculture in the Master Plan Survey Area in future. Table C-3-24 to C-3-27 shows the scales and general dimensions of Central Farms to be strengthened or newly established, which are prepared for the applied research development plan by AC.

TABLE C-3-24 LIST OF CENTRAL FARMS AND SEED FARMS UNDER PLANNING FOR DEVELOPMENT

Farm	Area (ac) Gross Area	Cropped Area	Major Crops	Status of Planning
A Central Farm				
1. Hmawbi*	454	342	Paddy	The development of the farm is included in "the Seed Development Project under World Bank loan and UNDP technical assistance" (1979/80-1981/82)
2. Layhtatpyin (Prome)	770	125	Sunflower Groundnut Cotton Paddy	The development of the farm as seed farm is covered by "FAO/UNDP Crop Development Project" (1979/80-1982/83). And ARD has earmarked this farm as a new Central Farm, although no detail plan for that have been drawn as yet.
3. Letpadan*	120	120	Paddy Jute Groundnut Sunflower	The present seed farm is to be upgraded to a Central Farm in "the Seed Development Project under World Bank loan and UNDP technical assistance (1979/80-1981/82)"
4. Henzada	127	120	Paddy Pulses Groundnut	The development of the present seed farm is included in "FAO/UNDP Crop Development Project". And ARD is making plans to upgrade the seed farm to a Central Farm now in operation under UNDP Assistance Program.
B Seed Farm				
1. Paungde	62	58	Paddy	No plan for development.

Note: * Preparation of development plan is over. Source: AC

TABLE C-3-25 STAFF TO BE IN POSITION IN 1981-82

	Rank	Central Farm				Seed Farm	Total
		Hmawbi	Layhtatpyin	Latpadan	Henzada	Paungde	
1	Farm Manager I	-	1	-	-	-	1
2	Farm Manager II	3 1/	2	1	1	-	7
3	Assit. Farm Manager	2 2/	2	3	1	-	8
4	Dy. Farm Manager	2 3/	2	-	1	-	5
5	Assist. Deputy Farm Manager	5 4/	2	3	1	-	11
6	Village Tract Manager	7 5/	4	3	2	-	16
7	Village Manager	25	25	10	8	2	70
8	Branch Clerk	2	2	-	1	-	5
9	Upper Division Clerk	2	2	1	1	-	6
10	Lower Division Clerk	2	4	2	2	-	10
11	Driver	-	4	1	2	-	7
12	Tractor Driver	7	8	2	4	-	21
13	Carpenter	-	2	-	1	-	3
14	Mechanic I	1	2	-	1	-	4
15	Mechanic II	1	2	1	2	-	6
16	Permanent Labour	39	60	2	20	1	122
	Total	98	124	29	48	3	302

Note: 1/ Each one of Farm Manager, Rice Breeder and Plant Pathologist

2/ Each one of Farm Manager and Rice Agronomist

3/ Each one of Farm Manager and Seed Specialist

4/ Assistant Farm Manager and four Junior Research Officers

5/ Seven Laboratory Assistant

Source: AC

TABLE C-3-26 EQUIPMENTS TO BE IN POSITION IN 1981-82

	Equipments	Central Farm				Seed Farm	Total
		Hmaubi	Layhtatpyin	Letpadan	Henzada	Paungde	
1	Tractor 60-70 H.P.	2	1	1	1	-	5
2	Disc plow 4 disc (Reversible)	1	1	1	1	-	4
3	Pick - up	2	-	-	-	-	2
4	Disc Harrow	-	-	1	-	-	1
5	Groundnut digger	-	-	1	-	-	1
6	Bicycle	2	-	1	-	-	3
7	Motor - cycle	1	-	-	-	-	1
8	Fuel - storage / Handling (unit)	1	-	-	-	-	1
9	Generator 15 KVA	-	-	2	-	-	2
10	Irrigation Pumping Provision U	5	-	5	-	-	10
11	Workshop Equipment and Tools	1	-	1	-	-	2
12	Lab: and field equipment	1	-	-	-	-	1
13	Air Screen Cleaner (11/hr)	1	-	-	-	-	1
14	Elevator (3 T/hr. 16ft. dish height)	2	-	-	-	-	2
15	Working bins with hopper bottom (4'x 4'x 4')	2	-	-	-	-	2
16	Bagger - Scale 1 - 5 Kg	3	-	-	-	-	3
17	Bagger - Scale 25 - 50 Kg	1	-	-	-	-	1
18	Platform scale (500 kg)	1	-	-	-	-	1
19	Plastic Bag scaler	3	-	-	-	-	3
20	Hand truck - 2 wheel	2	-	-	-	-	2
21	Hand trunk - 4 wheel	1	-	-	-	-	1
22	Thresher - IRRI type	2	-	-	-	-	2
23	Driver - IRRI type	1	-	-	-	-	1
	Total	36	2	13	2	-	87

Source: AC

TABLE C-3-27 BUILDINGS TO BE IN POSITION IN 1981-82

Building	Central Farm				Seed Farm	Total
	Hmawbi	Layhtatpyin	Letpadan	Henzada	Paungde	
1. Grade I	2	1	2	1	-	6
2. Grade II	5	-	4	-	-	9
3. Grade III	10	1	8	1	-	20
4. Office	1	1	1	1	-	4
5. Minor Workshop	1	-	1	-	-	2
6. Warehouse (40'x80')	1	-	-	-	-	1
" (30'x60')	-	-	1	-	-	1
7. Processing Building	1	-	-	-	-	1
8. Machinery Shelter	-	2	1	2	-	5

Source: AC

The study items to be taken up in these cantral farms on irrigated agriculture are shown below.

(i) Breeding seeds suitable to cropping in the Master Plan Study Area and applied researches for the seeds bred in the ARI (Agricultural Research Institute) or imported foreign seeds,

(ii) Applied researches for fertilization and plant protection,

(iii) Experiments for establishing the multiple cropping system, and

(iv) Experiments of on-farm level irrigation and water management.

Items (i) and (ii) of the above have been studied in the Hmawbi Central Farm, particularly on the rainfed paddy cultivation. In future, the applied researches on the similar subject for irrigated agriculture should be carried out in the Central Farms. In addition to the above, items (iii) and (iv) should be thoroughly studied for developing the irrigated farming in the Master Plan Study Area.

A successful execution of the said applied researches will require to strengthen the staff concerned and to provide necessary equipments, buildings and so forth (Refer to Table C-3-24 to C-3-27).

The research activities should be made by the above four central farms in close cooperation with the ARI in Yezin through the Hmawbi Central Farm as a representation of the four so as to promote the researches for the Master Plan Study Area. The Hmawbi Central Farm should provide various facilities and equipment so that it will be able to serve as Lower Burma main rice research station, and conduct researches and experiment for seed breeding, improvement of farming techniques, etc.

(2) Seeds multiplication

The demand of standardized quality seeds will be increased, as the fields under improved irrigation/drainage conditions will be expanded. Therefore, the standardization of seeds quality and the efficient supply system of the quality seeds should be strenghthened urgently for the purposes.

The production increase in quality seeds to meet the rising demand in future will essentially require to improve the irrigation/drainage facilities on the seed farms and may need to construct new seed farms. And furthermore, it will be necessary to increase the production of quality seeds by trusted farmers. Under the situation, such entrusted farmers should be organized to execute the scheduled prodution to cope with the demand increase as well as the mechanized seed assorting system should be introduced to treat a large quantity of seeds producted by trusted farmers.

As the first step, a seed production system should be established with capacity to supply the amount to cover the irrigation project areas under the close coordination with each Township AC office and function for the respective irrigation projects; the registered seeds would be produced in the Central Farms and Seed Farms, while the quality seeds would be produced by the trusted farmers in the Project Area.

Based on the seed requirements discussed in the section III-5 in this Annex, the necessary acreages for the registered seed production were estimated at about 500 ha (about 1,300 ac) and those for the quality seeds for renewal at about 8,700 ha (about 21,000 ac), respectively. (Refer to Table C-3-28).

As shown below Table C-3-29, the four Central Farms and one Seed Farm will have 1,476 ac of areas sown available for seed production per annum; thereby, the registered seeds will be

TABLE C-3-28 SEED PRODUCTION AREA FOR QUALITY SEEDS AND REGISTERED SEEDS

Crop	Annual Requirement (ton)	Rate of Renewal (%)	Annual Requirement for Renewal (ton)	Required Quality Seed Farm Area		Required Re-gestered Seed Farm Area (ha)
				Yield (ton/ha)	Area (ha)	
Paddy, HYV	41,982	25	10,496	4.5	2,332	26 (1/90)
Paddy, Other vars.	27,584	10	2,758	2.0	1,379	34 (1/40)
Jute	778	100	778	0.5	1,556	31 (1/50)
Groundnut	18,235	20	3,647	1.5	2,431	405 (1/6)
Sesame	759	20	152	0.7	217	2 (1/100)
Pulses	3,429	20	686	0.9	762	15 (1/50)
Total					8,677 (21,441ac)	513 (1,266ac)

adequately produced to meet the requirements under the conditions that the related fields should be provided with irrigation/drainage facilities to allow the two crops a year.

TABLE C-3-29 SEEDS PRODUCTION AREA

(Unit: ac)

Farm	Total Area	Net Croped Area For Research	Net Croped Area For Seeds	Annual Croped Area For Seeds
1. Central Farm				
(a) Hmawbi	454	50	250	500
(b) Laythtatpyin	770	50	250	500
(c) Henzada	127	30	90	180
(d) Letpadan	120	30	90	180
Sub-total	1,471	160	680	1,360
2. Paungde Seed Farm	62	-	58	116
Total	1,533	160	1,360	1,476

These Central Farms and Seed Farm should be provided with various facilities by enable effective seed production available such as farming machines, seed sorting facilities, storage facilities, test equipments, etc., which will have the respective capacities to deal with the amount of seeds to be produced in the trusted farmers' seed farms of 8,700 ha (21,000 ac).

3) Extension and training

The present extension requires some improvements as stated in I-6 in this Annex. Furthermore, the intensified and scheduled extension is indispensable for transitional period of agriculture from traditional farming to modernized one. The following measures should be taken for improving and intensifying the present extension services carried out in the Project Area.

a) Reorganization of Extension Department

The Divisions of Research, Extension and Land Use are independent from the Agriculture Corporation and transferred to be under direct administration of the MAF.

b) Increase in extension workers

Firstly, the duty acreage covered by one extension worker should be reduced to 1,200 ha (3,000 ac) from current duty of 2,000-2,500 ha (5,500-6,000 ac) by increasing the extension staff in number.

In the irrigated area, the extension staff would have to be increased in number to the extent of one extension worker for 400 ha (1,000 ac) which is the standard now set up in the Whole Township Paddy Production Development Project.

c) Quantity extension service

It is necessary to establish an effective extension programme by strengthened training and education of the extension officers and introducing the Subject Matter Specialist system under the close coordination with the Applied Research Division.

d) Strengthening the functions of extension offices

It is necessary to provide branch extension offices and farmers' meeting houses and these extension officers should be provide with transportation facilities such as motorcycles, and audio-visual education equipment

It is necessary to commence the implementation of items a) and b) because the implementation will take much time, and the implementation of items c) and d) should be followed it.

The proposed number of village extension officers is about 1,900 persons, reaching 3.5 times as many as the current number of village manager, 520 persons, shown in Table C-3-30.

TABLE C-3-30 ESTIMATE OF REQUIRED NUMBER OF VILLAGE EXTENSION OFFICER

Area	Area (1,000 ha)	Required Nos. of Extension Staff
1. Irrigation Project & Swamp Reclamation Project	512	1,280
2. Others	695	580
Total	1,207	1,860

In addition to the village extension officers, 370 village tract officers, and 80 Subject Matter Specialists are proposed for rendering effective extension services in the Project Area.

The proposed items c) and d) will need to provide various facilities and equipment tabulated in Table C-3-31.

It is rather difficult to take above said measures for strengthening the extension activities to cover the whole Project Area in a short period. Therefore, it will be necessary to take a supporting measure in the respective irrigation project as mentioned below.

The operation and maintenance offices located in each irrigation projects provide the agricultural section to which several agriculturists should be assigned. These agriculturists should assist the extension workers in their services along with the government's policy as well as carry out water management at on-farm level, so that the farming works can be promoted smoothly. (Refer to Fig. C-3-5)

The above measures are essential for successful realization of the irrigated agriculture because i) the irrigated agriculture requires more intensified and higher quality extension services

TABLE C-3-31 AGRICULTURAL EXTENSION DEVELOPMENT

1. Number of Extension Staff (Village Level)

(a) Irrigation/Swamp Development Project Areas:	1,280	(one staff per 400 ha)
(b) Other Areas :	580	(one staff per 1,200 ha)
Total	1,860	

2. Number of Extension Staff (Village Tract Level): 370 (one fifth of village levels staff)

3. Number of Subject Matter Specialists (S.M.Ss) : 80 (three S.M.Ss per township)

4. Training Schedule

   (a) For Extension Staff

   - Fortnighly training at each township office
   - Monthly joint training at each township office

   (b) For S.M.Ss

   - Training at Central Office, several times a year
   - Oversea training for selected S.M.Ss.

5. Visit to contact Farmer Groups etc.

   (a) Village Level Extension Staff: Eight visits (eight days) to contact farmer groups and tow visits (two days) to the field within two weeks.

(Cont'd)

(b) Village Tract Level Extension Staff: Five visits (five days) to village demonstration farms within a week and one visit to each contact farmer group a week.

(c) S.S.Ss: Visits to each village based on yearly schedule

6. Transporation Facilities

(a) Four-wheel drive vehicles	:	Each one per township
(b) Light pick-up truck or motorboat (meduim)	:	Each village tract
(c) Motorcycles (100 cc) or motorboat (small)	:	Each extention staff and S.M.S
(d) Motorboat (big)	:	Each S.M.S

7. Extension staff's station : Each village tract

8. Equipment and Audio-Visuals : Lumpsome

- Cine-projector, more cameras
- Slide-projector, cameras
- Amplifier, Micrephones, Horn-speaker
- Tape recorder
- Soil testing equipments
- Others

than those executed currently in the Project Area, and ii) the irrigated agriculture needs a considerable amount of farm inputs, a large sum of credit and a number of farming machines which should be smoothly and efficiently supplied to cope with the requirements in irrigation project areas. It essentially requires the best coordination available among the various related authorities.

Also, the extension activities besides those for irrigated agriculture should be strengthened along with the direction of the Whole Township Paddy Development Project which the Government has been promoting now. Furthermore, such intensified extension services should be rendered for cropping of the other major crops than paddy as one of the items in the programme.

III.7. Pilot scheme

Pilot schemes for demonstrating modernized farming should be executed so that the traditional rainfed agriculture can be smoothly transformed to the modernized irrigated agriculture. Under such consideration, the pilot schemes should be realized prior to implementation of the respective irrigation projects. The pilot schemes wouls be implemented with irrigation/drainage facilities, land consolidation, etc. For on-farm development to be followed by costruction trial farm, demonstration farms and training facilities of extension officers and farmers. (Refer to Annex B, Pilot Land Consolidation Project)

The aims and functions of the pilot scheme projects are i) to show the example of irrigated agriculture for deepening the understanding of farmers and Government's personal concerned about the irrigated agriculture, ii) to conduct various trials for irrigated agriculture for establishing the best suitable method of farming to the irrigated agriculture in the project area, iii) to difuse the techniques and knowledges from various studies and trials, and to train the farmers in the project area and staff concerned, iv) to establish the farmers' water management organization and O & M

organization for on-farm facilities, and v) to conduct various studies about on-farm development including land consolidation works for formulating the best suited plan availble in the project area and to collect related data of reference purposes in the future large-scale land consolidations project implementation.

III.8. Whole Township Paddy Production Development Project

(1) General

In 1975, the authorities concerned selected Pha-lon Village Tract in Taikkyi township and the increased number of extension workers rendered their services to a limited number of farmers to carry out intensive extension works with systematic application of fertilizers and chemicals. The said farmers could double the paddy yield per acre (about 80 baskets per acre) within only two years.

Observing the results, the farmers in whole Taikkyi Township required the authorities concerned to extend this intensive method to the whole township area. The Whole Township Paddy Production Development Project (WTPPDP) was formulated as such, and now extended nationwide.

In this WTPPDP, one extension worker can cover only about 1,000 ac, and the training camps were provided for extension works. The intensive extension works aimed at introduction of HYV, shortening of nursery period, densely planting, increasing application of fertilizer, establishment of fertilizer application standard, etc.

In 1977/78, the first project year, two townships in the whole country were selected as project areas, one of which, Taikkyi is in the Area.

In 1978/79, the WTPPDP was extended to cover 23 townships of the country, among which six townships of Taikkyi, Okpo, Henzada Kyonpyaw, Hlegu and Hmawbi townships are in the Area. Japanese Government has contributed to supply of fertilizers and other farming materials to some of these townships in grant.

In 1979/80, this WTPPDP has been extended to cover 40 or 50 townships in whole Burma, among which ten townships, adding four

townships Zigon, Letpadan, Yegyi and Zalun to the above six townships are in the Area. The total acreage covered by the WTPPDP will be reached about 290 thousand ha (about 720 thousand ac) in the Area.

The objective of this WTPPDP is to raise the paddy production of the major paddy producing townships through intensified agricultural educational programme supported by sufficient inputs.

(2) Some problems on WTPPDP

The above WTPPDP has been in good success by inputs of intensive extension services, fertilizers and other farming materials. However, stable supply of the farm input materials will be indispensable to maintain the good effects produced from the WTPPDP.

The Five-year Development Programme provides a plan to construct the urea manufacturing plant (No. 4), which will be completed by 1984/85; consequently, self-sufficiency in urea supply will be secured from 1984/85 and on, whereas the country will have to seek for the foreign aids or some other ways in urea supply to meet the requirement for four years up to 1984/85. The supply of phosphote fertilizers and other agri-chemicals, however, will have to be dependent totally upon imports and/or foreign aids because there are no plants to manufacture these material in Burma.

Since the HYV paddy is short in its plant stem, it is impossible to grow this kind of paddy in the fields to be flooded more than about 60 cm deep (2 ft). In future, the flooded fields should be cropped with taller stem paddy varieties which will be improved from the existing HYV varieties.

(3) The WTPPDP in the Area

The WTPPDP in the Area is desired to be extended under the four-staged development plan as shown in Fig. C-3-6 in order to be

completed in 1984/85. The WTPPDP for the respective townships should be developed to cover the whole township area within three years. The farm inputs to be required for successful project execution for six years between 1979/80 and 1984/85 are estimated at 216,000 MT respectively as detailed in Table C-3-32, and the staffing of extension workers also should be reinforced by increasing from current about 230 persons to about 1,150 persons.

TABLE C-3-32 ANNUAL FARM INPUTS REQUIRED BY WTPPDP

Township	76/77	79/80	80/81	81/82	82/83	83/84	84/85	Total
A. Acreage (1,000 ac)								
Taikkyi (77/78 shart)	67	67	67	67	67	67	67	67
Okpo+4 (78/79 start)[1/]	292	146	292	292	292	292	292	292
Zigon+3 (79/80 start)[2/]	172	26	86	172	172	172	172	172
Danubyu+5 (80/80 start)[3/]	287	-	43	143	287	287	287	287
Kyanyin+4 (81/82 start)[4/]	169	-	-	25	85	169	169	169
Prome+4 (82/83 start)[5/]	155	-	-	-	23	77	155	155
Total	1,142	239	488	639	926	1,064	1,142	1,142
B. Production (Million BKT) and Yield (BKT/ac)								
Production	49	57	65	70	79	83	86	86
Yield	43	50	57	61	69	73	75	75
C. Required Farm Inputs (1,000 MT)								
Urea	4	12	25	32	47	54	58	216[6/]
T.S.P.	-	6	13	16	24	27	29	109[6/]
M/P	-	3	7	8	12	14	15	56[6/]
D. Required Extension Workers (Persons)								
Extension Workers	229	239	488	639	926	1,064	1,142	1,142

Note: 1/ Okpo, Henzada, Kyonpyaw, Hlegu and Hmawbi Townships 2/ Zigon, Letpadan, Yegyi and Zalun
3/ Danubyu, Lemyethna, Ingabu, Myanaung and Tharrawaddy Townships 4/ Kyangin, Padaung, Monyo, Gyobigauk and Nattalin townships 5/ Prome, Paukkaung, Thegon, Shwedaung and Paungde townships
6/ not including amounts before 1979/80

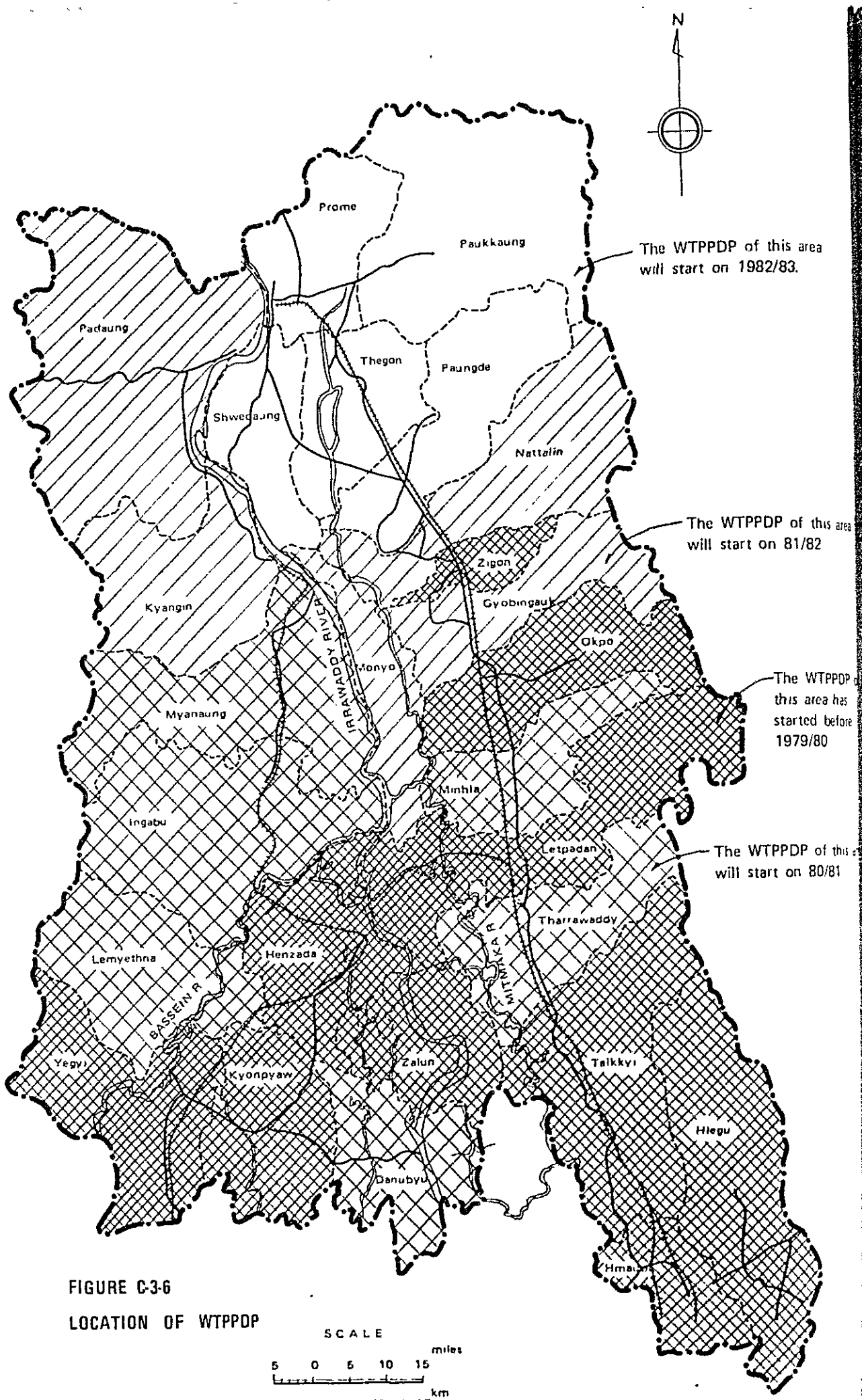

FIGURE C-3-6

LOCATION OF WTPPDP

IV. PROJECT IDENTIFICATION

IV.1. Intensification of applied researches

According to the applied research development plan discussed in III.6., it will become necessary to improve the existing Hmawbi Central Farm and to construct another three Central Farms in the Project Area. The Hmawbi Central Farm improvement and upgrading of the Letpadan Seed Farm to the Central Farm have been planned in the FAO/UNDP Seed Development Project. Thereby, the Project plans to provide new Central Farms by upgrading of the Prome (Layhtatpyin) and/or Henzada Seed Farms to Central Farms. (Refer to Table C-4-1 and Fig. C-4-1)

The construction costs for upgrading the above two farms were estimated on the basis of the scale and general dimensions of the facilities described in III.6. in this Annex, and the results are shown in Table C-4-2. The total construction cost is about 25.7 million Kyat.

IV.2. Seed Farm Development

The seed farm development plan in the seed farms attached to the existing and proposed Central Farms is included in the plan for strengthening of the Central Farms. Besides the above seed farm plan, the Project takes up a plan to improve the Paungde Seed Farm.

1) Location: In the area of existing Paungde Seed Farm
2) Agency in charge: AC,ARD

TABLE C-4-1 APPILIED RESEARCH STRENGTHENING PROJECT

Item	Layhtatpyin Central Farm	Henzada Central Farm
1. Location	Layhtatpyin, Prome	Dagundaing, Henzada
2. Agencies Concerned	AC, ARD	AC, ARD
3. Objectives	Newly establishment of regional experiment station to develop irrigated agriculture on a regional basis	Newly establishment of regional experiment station to develop irrigated agriculture on a regional basis
4. Background	FAO/UNDP Crop Development Project includes the development this farm as a seed farm, but there is no detail plan for upgrading the farm to a Central Farm	FAO/UNDP Crop Development Project includes the development this farm as a seed farm. Upgrading the farm to a Central Farm is under planning by ARD
5. Conponents	i) Farm development ii) Buildings, Equipments iii) Training	i) Farm development ii) Buildings, Equipments iii) Trainig
6. Major Dimensions	i) Total area : 770 ac ii) Total staff : 124 ac	i) Total area : 127 ac ii) Total staff : 48 ac
7. Approximate Project Cost (thousand Kyats)	14,063	11,679

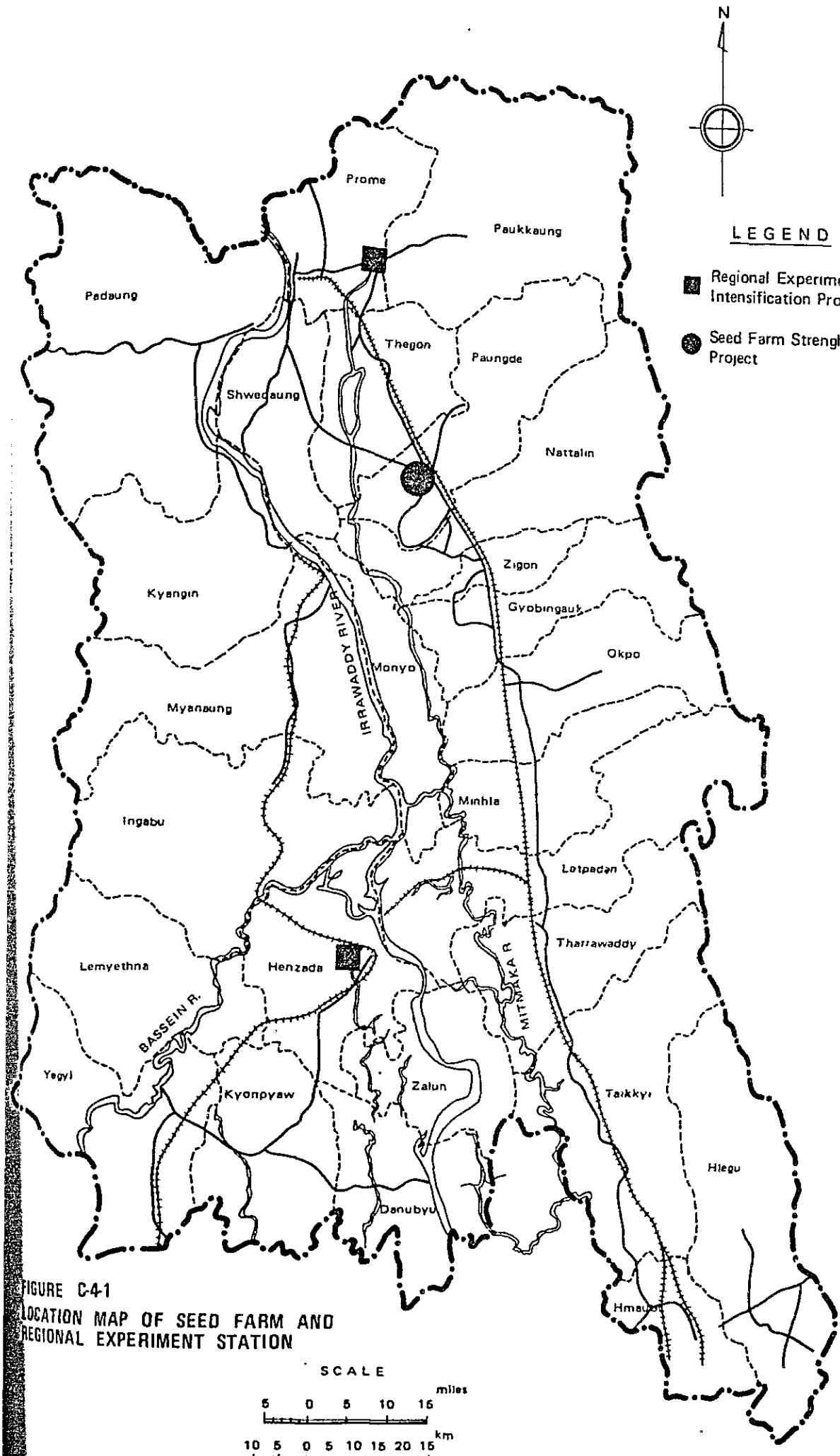

FIGURE C-4-1
LOCATION MAP OF SEED FARM AND REGIONAL EXPERIMENT STATION

TABLE C-4-2 APPROXIMATE COST ESTIMATION OF CENTRAL FARMS

(unit: thousand Kyats)

Item	Unit Price Unit	(1,000 Kyats)	Laythatpyin Amount	Value	Henzada Amount	Value	Total
1. Farm Development (Inclusive of construction equipment)	ac	5.8	300	1,740	120	696	2,436
2. Buildings							
-Grade I	Unit	92	1	92	1	92	184
-Grade II	"	46	-	-	-	-	-
-Grade III	"	36	1	36	1	36	72
-Office	"	10	1	10	1	10	20
-Workshop 1/	"	278	1	278	1/2	139	417
-Warehouse (288m^2)	"	230	1	230	-	-	230
- " (162m^2)	"	130	-	-	1	130	130
-Processing Building	"	130	1	130	1	130	260
-Machinary Shelter (200m^2)	"	160	1	160	1	160	320
-Laboratories	"	10	1	10	1	10	20
-Training Center (400m^2)	"	440	1	440	1	440	880
Sub-total				1,386		1,147	2,533
3. Farm Machinery	Unit	125	5	625	4	500	1,125
4. Laboratory Equipments	"	1,500	1	1,500	1	1,500	3,000
5. Seed Processing Facilities, others	"	500	1	500	1	500	1,000
6. Oversea Training	"	500	1	500	1	500	1,000
7. Expert/Cunsultants Services	"	3,000	1	3,000	1	3,000	6,000
8. O/M Cost				2,000		1,500	3,500
9. Others (1~8 x 0.25)				2,812		2,336	5,148
Total				14,063		11,679	25,742

Note: 1/ Inclusive of machinery and equipments costs

3) Objective: Stable production of registered paddy seeds for difusion, sorting, testing, storing of seeds, and distributing the seeds to farmers concerned.

4) Background: The Paungde Seed Farm improvement Plan is included in neither the FAO/UNDP Seed Development Project nor Crop Development Project, and the said seed farm is expected to play an important role to produce a part of the necessary amount of seeds in the irrigation project areas in future.

5) Components:

i) Farm development - to provide irrigation/drainage facilities and land consolidation. As a water source, the groundwater will be used temporarily, but in future the irrigation water will be supplied from the facilities to be constructed in one of the proposed irrigation project areas of this Master Plan Study.

ii) Farming machinery for seed production, seed sorting facilities, seed testing equipment, etc.

iii) Repair or improvement of facilities for seed processing and storage.

6) Major dimensions: Seed farm for registered seed production: about 60 ac.

7) Cost estimate (Unit: '000 Kyat)

(i)	Civil work for farm development (including construction equipments)	350
(ii)	Seed production machineries, Seed selection and processing facilitics, Seed inspection equipments	1,000
(iii)	Improvement of warehouse, office and other buildings	1,000

(iv)	Others	1,000
	Total	3,350

IV.3. Pilot Land Consolidation Project

The Pilot Land Consolidation Project can be refered to in Annex D about the details such as project location, scale, major components, estimated costs, etc.

APPENDICES

APPENDIX C-2-1 PRODUCTION OF PADDY

Paddy Cultivation

Year: 1970/71

Sr. No.	Township	Sown Acreage (Acre)	Matured Acreage (Acre)	Yield (BKT/acre)	Production (BKT)
1.	Paukkaung	43,963	43,934	38.5	1,693,167
2.	Prome	72,870	72,482	40.3	2,923,024
3.	Padaung	42,597	42,507	42.5	1,805,094
4.	Paungde	68,392	68,311	45.4	3,097,913
5.	Thegon	90,755	90,464	44.3	4,011,485
6.	Shwedaung	56,865	56,849	37.8	2,149,409
7.	Nattalin	97,826	95,324	47.3	4,513,510
8.	Zigon	42,728	42,694	44.0	1,879,522
9.	Gyobingauk	79,469	79,240	47.4	3,757,456
10.	Monyo	29,862	25,456	41.4	1,053,985
11.	Okpo	81,701	81,349	46.4	3,777,929
12.	Minhla	68,766	67,887	46.8	3,175,724
13.	Letpadan	99,452	96,452	47.3	4,565,142
14.	Tharrawaddy	87,477	80,648	47.5	3,830,495
	Sub-total	962,723	943,597	44.8	42,233,855
15.	Taikkyi	127,355	124,242	38.2	4,741,250
16.	Hlegu	150,380	147,838	26.0	3,840,013
17.	Hmawbi	63,960	63,477	31.3	1,986,317
	Sub-total	341,695	335,557	31.5	10,567,580
18.	Kyangin	42,420	42,292	39.7	1,679,244
19.	Myanaung	125,275	123,782	39.4	4,882,894
20.	Ingabu	130,455	123,647	38.5	4,763,228
21.	Lemyethna	59,302	56,037	36.8	2,063,297
22.	Yegyi	108,459	106,636	37.8	4,025,980
23.	Henzada	139,359	137,485	42.3	5,817,639
24.	Zalun	82,925	80,373	40.8	3,275,535
25.	Kyonpyaw	123,931	123,795	40.4	4,998,608
26.	Danubyu	100,985	96,226	39.6	3,811,567
	Sub-total	913,111	890,273	39.7	35,317,992
	Total	2,217,529	2,169,427	40.6	88,119,427

Source: Settlement and Land Record Dept.

Paddy Cultivation

Year: 1971/72

Sr. No.	Township	Sown Acreage (acre)	Matured Acreage (acre)	Yield (BKT/acre)	Production (BKT)
1	Paukkaung	43,959	43,951	37.5	1,646,563
2	Prome	72,523	71,907	39.6	2,849,157
3	Padaung	41,842	41,001	39.7	1,628,379
4	Paungde	67,134	67,134	46.0	3,088,164
5	Thegon	90,867	90,351	45.6	4,117,781
6	Shwedaung	56,385	53,063	38.8	2,056,722
7	Nattalin	95,164	92,800	47.4	4,398,419
8	Zigon	41,703	41,622	45.7	1,900,16
9	Gyobingauk	77,441	75,475	47.0	3,548,198
10	Monyo	27,888	21,866	40.4	882,512
11	Okpo	81,021	80,397	45.0	3,616,667
12	Minhla	67,702	67,135	47.6	3,193,771
13	Letpadan	98,967	97,132	48.0	4,662,044
14	Tharrawaddy	88,543	84,019	47.4	3,978,342
	Sub-total	951,139	927,853	44.8	41,566,881
15	Taikkyi	127,842	120,923	38.9	4,697,859
16	Hlegu	151,526	150,415	30,9	4,652,398
17	Hmawbi	95,099	64,857	34.5	2,240,454
	Sub-total	374,467	336,195	34.5	11,590,711
18	Kyangin	42,009	41,761	39.7	1,657,086
19	Myanaung	124,464	123,322	38.4	4,732,590
20	Ingabu	128,734	124,198	38.5	4,785,343
21	Lemyethna	58,206	55,688	37.3	2,075,403
22	Yegyi	106,335	106,061	37.9	4,022,284
23	Henzada	138,075	132,670	42.0	5,566,006
24	Zalun	81,577	78,366	40.3	3,157,345
25	Kyonpyaw	122,912	122,424	39.8	4,870,680
26	Danubyu	100,334	92,963	40.7	3,786,377
	Sub-total	902,666	877,453	39.5	34,653,114
	Total	2,228,272	2,141,501	41.0	87,810,706

Source: Settlement and Land Record Dept.

Paddy Cultivation

Year: 1972/73

Sr. No.	Township	Sown Acreage (acre)	Matured Acreage (acre)	Yield (BKT/acre)	Production (BKT)
1	Paukkaung	31,124	27,725	13.6	377,119
2	Prome	51,971	35,337	10.2	361,299
3	Padaung	37,164	35,657	20.6	736,306
4	Paungde	66,329	65,447	29.0	1,900,603
5	Thegon	87,777	82,737	26.4	2,184,286
6	Shwedaung	47,003	40,663	20.9	848,546
7	Nattalin	96,582	94,851	39.0	3,696,048
8	Zigon	41,069	41,025	45.4	1,861,920
9	Gyobingauk	76,833	76,244	44.4	3,383,149
10	Monyo	22,540	21,377	35.9	767,269
11	Okpo	80,407	80,346	41.4	3,325,372
12	Minhla	66,947	66,862	45.2	3,023,572
13	Letpadan	98,543	97,639	47.8	4,666,392
14	Tharrawaddy	86,828	86,310	45.7	3,944,953
	Sub-total	891,117	852,220	36.0	31,077,434
15	Taikkyi	126,002	124,994	36.0	4,501,034
16	Hlegu	149,997	148,616	29.2	4,338,038
17	Hmawbi	63,808	63,642	29.9	1,903,919
	Sub-total	339,807	337,252	31.9	10,742,991
18	Kyangin	39,416	39,243	32.0	1,256,906
19	Myanaung	120,257	117,456	32.1	3,772,014
20	Ingabu	123,828	123,309	33.3	4,106,190
21	Lemyethna	57,888	55,892	35.7	1,994,011
22	Yegyi	100,198	99,893	35.8	3,572,231
23	Henzada	136,650	136,402	39.9	5,441,076
24	Zalun	81,406	79,979	37.0	2,960,394
25	Kyonpyaw	123,128	122,972	37.3	4,582,468
26	Danubyu	102,087	91,952	39.6	3,637,849
	Sub-total	884,858	867,098	36.1	31,323,139
	Total	2,115,782	2,056,570	34.2	73,143,564

Source: Settlement and Land Record Dept.

Paddy Cultivation

Year: 1973/74

Sr. No.	Township	Sown Acreage (acre)	Matured Acreage (acre)	Yield (BKT/acre)	Production (BKT)
1	Paukkaung	40,752	40,196	36.7	1,473,987
2	Prome	71,880	71,658	41.7	2,991,005
3	Padaung	41,316	41,174	46.0	1,892,357
4	Paungde	66,815	66,764	47.2	3,152,637
5	Thegon	90,671	90,603	44.3	4.012,847
6	Shwedaung	56,342	55,434	39.2	2,172,816
7	Nattalin	98,102	96,873	48.5	4,702,531
8	Zigon	41,519	41,458	46.4	1,922,51
9	Gyobingauk	77,533	77,465	47.0	3,637,855
10	Monyo	24,701	22,102	45.3	1,001,47
11	Okpo	81,598	80,876	47.8	3,864,26
12	Minhla	67,759	67,551	46.2	3,122,88
13	Letpadan	98,623	94,881	49.2	4,666,573
14	Tharrawaddy	86,299	82,190	47.1	3,867,34
	Sub-total	943,910	929,225	45.7	42,481,08
15	Taikkyi	127,939	121,089	36.8	4,458,16
16	Hlegu	150,091	145,607	30.8	4,490,42
17	Hmawbi	64,166	63,066	31.6	1,991,47
	Sub-total	342,196	329,762	33.2	10,940,05
18	Kyangin	41,687	41,504	40.6	1,685,48
19	Myanaung	125,437	123,934	40.3	4,999,0
20	Ingabu	129,627	122,029	40.5	4,943,444
21	Lemyethna	59,607	57,870	38.3	2,218,73
22	Yegyi	104,861	96,997	39.0	3,787,43
23	Henzada	136,733	134,829	42.5	5,727,56
24	Zalun	81,236	76,679	41.0	3,142,22
25	Kyonpyaw	123,822	115,236	40.4	4,657,83
26	Danubyu	98,837	75,650	42.6	3,225,44
	Sub-total	901,847	844,728	40.7	34,387,24
	Total	2,187,953	2,103,715	41.7	87,808,3

Source: Settlement and Land Record Dept.

Paddy Cultivation

Year: 1974/75

Sr. No.	Township	Sown Acreage (acre)	Matured Acreage (acre)	Yield (BKT/acre)	Production (BKT)
1	Paukkaung	43,688	43,680	38.5	1,681,243
2	Prome	71,003	69,823	38.7	2,700,070
3	Padaung	41,178	41,123	44.8	1,841,780
4	Paungde	68,432	68,025	47.9	3,259,768
5	Thegon	88,252	85,817	45.0	3,859,315
6	Shwedaung	56,107	53,032	38.8	2,059,041
7	Nattalin	99,012	92,208	48.0	4,428,305
8	Zigon	41,870	41,663	46.5	1,936,635
9	Gyobingauk	79,785	77,087	46.4	3,577,449
10	Monyo	26,737	18,132	32.2	583,442
11	Okpo	81,135	79,684	45.3	3,609,715
12	Minhla	68,853	67,561	46.1	3,112,840
13	Letpadan	99,472	65,956	43.9	2,894,496
14	Tharrawaddy	86,774	76,270	44.1	3,364,546
	Sub-total	952,298	880,061	44.2	38,908,645
15	Taikkyi	128,663	117,728	35.0	4,119,389
16	Hlegu	152,592	151,349	31.4	4,748,153
17	Hmawbi	66,597	62,533	31.9	1,996,921
	Sub-total	347,852	331,610	39.5	10,864,463
18	Kyangin	41,445	40,949	40.1	1,643,982
19	Myanaung	126,944	119,209	39.4	4,695,636
20	Ingabu	132,057	119,114	40.2	4,784,669
21	Lemyethna	60,080	57,119	40.9	2,334,522
22	Yegyi	109,536	102,622	40.3	4,136,466
23	Henzada	137,759	118,968	42.2	5,022,829
24	Zalun	81,991	54,302	39.1	2,121,476
25	Kyonpyaw	126,009	123,404	40.6	5,011,232
26	Danubyu	99,751	77,415	43.0	3,327,379
	Sub-total	915,572	813,102	40.7	33,078,191
	Total	2,215,722	2,024,773	37.1	82,851,299

Source: Settlement and Land Record Dept.

Paddy Cultivation

Year: 1975/76

Sr. No.	Township	Sown Acreage (acre)	Matured Acreage (acre)	Yield (BKT/acre)	Production (BKT)
1	Paukkaung	44,030	44,008	38.4	1,690,204
2	Prome	70,777	70,377	40.0	2,818,591
3	Padaung	41,166	41,096	47.1	1,935,488
4	Paungde	68,296	67,667	44.2	2,990,205
5	Thegon	90,778	87,850	44.4	3,901,084
6	Shwedaung	55,601	55,207	39.9	2,205,325
7	Nattalin	98,212	97,215	48.4	4,707,787
8	Zigon	42,108	42,051	47.9	2,013,685
9	Gyobingauk	79,356	79,134	46.4	3,672,377
10	Monyo	26,807	25,480	44.9	1,143,152
11	Okpo	81,293	81,208	48.1	3,904,396
12	Minhla	68,999	68,891	47.1	3,244,431
13	Letpadan	99,282	97,459	49.9	4,860,414
14	Tharrawaddy	88,455	88,455	46.0	4,070,478
	Sub-total	955,160	946,098	45.6	40,157,61[illegible]
15	Taikkyi	133,369	131,572	36.9	4,849,34[illegible]
16	Hlegu	152,661	150,973	32.7	4,930,45[illegible]
17	Hmawbi	67,212	65,931	32.6	2,150,66[illegible]
	Sub-total	353,242	348,476	34.2	11,930,47[illegible]
18	Kyangin	41,514	41,431	41.1	1,701,17[illegible]
19	Myanaung	125,871	122,107	41.8	5,106,752
20	Ingabu	130,669	130,264	42.6	5,545,927
21	Lemyethna	59,282	58,302	41.7	2,432,132
22	Yegyi	110,084	109,353	39.3	4,300,217
23	Henzada	137,613	136,893	43.5	5,950,73[illegible]
24	Zalun	82,140	79,971	40.7	3,254,914
25	Kyonpyaw	124,099	123,702	40.5	5,013,583
26	Danubyu	98,058	94,176	43.0	4,053,54[illegible]
	Sub-total	909,330	896,199	37.6	37,358,97[illegible]
	Total	2,217,732	2,190,773	40.5	89,447,063

Source: Settlement and Land Record Dept.

Paddy Cultivation

Year: 1976/77

Sr. No.	Township	Sown Acreage (acre)	Matured Acreage (acre)	Yield (BKT/acre)	Production (BKT)
1	Paukkaung	43,890	43,878	39.5	1,731,960
2	Prome	69,425	69,385	41.8	2,902,410
3	Padaung	40,711	40,586	46.1	1,870,574
4	Paungde	68,218	68,102	48.0	3,266,166
5	Thegon	90,012	88,400	45.2	3,992,198
6	Shwedaung	55,308	54,889	39.9	2,192,267
7	Nattalin	93,477	93,088	49.8	4,636,548
8	Zigon	42,258	42,238	49.2	2,078,863
9	Gyobingauk	79,626	79,244	48.0	3,803,009
10	Monyo	26,057	23,988	46.0	1,103,781
11	Okpo	80,689	80,475	48.8	3,925,234
12	Minhla	69,129	68,775	48.5	3,334,356
13	Letpadan	98,709	96,675	50.3	4,860,465
14	Tharrawaddy	87,811	85,859	47.1	4,033,940
	Sub-total	945,320	935,582	46.7	43,737,771
15	Taikkyi	131,118	129,794	39.3	5,103,500
16	Hlegu	154,572	153,692	36.2	5,556,778
17	Hmawbi	66,801	66,485	34.9	2,318,678
	Sub-total	352,491	349,971	37.1	12,978,956
18	Kyangin	41,300	41,221	42.5	1,751,892
19	Myanaung	124,927	119,902	43.2	5,179,694
20	Ingabu	128,022	124,217	42.4	5,266,155
21	Lemyethna	58,291	55,617	42.8	2,377,626
22	Yegyi	110,464	106,497	41.5	4,418,560
23	Henzada	137,658	136,482	43.9	5,986,101
24	Zalun	81,348	77,583	43.3	3,355,465
25	Kyonpyaw	123,513	121,159	41.5	5,029,096
26	Danubyu	96,964	95,715	43.9	4,206,227
	Sub-total	902,487	878,393	42.8	37,570,816
	Total	2,200,298	2,163,946	43.6	94,287,543

Source: Settlement and Land Record Dept.

PADDY PRODUCTION

Year: 1977/78

Sr. No.	Township	Sown Acreage (Acre)	Matured Acreage (Acre)	Yield (BKT/ac)	Production (BKT)
1.	Paukkaung	43,093	41,020	37.4	1,535,128
2.	Prome	68,000	54,461	37.7	2,055,504
3.	Padaung	39,494	34,783	41.0	1,427,541
4.	Paungde	66,849	64,649	44.8	2,897,321
5.	Thegon	89,927	80,227	43.6	3,499,501
6.	Shwedaung	54,668	48,881	36.5	1,783,062
7.	Nattalin	91,923	89,297	43.2	3,859,429
8.	Zigon	41,646	41,341	47.8	1,976,203
9.	Gyobingauk	79,015	77,015	49.5	3,812,413
10.	Monyo	25,152	20,593	45.7	941,455
11.	Okpo	81,187	80,466	50.5	4,064,338
12.	Minhla	68,547	68,142	49.0	3,341,609
13.	Letpadan	96,594	92,274	47.9	4,422,788
14.	Tharrawaddy	87,166	79,700	45.1	3,596,472
	Sub-total	933,261	872,849	44.9	39,212,764
15.	Taikkyi	132,266	126,831	54.2	6,874,290
16.	Hlegu	156,086	155,488	35.2	5,468,772
17.	Hmawbi	66,679	63,476	33.8	2,143,540
	Sub-total	355,031	345,795	41.9	14,486,602
18.	Kyangin	41,155	39,339	36.8	1,447,675
19.	Myanaung	125,171	115,738	39.8	4,609,347
20.	Ingabu	128,495	123,948	38.5	4,767,040
21.	Lemyethna	58,358	52,742	40.0	2,108,625
22.	Yegyi	108,459	103,255	41.6	4,293,342
23.	Henzada	137,661	137,247	44.7	6,128,079
24.	Zalun	81,568	77,039	44.5	3,429,420
25.	Kyonpyaw	122,336	121,512	42.4	5,148,464
26.	Danubyu	100,197	98,826	44.0	4,350,436
	Sub-total	903,400	869,646	41.7	36,282,428
	Total	2,191,692	2,088,290	43.1	89,981,794

Source: Settlement and Land Record Dept.

APPENDIX C-2-2 PRODUCTION OF JUTE

Jute Cultivation (Monsoon)

Year: 1970/71

Sr No.	Township	Sown Acreage (Acre)	Matured Acreage (Acre)	Yield (Viss/acre)	Production (Viss)
1.	Paukkaung	-	-	-	-
2.	Prome	249	115	131.7	15,151
3.	Padaung	4,487	4,434	173.1	767,747
4.	Paungde	1,643	1,283	152.3	195,423
5.	Thegon	84	54	95.0	5,131
6.	Shwedaung	860	660	180.8	119,332
7.	Nattalin	1,195	1,089	157.3	171,331
8.	Zigon	613	422	216.8	91,477
9.	Gyobingauk	1,238	1,135	105.1	119,302
10.	Monyo	10,635	9,642	183.5	1,769,276
11.	Okpo	42	32	66.2	2,119
12.	Minhla	352	180	119.9	21,588
13.	Letpadan	393	98	138.1	13,534
14.	Tharrawaddy	97	20	88.1	1,761
	Sub-total	21,888	19,164	171.8	3,293,172
15.	Taikkyi	291	258	102.8	26,534
16.	Hlegu	81	41	89.3	3,663
17.	Hmawbi	-	-	-	-
	Sub-total	372	299	101.0	30,197
18.	Kyangin	155	96	172.1	16,517
19.	Myanaung	466	344	182.9	62,928
20	Ingabu	278	85	77.3	6,571
21.	Lemyethna	140	116	190.1	22,046
22.	Yegyi	248	240	136.6	32,785
23.	Henzada	723	478	143.5	68,585
24.	Zalun	1,184	568	109.2	62,015
25.	Kyonpyaw	534	498	150.0	74,700
26.	Danubyu	1,141	1,020	155.0	158,125
	Sub-total	4,869	3,445	146.4	504,272
	Total	27,129	22,908	167.1	3,827,641

Source: Settlement and Land Record Dept.

Jute Cultivation (Monsoon)

Year: 1971/72

Sr. No.	Township	Swon Acreage (Acre)	Matured Acreage (Acre)	Yield (Viss/acre)	Production (Viss)
1.	Paukkaung	-	-	-	-
2.	Prome	1,400	895	100.7	90,109
3.	Padaung	7,365	7,071	166.2	1,174,942
4.	Paungde	3,854	2,958	179.7	531,434
5.	Thegon	960	485	115.3	55,901
6.	Shwedaung	1,812	1,322	210.5	278,280
7.	Nattalin	3,772	3,460	247.4	855,976
8.	Zigon	1,393	1,048	285.3	298,994
9.	Gyobingauk	4,232	3,679	305.8	1,124,881
10.	Monyo	14,858	14,785	205.0	3,030,925
11.	Okpo	861	720	191.1	137,626
12.	Minhla	1,149	837	235.8	197,377
13.	Letpadan	635	186	95.8	17,826
14.	Tharrawaddy	423	100	149.9	14,989
	Sub-total	42,714	37,546	208.0	7,809,260
15.	Taikkyi	480	444	100.3	44,518
16.	Hlegu	133	92	78.6	7,228
17.	Hmawbi	16	8	112.5	900
	Sub-total	629	544	96.8	52,646
18.	Kyangin	242	159	166.1	26,406
19.	Myanaung	1,540	873	161.5	141,012
20.	Ingabu	414	203	89.1	18,092
21.	Lemyethna	809	407	162.5	66,123
22.	Yegyi	1,035	756	96.1	72,668
23.	Henzada	1,146	815	104.4	85,062
24.	Zalun	1,754	962	145.8	140,285
25.	Kyonpyaw	747	722	176.9	127,745
26.	Danubyu	1,816	1,813	191.7	347,530
	Sub-total	9,503	6,710	152.7	1,024,923
	Total	52,846	44,800	198.4	8,886,829

Source: Settlement and Land Record Dept.

Jute Cultivation (Mosoon)

Year: 1972/73

Sr. No.	Township	Sown Acreage (Acre)	Matured Acreage (Acre)	Yield (Viss/acre)	Production (Viss)
1.	Paukkaung	36	30	96.2	2,885
2.	Prome	829	759	130.4	98,986
3.	Padaung	8,606	8,273	174.4	1,442,684
4.	Paungde	4,438	4,304	238.3	1,025,754
5.	Thegon	1,320	1,253	153.7	192,525
6.	Shwedaung	1,716	1,472	223.5	328,933
7.	Nattalin	6,089	5,924	236.3	1,399,864
8.	Zigon	2,031	1,806	229.8	415,020
9.	Gyobingauk	5,586	5,254	243.0	1,276,821
10.	Monyo	18,294	18,110	225.8	4,089,856
11.	Okpo	1,369	1,303	167.8	218,630
12.	Minhla	1,678	1,628	145.4	236,670
13.	Letpadan	637	427	118.7	50,697
14.	Tharrawaddy	305	167	194.8	32,537
	Sub-total	52,934	50,710	213.2	10,811,862
15.	Taikkyi	774	591	97.1	57,362
16.	Hlegu	115	84	86.2	7,242
17.	Hmawbi	33	28	127.5	3,570
	Sub-total	922	703	97.0	68,174
18.	Kyangin	575	519	138.2	71,744
19.	Myanaung	1,853	1,120	136.2	152,585
20.	Ingabu	406	244	135.5	33,061
21.	Lemyethna	934	791	165.2	130,674
22.	Yegyi	729	540	109.7	59,243
23.	Henzada	1,302	910	149.9	136,446
24.	Zalun	1,368	1,047	151.1	158,215
25.	Kyonpyaw	1,499	1,498	180.2	269,868
26.	Danubyu	3,055	2,481	184.8	458,430
	Sub-total	11,721	9,150	160.7	1,470,266
	Total	65,577	60,563	203.9	12,350,302

Source: Settlement and Land Record Dept.

Jute Cultivation (Monsoon)

Year: 1973/74

Sr. No.	Township	Sown Acreage (Acre)	Matured Acreage (Acre)	Yield (Viss/acre)	Production (Viss)
1.	Paukkaung	53	42	107.4	4,510
2.	Prome	289	272	132.9	36,138
3.	Padaung	5,232	4,985	159.1	792,914
4.	Paungde	2,837	2,734	233.9	639,537
5.	Thegon	319	302	170.0	51,338
6.	Shwedaung	1,051	945	216.2	204,319
7.	Nattalin	4,073	3,980	224.3	892,698
8.	Zigon	1,763	1,628	280.4	456,554
9.	Gyobingauk	4,811	4,658	295.6	1,377,062
10.	Monyo	18,182	16,623	225.4	3,746,952
11.	Okpo	684	478	211.6	101,140
12.	Minhla	2,230	2,221	195.7	434,557
13.	Letpadan	594	518	134.2	69,51[illegible]
14.	Tharrawaddy	274	224	151.2	33,858
	Sub-total	42,392	39,610	223.2	8,841,09[illegible]
15.	Taikkyi	715	489	114.5	56,00[illegible]
16.	Hlegu	388	261	85.0	22,187
17.	Hmawbi	26	20	98.8	1,975
	Sub-total	1,129	770	104.1	80,162
18.	Kyangin	458	154	130.9	20,151
19.	Myanaung	941	509	150.2	76,428
20.	Ingabu	442	303	174.0	52,720
21.	Lemyethna	979	848	175.9	149,201
22.	Yegyi	136	127	135.9	17,263
23.	Henzada	834	815	142.6	116,216
24.	Zalun	1,148	633	159.6	101,018
25.	Kyonpyaw	1,464	1,404	173.1	243,0[illegible]
26.	Danubyu	3,133	2,337	166.1	388,070
	Sub-total	9,535	7,130	163.3	1,164,157
	Total	53,056	47,510	212.3	10,085,41[illegible]

Source: Settlement and Land Record Dept.

Jute Cultivation (Monsoon)

Year: 1974/75

Sr. No.	Township	Sown Acreage (Acre)	Matured Acreage (Acre)	Yield (Viss/acre)	Production (Viss)
1.	Paukkaung	-	-	-	-
2.	Prome	122	86	101.9	8,760
3.	Padaung	2,841	1,782	148.4	264,523
4.	Paungde	1,699	1,111	193.7	215,232
5.	Thegon	259	97	140.0	13,580
6.	Shwedaung	1,044	430	215.1	92,487
7.	Nattalin	3,670	692	190.3	131,712
8.	Zigon	991	729	227.5	165,820
9.	Gyobingauk	2,857	1,090	156.7	170,839
10.	Monyo	15,907	3,041	140.6	427,628
11.	Okpo	59	42	112.1	4,708
12.	Minhla	758	-	-	-
13.	Letpadan	581	24	161.9	3,885
14.	Tharrawaddy	184	-	-	-
	Sub-total	30,972	9,124	164.3	1,499,174
15.	Taikkyi	715	67	104.0	6,970
16.	Hlegu	109	7	80.1	561
17.	Hmawbi	43	-	-	-
	Sub-total	867	74	101.8	7,531
18.	Kyangin	120	46	91.3	4,200
19.	Myanaung	399	149	103.4	15,411
20.	Ingabu	233	18	150.0	2,700
21.	Lemyethna	199	50	173.7	8,686
22.	Yegyi	123	40	114.8	4,590
23.	Henzada	853	410	152.4	62,464
24.	Zalun	910	143	123.3	17,636
25.	Kyonpyaw	907	704	179.3	126,217
26.	Danubyu	1,295	1,097	182.2	199,841
	Sub-total	5,039	2,657	166.3	441,745
	Total	36,878	11,855	164.4	1,948,450

Source: Settlement and Land Record Dept.