

CHAPTER 4

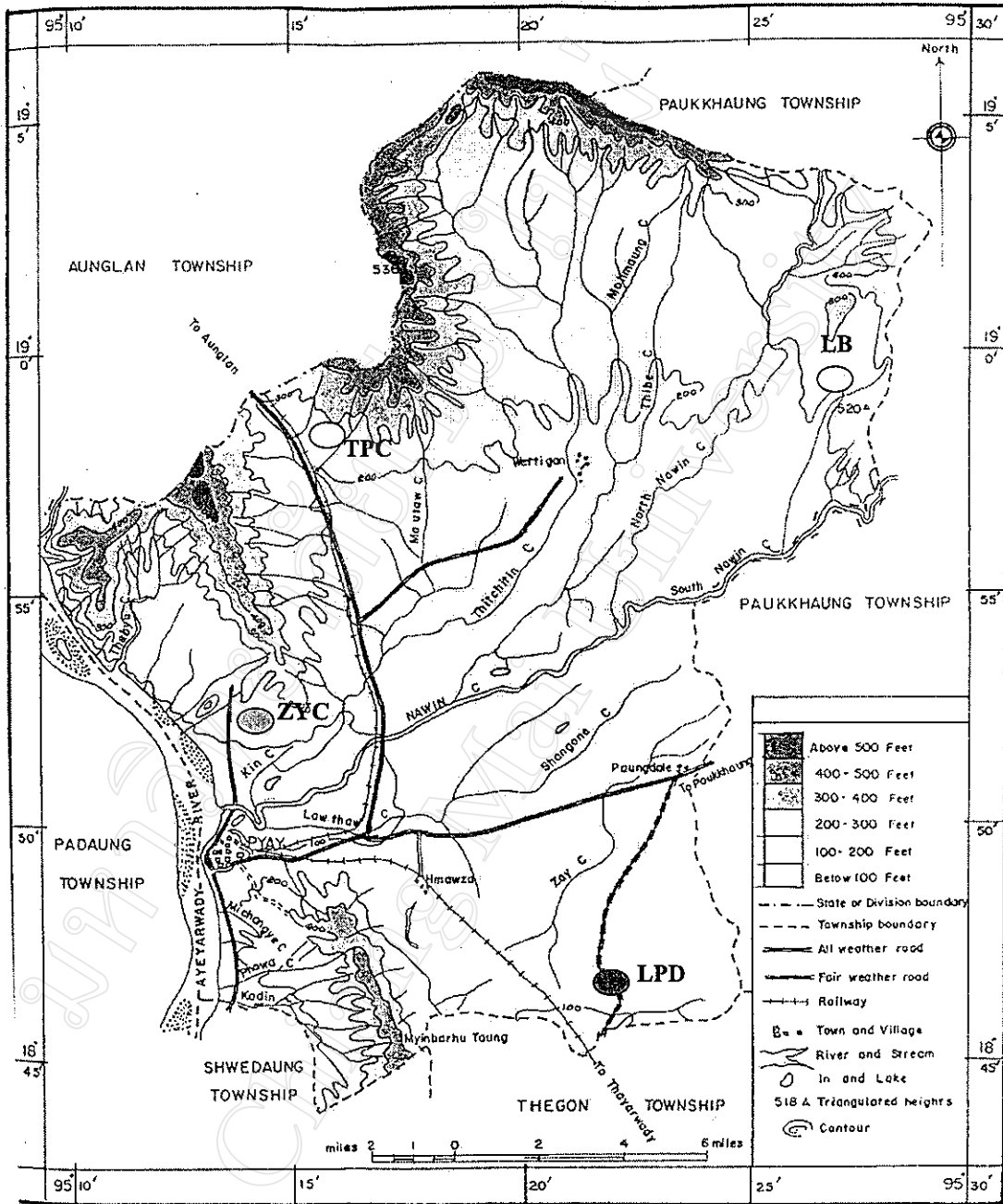
RESULTS OF THE FIELD SURVEY

The field survey was carried out in the study area, Pyay Township, which is imposed to supply fresh cane for No (12) sugar mill (Nawaday sugar mill). The informal survey with key respondents and authorized persons, field visits and formal survey with questionnaires were done during the study period. The references, documents and reports were collected that related to study area. It was done from March to May 2001 in the research area. The results of the field survey were described as follows:

4.1. Physical environment of the area

4.1.1. Physical features of the area

The area, Pyay township is located between $18^{\circ}43'$ – $19^{\circ}08'$ North latitude and $95^{\circ}10'$ – $95^{\circ}30'$ East longitude, it is bounded with Aunglan on the North, Paukhaung on the east, Thegon and Shawetaung on the south and Padaung on the west. The total area of the township is 788.4 square kilometers (194820 acres; 77842 hectares). Generally, topography is flat, but there can be seen small hills which are vary from 200 to 500 feet (61-152 meter) altitude in some of eastern and western parts of the township. The map of physical feature of the study area with surveyed sites was presented (Map 1).



Source: Myanmar Survey Department, Yangon.

- Letpandaw (LPD)
- LeBe (LB)
- Zayitchaung (ZYC)
- Thanpayachone (TPC)

Map 1: Physical features of Pyay Township with locations of surveyed sites.

4.1.2. Climate

Pyay Township is situated on the border of the delta-wet zone and dry zone of Myanmar and therefore it shows transitional characteristics. According to Köppen classification system, Pyay falls into the type of tropical Savanna climate: temperature of the coldest month exceeds 18° C and the precipitation of the driest month is less than 60 mm rainfall. Table 1 presents climatic conditions of the studied area.

Table 1: The monthly climatic conditions of the study area, Pyay, Myanmar.

Factor	J	F	M	A	M	J	J	A	S	O	N	D	Avg / total
Temp	24	26	29	32	31	28	28	28	28	28	26	24	27.5
Rainfall	2.6	0.29	1.13	10.5	137	234	226	227	196	143	44	4.3	1225
Rainy days	1	1	1	2	9	18	22	24	18	11	3	1	111
Solar radiation	1873 $\times 10^4$	2170 $\times 10^4$	2300 $\times 10^4$	2413 $\times 10^4$	1990 $\times 10^4$	1550 $\times 10^4$	1420 $\times 10^4$	1441 $\times 10^4$	1600 $\times 10^4$	1793 $\times 10^4$	1772 $\times 10^4$	1772 $\times 10^4$	1902 $\times 10^4$
Relative humidity	60	47	45	49	66	83	85	86	85	82	76	68	69
Sunshine	9.3	10	9.3	8.9	7.6	4.8	4.1	4.2	5.8	7.3	8.2	8.6	7.4
Day length	11	11	12	13	13	13	13	13	13	12	12	11	12.1
Wind speed	99	92	110	141	148	122	117	110	89	78	110	117	111

Source: Meteorology department (1950-95), adapted from Maw, 1998.

Units: rainfall in mm, temperature in Celsius, solar radiation in $\text{J m}^{-2} \text{day}^{-1}$, Relative humidity in %, Sunshine in hr day^{-1} , Day length in hr day^{-1} , Wind speed in km day^{-1} .

In the area, the average monthly mean temperature varies from a minimum of just above 17° C in December to a maximum of well over 38° C in March and April. During the rainy season and winter, mean of monthly temperature decrease. Solar radiation in area is $1092 \times 10^4 \text{ J m}^{-2} \text{day}^{-1}$ in average. The solar radiation ranges from $1420 \times 10^4 \text{ J m}^{-2} \text{day}^{-1}$ as minimum in July, to $2413 \times 10^4 \text{ J m}^{-2} \text{day}^{-1}$ as maximum in April, due to observed years (1950-1995). The duration of longer sunshine hours in monthly mean extends from October and remains high until April. The annual mean is above 7 hours and duration of day length is above 12 hour day^{-1} based on 1950-1995 observed data. The rainfall occurs almost entirely between the month of May to

October. Annual rainfall receives 1039 mm year⁻¹. During 1997 and 1998 had received less rain than normal due to the effect of climate change. Distribution of rainfall had slightly changed since five recent years ago. There was no raining day from December to March. Average raining days in year is 104 days. Average of relative humidity is 72%. Relative humidity is around 50-60% during dry season (February-April).

4.1.3. Soil

Soils are greatly varied in the area. Soils cover of Pyay township is very complicated in connection with the geo-morphological conditions, is characterized by it's own combinations of soils. Soil information that related to the study sites and sugarcane growing area in the region were noted from the soils survey report of Pyay District (Land Use Department, 1959 and 2000). The dominant soil types in area are Xanthicferralsols, Nitrosols, Gleysols, and Lithosols. There are also some patches of Alluvial swampy clay soils and small spots of swampy soils. Eastern and Northern upland which is characterized by the predominance of Nitrosols (Cinnamon soils). Sugarcane is mostly grown on Nitrosols and Xanthicferralsols soils in area and rarely on Gleysols including Letpandaw study site. It is the main growing land for paddy. Nitrosols (Cinnamon soils) occur on the eastern upland, transitional to plain area, with the coverage elevation of about 152 meter. In this soil type includes dark cinnamon soils and light cinnamon soils. Dark cinnamon soils (sub group of Nitrosols) are light loamy soils in texture with dark color. Light cinnamon soils (sub group of Nitrosols) cover the area of eastern upland and Pyay hills ranges. They are widely distributed. Physical properties of these soils are favorable for crop cultivation in general. During this survey, soil samples were collected as composite samples from the fields of survey sites with farmers' participation. The results of soil tests are presented in (Table 2).

Table 2: Selected physical and chemical properties of soils from surveyed sites.

Field/ plot No	Site	pH	Texture			Organic carbon	Humus	Total N	Exchangeable Cations			Extractable Nutrient	
			Sand	Silt	Clay				Ca	Mg	K	P truog	K2O
			%						%			m mole 100 gm ⁻¹	
796	LPD	5.77	5.00	54.08	35.92	0.50	1.00	0.14	6.87	1.87	0.285	34.90	13.40
797	LPD	5.83	11.95	54.20	30.80	0.80	1.60	0.18	7.01	1.03	0.415	34.90	19.50
798	LPD	6.27	21.30	21.30	28.04	0.62	1.24	0.18	5.56	2.47	0.394	34.90	18.51
382	ZYC	6.16	77.55	10.10	10.20	0.31	0.62	0.11	2.65	0.61	0.219	11.52	10.29
401	ZYC	5.85	67.70	13.00	16.10	0.69	1.38	0.15	3.36	0.63	0.453	17.46	21.27
402	ZYC	6.05	80.70	7.90	10.10	0.12	0.24	0.11	1.62	0.40	0.071	11.52	3.35
383	ZYC	6.46	78.75	6.36	10.64	0.42	0.84	0.12	2.42	0.61	0.279	17.46	13.09
402	ZYC	5.48	80.00	3.00	15.00	0.30	0.60	0.12	1.62	0.20	0.144	26.20	6.74
402	ZYC	6.11	85.00	4.02	7.48	0.12	0.24	0.11	2.22	0.20	0.133	40.00	6.25
383	ZYC	6.12	53.85	31.52	10.48	0.62	1.24	0.11	3.92	1.44	0.221	22.70	10.39
303	LB	5.78	65.15	14.06	18.24	0.12	0.24	0.14	3.06	0.82	0.303	22.70	14.20
300	LB	5.92	80.00	4.12	13.88	0.30	0.60	0.13	2.22	0.40	0.386	40.00	18.13
300	LB	5.95	52.80	22.4	21.60	0.86	1.72	0.12	5.1	0.82	0.479	45.41	22.48
312	LB	6.16	61.30	19.76	16.24	0.55	1.10	0.16	4.08	1.02	0.217	52.40	10.29
8_9	TPC	5.48	56.10	26.10	8.32	0.30	0.60	0.11	1.82	0.20	0.148	52.40	6.93
24-25	TPC	5.50	83.20	3.20	6.38	0.24	0.48	0.09	0.61	0.40	0.034	11.52	1.60

Source: Field survey (2001).

4.2. Land use in the area

The secondary data about land use for different crops in the township is given the present situation of the agriculture in the township for the year 1999 and 2000. The data indicates that paddy fields occupy above 60% of the total sown area and, is the first largest farm enterprise in the region, followed by sugarcane, sesame, groundnut, and pulses in seniority (Table 3).

Table 3: Cultivated area of relative important crops in the area (2000-2001).

Name of crops	2000	2001
	hectare	
Paddy (rain)	27029.4	20615.1
Paddy (summer)	6720.2	2299.0
Peanut (rain)	1345.2	720.7
Peanut (winter)	906.9	690.4
Sesame (rain)	2961.1	2594.8
Irrigated Sesame	1108.8	1719.1
Sun flower	502.2	678.6
Green Gram (rain)	153.8	207.2
Green Gram (winter)	1308.3	3146.4
Peagion pea	123.0	191.8
Mung bean / Black gram	935.2	1940.8
Chick pea	207.6	134.3
Lab bean	509.5	455.7
Kali or Krishna	741.4	785.1
Sona Mung	37.2	152.1
Cow pea	199.9	199.1
Cotton (Gossypium spp)	37.2	20.2
Cotton (Gossypium obtusifolium)	868.8	627.3
Sugarcane	5976.8	6122.1
Total	51672.5	43299.8

Source: Settlement and Land Record Department (2001).

4.4. Farm household, Farm size and energy resource of survey sites

Population-density of the township is 800 people per square kilometer. Most of the farmers are holding a small farm size below 2 ha per house hold. In the survey sites, 54% of farmer possesses less than 2 hectare of land, 35% of farmers are holding 2-5 ha of farm size, and 11% of farmers posses above 5 ha of land. In the study sites, average of household member is (5.25) in Letpandaw, (7.5) in Zayitchaung, (4.5) in Lebe and (4.65) in Thanpayachon respectively. Most of their farm operations are still relied on their owned family labor and animal labor. Small farm-machines likes as hand tractors, water-pumps, engines, etc., have been introducing into farming, but it is

still far away to meet their requirement for efficient farm management. At present, Myanma Mechanized Farm Department (MMFD) provides mechanical tillage and other mechanical and technical assistances for farmers' fields. The current condition of household, farm size and some energy resources for crop production in each site were presented in Table 4.

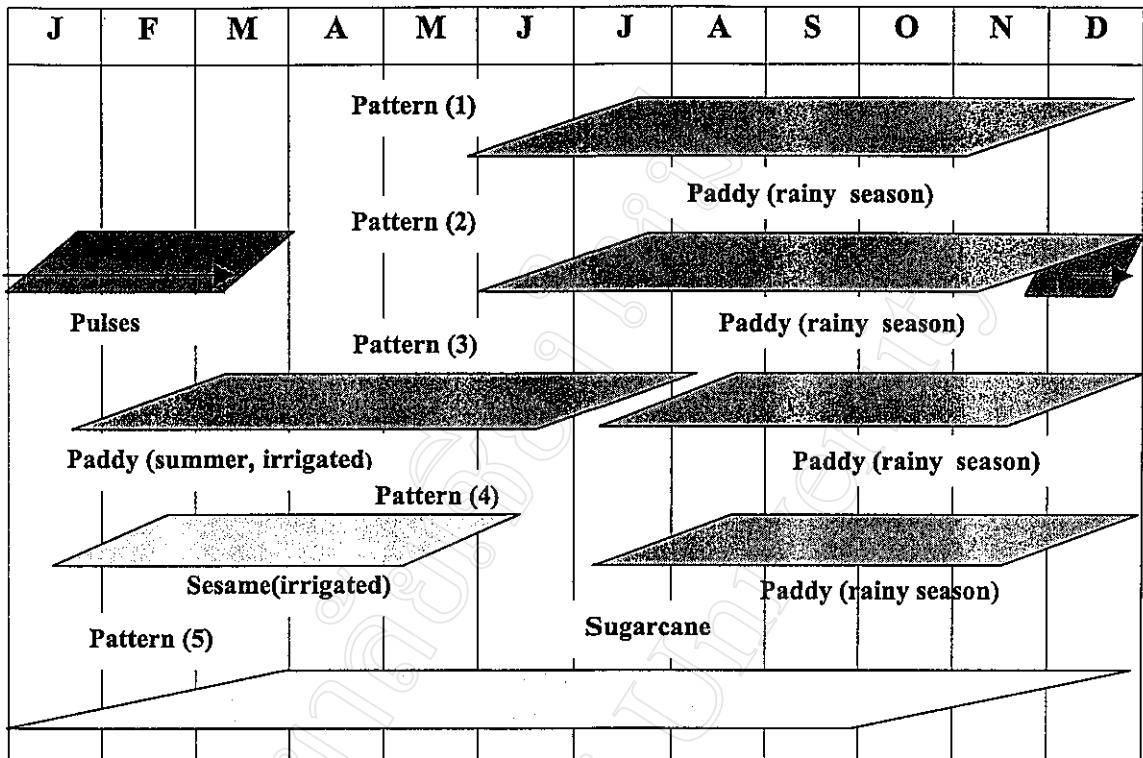
Table 4: Present conditions of household, farm size and some energy resources for crop production in each site as average.

Item	Unit	LPD	ZYC	LB	TPC
Number of family member	Man	5.25	7.5	4.5	4.65
Number family labor for farm	Man	2.05	3.35	1.65	2.4
Total Land holding	Hac	5.1	5.8	4.7	4.5
Holding low land	Ha	3.5	1.3	1.0	1.5
Holding up land (hectare)	Ha	1.6	4.5	3.7	3.0
Number of draft animal per family	No	2.89	4.8	2.8	3.85
Cow dung manure collected per year (approximate)	kg	6000	7500	5000	5000
Number of tractor in village	No	1	1	1	1
Number of hand power tiller in village	No	4	1	1	1
Number of small engine and pump in village	No	4	6	3	4

Source: Field survey (2001).

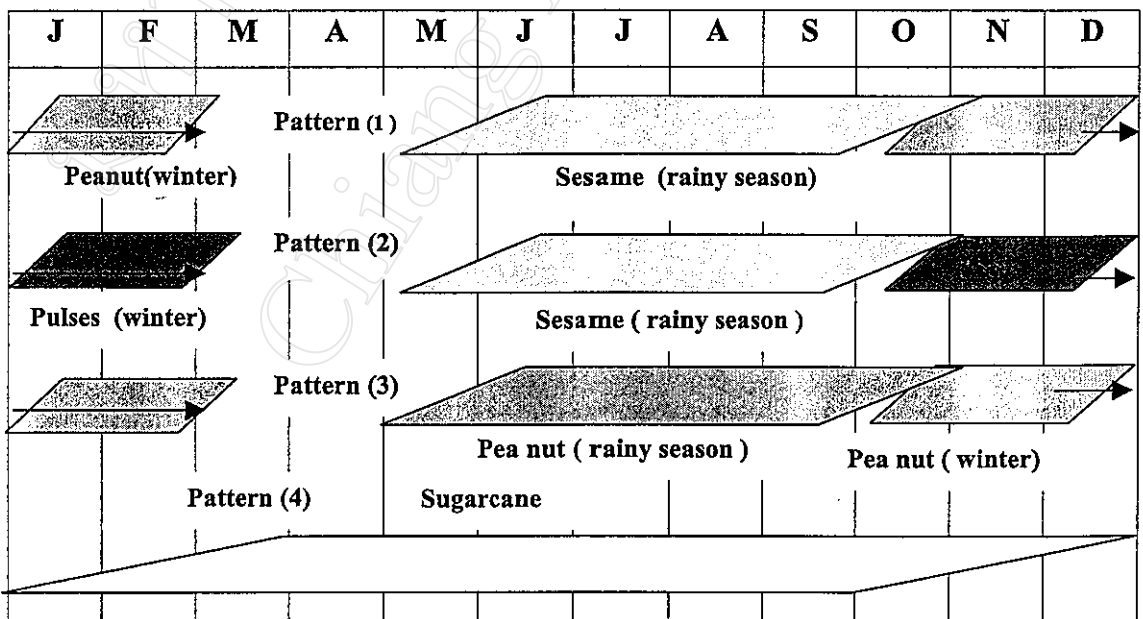
4.5. Cropping systems and cropping patterns

In the area, most of the farmers possess several plots of land, both in upland and low land area. They grow different crops on their farmlands. Therefore, cropping systems are diversifying in the study area. In the year 2000 and year 2001, among the survey sites, single rice crop, rice-pulses-fallow, rice-summer sesame-fallow, rice-peanut-fallow: cropping patterns were found dominantly on low land. A few farmers who access to irrigation can grow triple rice or double rice crop within one year. The cropping patterns—sesame -pulses-fallow, peanut-peanut-fallow, sesame-sugarcane—are major cropping patterns and widely occupied on uplands. Present major cropping patterns for both low land and upland are presenting with Figure 1 and 2. Among the survey sites, there were found that farmers grew sugarcane crop on upland, except Letpandaw site.



Source: Field survey (2001).

Figure 1: Major cropping patterns in lowland (2000-2001).



Source: Field survey (2001).

Figure 2: Major cropping patterns in upland (2000-2001).

4.6. Economic aspect of sugarcane production in the area

Sugarcane crop had occupied the second largest area of cultivated land, but the first largest in up land. More than 3000 farmers had grown sugarcane crop in the year 2000, on a part of their land. Therefore, it is the second most important farm enterprise for the township. Sugarcane production plays as a major role in the social-economic aspect of the township. During the survey, cane growers were asked, in order to capture their perception on sugarcane crop. Table 5 presents about for the perception of cane growers. The gross margin for relative important crops in the area were recorded and presented in Table 6.

Table 5: farmers' perception on sugarcane crop.

ISSUE	LPD	ZYC	LB	TPC
	%			
Compatibility and certainty	85	95	85	100
More benefits than other crops	35	90	70	85
According to their skills and traditional	55	60	50	85
Allocation to have good arrangement on the whole farm	-	-	-	-
Responsibility	-	-	-	-

Source: Field survey (2001).

According to the results of survey, farmers prefer to grow sugarcane crop in the region. The cost and return of crop productions were recorded to analyze the competitive advantage of sugarcane by using gross margin analysis. The cost of production for new plant sugarcane was higher 2-5 times than other crops, but it was reduced doubly in ratoon cane crop production. Among the major crops, sugarcane had highest net return; approximately 42000-54000 kyats ha⁻¹. However, sugarcane crop takes at least 12 month, therefore gross margin should be considered in the major combinations of crops, in other word, cropping pattern. While it had compared in this manner, sugarcane had still ahead than peanut-peanut combination, sesame-peanut combination under the upland condition, but less than double cropping pattern of paddy under low land ecosystem condition where the area were capable to irrigate.