Assigned by Ministry of Agriculture, Forestry and Fisheries

Report on the Basic Survey on Agricultural and Rural Development by Progress Stage in Asian Countries

— The Union of Myanmar —

Focus on
Mandalay and Ayeyarwady Division

MARCH 2001

The Asian Population and Development Association

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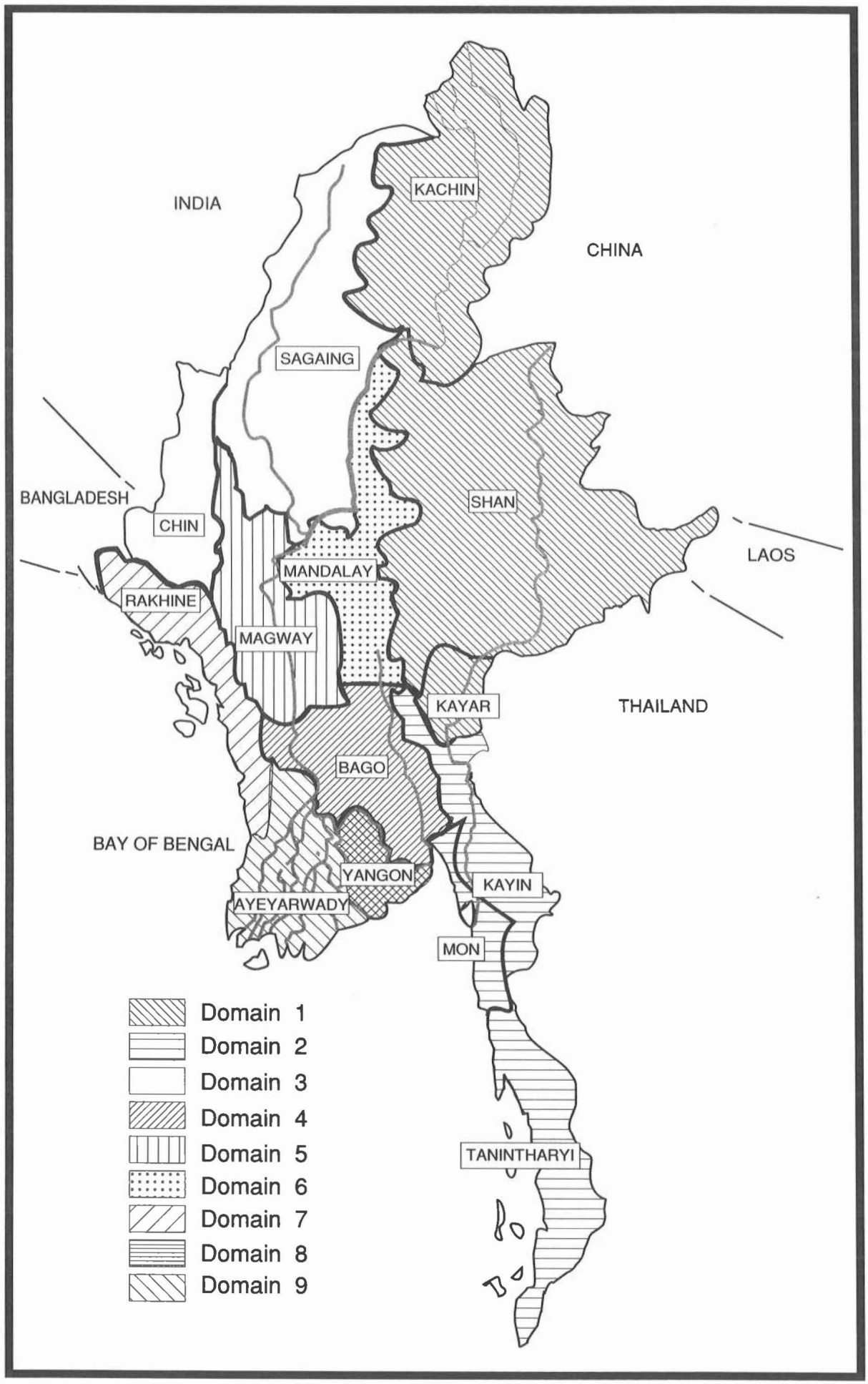
Domain and Administrative Map of Maynmar



Visit to Ministry of Planning and Economic Development
From the left Mr. Soe Win Maung,
Assistant Director, Planning Department,
Ministry of Agriculture and Irrigation
Mr. Kusumoto Osamu,Survey Member
Mr. Zau Tun, Deputy Minister (Brig-General)

At Ministry of Agriculture and Irrigation
Front row, third from the right Mr. Tint Htut Oo, Director General,
Planning Department

At UNDP Maynmar Office
From the Right : Mr. Ohono Akihiko, Survey Member
Mr. Mr. Hla Myint Hpu, Programme Manager, UNDP
Ms. Hilda Thin Kyu, Programme Assistant, UNDP
Dr. Fukui Seiichi, Survey Leader
Dr. Fujita Koichi, Survey Member

At MAPT (Myanmar Agricultural Products and Trade)
Right Mr. Minn Hla Aung, Managing Director

Foreword

This report presents the results of the "Basic Survey on Agricultural and Rural Development by Progress Stage in Asian Countries", a project implemented in Union of Myanmar by the Asian Population and Development Association (APDA) under the consignment from the Ministry of Agriculture, Forestry and Fishery in 2000. The survey and complication of the results were mainly carried out by the member of survey committee of APDA (Chairperson: Dr. Shigeto Kawano, Professor Emeritus, the University of Tokyo).

The objective of this survey was as follows: "In extending assistance for agriculture and rural development to Asian countries, it is necessary to identify the areas in which agricultural and rural development assistance is to be offered, the form in which it is offered and the regions to which it is offered in accordance with stages of development in keeping with the country's policy issues for overall promotion and improvement of rural areas while taking structural changes in population and employment into consideration, in an effort to form the foundation for offering effective and efficient assistance".

For this purpose, survey will be conducted by selecting model and regions from Asian countries to study the form of agricultural and rural development according to structural changes in population and employment, thereby contributing to policy dialogue regarding agricultural and rural development. The field survey in Union of Myanmar was conducted with the guidance and cooperation of: Mr. Nyunt Tin, Minister of Agriculture and Irrigation of Union of Myanmar; Mr. Tin Htut Oo, Director General of Planning Department, Ministry of Agriculture and Irrigation, Mr. Soe Win Maung, Assistant Director of Ministry of Agriculture and Irrigation, Mr. Noaki Ito, Counsellor of the Embassy of Japan, Mr. Kazuhiro Furukawa, Second Secretary, Mr. Toshimichi Aoki, JICA Resident Representative in Myanmar and other cooperators.

In Japan, guidance regarding the content of the survey and assistance in arrangement of field survey were offered by the International Cooperation Division, General Food Policy Bureau, the Ministry of Agriculture, Forestry and Fisheries. And Mr. L. Zau Goone, Minister-Counsellor of Union of Myanmar to Japan had done over all arrangement for field survey in Union of Myanmar. I would like to take this opportunity to extend my deepest gratitude for their support.

I sincerely hope that this report will contribute to the advancement of the rural community and agricultural development programs in Union of Myanmar and support effective assistance by the Japanese Government in this country.

Contents

Chapter 1

Population of Myanmar

1. Population of Myanmar and Statistical Issues Seen in Population Increase Rate

Total population of Myanmar in the 1997/98 period was estimated at 46.4 million. However, Myanmar's population index has numerous problems because population census has not been taken since 1982.

Myanmar is currently under the rule of military government which is under criticism from the international community for repression and suppression of human rights. Under these circumstances, the present administration has become wary about the impact of revealing the realities about the country's population.

In reality, Myanmar is facing numerous problems in connection with her ethnic minorities. Independence movement has not subsided in spite of the country's naming in recognition of her diversity "Union of Myanmar." As the slogan "We will not break up" held up at military facilities paradoxically suggests, the administration of Myanmar has strong sense of crisis against disintegration of the country.

The present military administration has succeeded in realizing peace among almost all ethnic minorities that had been in conflict with one another through its conciliatory line and preferential development measures they have taken towards these groups in addition to de facto approval of their autonomy. Nevertheless, peace has been attained with the Karen (Kachin) National Front representing the largest ethnic minority.

Population census has not been implemented owing to these reasons of international and domestic politics. The values that have been publicized are estimates based on various grounds and are not necessarily consistent.

Two types of study and data are mainly used as the basis for estimating the country's population. One is data under the jurisdiction of the Ministry of Immigration and Population based on registration of birth, death and migration. The other is data based on sample surveys conducted independently by the Ministry of Health and the Ministry of Agriculture and Irrigation.

The demographic statistics publicized by the Central Statistics Office (CSO) is based on

the sudden rise in population increase rate announced by the Central Statistic Office may be the result of having adjusted this statistics' system to match the health-related statistics and may not signify any extraordinary change.

Table 2 Fluctuations Resulting from Migration

Year	Migration			Total population	Percentage in total population (‰)
	In-migration	Out-migration	Balance (net migration)		
1990-91	1,022,703	160,655	862,048	40,790,000	21.1
1991-92	1,091,802	1,318,664	-226,862	41,550,000	-5.5
1992-93	1,107,648	1,221,478	-113,830	42,330,000	-2.7
1993-94	1,391,857	1,745,498	-353,641	43,120,000	-8.2
1994-95	1,538,062	1,422,026	116,036	43,920,000	2.6
1995-96	654,113	648,568	5,545	44,740,000	0.1
1996-97	1,314,587	1,126,786	187,801	45,570,000	4.1
1997-98	1,149,399	1,037,985	111,414	46,400,000	2.4

Source: Calculated from Statistical Yearbook 1998, Central Statistics Organization 2000.

The impact of migration is shown in Table 2. The impact is significant according to this table. The results of adding migration fluctuations on data in (1)* are shown in the following; the figures are totally different compared to those from the Central Statistic Office.

Table 3 Modification of Population Increase Rate According to Migration

Year	Population increase rate (1)*	Migratory portion	Modified population increase rate (‰)
1990-91	(20.3)	21.1	(41.4)
1991-92	20.3	-5.5	14.8
1992-93	20.2	-2.7	17.5
1993-94	19.9	-8.2	11.7
1994-95	20.2	2.6	22.8
1995-96	20.1	0.1	20.2
1996-97	19.9	4.1	24.0
1997-98		2.4	
1999-2000			

Source: Calculated from Ministry of Labour/UNFPA, *Handbook on Human Resource Development Indicators 1998*, and *Statistical Yearbook 1998*, Central Statistics Organization 2000. Population increase rate for 1991-92 was used for 1990-91 as owing to unavailability of data.

The limitedness of data is strongly felt as the relationship between fertility, mortality and migration data and population increase rate is not clear. Considering the fact that considerably large number of people that move in and out of the country are not reflected in population increase rate, it is not clear whether the difference between the population increase rate obtained from health-related sources and the population increase rate obtained from registration can be discussed. In the event the statistics based on fertility and mortality registration publicized by the Central Statistic Office and the results of fertility and mortality

Table 5 Total Fertility Rate and Crude Birth Rate by Domain and Urban/Rural Areas

	Total fertility rate (TFR)			Crude birth rate (CBR)			Rank	
	Total	Urban	Rural	Total	Urban	Rural	TFR	CBR
Domain1	3.15	2.85	3.23	26.42	25.20	26.66	2	2
Domain2	2.69	1.74	3.00	20.93	14.35	23.00	5	5
Domain3	3.07	1.30	3.50	24.50	12.64	26.66	3	3
Domain4	2.38	1.85	2.54	19.87	17.81	20.41	8	7
Domain5	2.44	1.13	2.69	18.99	10.76	20.27	7	8
Domain6	2.48	1.47	2.95	20.65	14.71	22.83	6	6
Domain7	4.47	3.23	4.67	32.19	27.13	32.91	1	1
Domain8	1.76	1.50	2.36	15.75	14.05	19.36	9	9
Domain9	3.01	2.22	3.16	24.30	19.61	25.07	4	4
National total	2.72	1.77	3.11	22.20	16.24	24.21		

Source: *Fertility and Reproductive Health Survey1997*, Yangon 2000

Total fertility rate (TFR) in urban areas of Magway Division in Domain 5 is 1.13 and is almost same as that in Tokyo where declining birth rate and aging are in progress. TFR in other urban areas such as Mandalay Division in Domain 6 and Yangon Division in Domain 8 are 1.47 and 1.50, respectively, and are at levels that are only slightly higher than that in Japan. On the other hand, TFR of Rakhine State in Domain 7 is extremely high at 4.67.

Yangon Division has the lowest fertility for both urban and rural areas while Rakhine State has the highest fertility for both urban and rural areas. Exceptionally rapid birth rate decline may be taking place in urban areas of Magway and Mandalay. When we touched on the subject of changes in population increase rate during a discussion with an official at the Ministry of Health, the official, apparently in his fifties, mentioned that his parents' generation typically has more than 10 siblings and that he himself had 7 brothers and sisters. He added that he has 3 children of his own and that he is concerned about them being reluctant to marry. Many told us that number of bachelors is increasing in Yangon because of their reluctance towards marriage.

No consistency can be identified between the crude birth rate shown here and the population increase rate that has been announced as official statistics. According to an estimate based on PCFS1990, crude birth rate in the 1996-97 period was 29.50‰. However, the rate in 1997 according to FRHS was 22.2‰, which would mean that it dropped considerably in a short period of time. Since crude mortality rate has not been obtained in FRHS, the difference between crude birth rate and crude mortality rate would be about 1.3% if we assume that the former is correct and that there was no significant change in the latter. Population increase rate after adding the population inflow in 1996-97 of 0.41% would amount to 1.67%, which differs considerably from the officially announced figure of 2.05%.

Mortality rate assumed in this calculation has not changed at all since 1990. If this mortality rate were improved by about 0.2% in reality, the estimate made by the Central Statistic Office, before it was modified by FRHS, may ironically have been the most accurate estimate among all population increase rate estimates announced officially in Myanmar.

Hypothesis 1 refers to a case in which population reaches 70 million in 2020 but its increase drops to zero thereafter by 2050. Hypothesis 2 is a case in which 2% population increase rate continues. Hypothesis 3 corresponds to a population increase rate needed for the population to reach 70 million when it ceases to increase in 2050.

However, Myanmar's population would reach 88 million and impose a strain on the country's agricultural development if the population were to reach 70 million in 2020 and its increase rate declines to zero over the 50-year period. Moreover, the scenario of attaining a population of 70 million and 2020 and reducing population increase rate to zero in 50 years requires a rapid demographic transition comparable to that experienced by Japan.

Table 7 is based on a very simple arithmetic estimation and does not have much significance. However, it indicates that the outcome would be completely different depending on the intention of the Myanmar government, i.e. whether it wants to place a ceiling on the country's population at 70 million, or attain 70 million population by 2020 or attain population increase rate of about 2%.

At any rate, an accurate census is needed for an in-depth discussion about Myanmar's development planning.

2. Ethnic Minorities

Myanmar is a multiethnic nation containing many ethnic minority groups among her population. As mentioned earlier, efforts made by the present administration have culminated in peace and cease-fire agreement with many ethnic minority groups with the exception of the Karen National Front of Kayin (Karen tribe). Contention between the Burmese and ethnic minority has continued throughout history, and minority groups including the Mon tribe have gained the hegemony of the country in the past. For this reason, Mon villages can also be found inside Division Myanmar, which is said to be predominantly Burmese.

Ethnic minority groups in many Southeast Asian countries have little national focus among them. They may have racial identity but usually do not have a sense of belonging towards any country. Many of them existed across national boundaries and were merely divided in the process where the framework of modern state became increasingly solid. Under these circumstances, the difficulty in building common understanding between the administration based on the premise of nation state and the minority races can easily be understood.

Karen tribe was also the backbone of the Burmese army during the British rule. Such historical details and the reorganization process of armed forces are making the ethnic issue increasingly complex.

Table 8 Ethnic Groups of Myanmar

Ethnic group	%	Details	%
Burmese	69.0	Burmar	69.0
Ethnic minority	25.7		
		Kachin	1.4
		Kayah	0.4
		Kayin	6.2
		Chin	2.2
		Mon	2.4
		Rakhine	4.5
		Shan	8.5
		Others	0.1
Foreign ethnic groups including mixed blood	5.3		
		Indian and Pakistani	1.3
		Chinese	0.7
		European and others	3.3

Source: *Statistical Yearbook 1998*, Central Statistics Organization 2000

Some also pointed out that the reason for such popularization of family planning in spite of the fact that the present administration is not actively promoting family planning and has not taken any measures beyond birth spacing lies in the spill-over effect of family planning materials that had been extended to neighboring countries such as Bangladesh and Thailand and entering the country through border trade. However, the present situation is that affluent people in rural areas are familiar with family planning and are taking advantage of the system, while landless and other people in the poverty group are seeing the cost of pills and injections as large burden and cannot afford to use family planning even if they wanted to.

The family planning policy implemented by the Myanmarese government under the intention of increasing the population rather than decreasing it is therefore giving rise to polarization between social classes.

Table 10 Knowledge Among Married Women About Family Planning (%)

Any method	92.9
Any modern methods	92.4
Pills	88.8
IUD	56.0
Injection	87.9
Condom	24.5
Sterilization (female)	78.8
Sterilization (male)	71.9
Menstrual cycle method	33.9
Norplant	2.1
Any traditional methods	66.4
Use of safe period	43.5
Withdraw	23.2
Massage	56.5
Other methods	4.2

Source: *Fertility and Reproductive Health Survey1997*, Yangon 2000

5. Public Health

The condition of water supply and toilet facilities that have large impact on infant mortality rate is as shown in Table 13. A wide gap exists in home electrification rate between urban and rural areas, reaching 68% in the former and falling short of 10% in the latter. Drinking water from water system can be used in urban areas only and the use of tube wells is limited in rural areas despite their good hygienic track record. As the majority of wells used are traditional pumping wells without any cover, measures such as introduction of tube wells and boiling the water rivers, canals and springs before drinking are deemed necessary.

Twenty percent of rural households do not have toilets and the most common "night soil" system and "ground permeation" system require improvement, as their distance from the source of drinking water becomes a serious issue due to wastewater permeation.

Table 13 Public Health-Related Indices

	Urban	Rural	National
Electricity at home	68.0	10.3	25.4
Source of water for household use			
Private water system	17.2	1.5	5.6
Shared water system	5.8	1.6	2.7
Tube well	37.8	16.1	21.8
Well (uncovered)	24.9	49.0	42.7
Rivers, canals and springs	3.6	13.4	10.9
Ponds	8.3	16.2	14.1
Rainwater	0.8	0.4	0.5
Others	1.6	1.6	1.6
Toilet facilities			
Flush	0.7	0.1	0.3
Water Seal	81.7	37.9	49.4
Pit	14.7	32.4	27.8
Bucket	0.3	0.5	0.5
None	1.8	20.0	15.2
Others	0.8	9.1	7.0

Source: *Fertility and Reproductive Health Survey1997*, Yangon 2000

Chapter 2

Outline of Myanmar Agriculture

Introduction

Based on richness in land resources and water resources, supplemented by favorable weather conditions, Myanmar has been traditionally an agricultural country. Myanmar had shifted its agriculture from subsistence to commercial one since late 1840s, and the country became major exporter of rice before World War II. Agriculture became principal driving force for the development of the whole economy of the country. The importance of agriculture sector remains more or less the same till nowadays. Food security for local populace, raw material production for domestic agro-based industries, foreign export earnings of the nation still greatly depends on agricultural production.

1. Myanmar in Brief

(1) Outline of Myanmar Agriculture

Myanmar is a South-East Asian country geographically situated between 9° 32' N and 28° 31' N latitudes and between 92° 10' E and 101° 11' E longitudes sharing common boundary of 5,858 km. with five neighboring countries – Bangladesh, India, China, Laos, and Thailand. The total coastline of 2,832 km. stretches along the Bay of Bengal and the Gulf of Martaban (Figure 2-1-1). Total land area of the country is 676,577 km^2.. About two thirds of the country fall in the tropical monsoon zone while the rest northern part lying in the temperate zone. The topography varies from flat land in river valley to snow-capped peaks in northern Myanmar. Annual rainfall ranges from 700 mm. in central Myanmar to 5,000 mm. in coastal areas. Mean temperature differs from a low at 14° C in high land areas to 34°C in central dry zone areas (see Table 2-1-2).

Myanmar has four transitional seasons of – hot season (March to mid-May); wet season (mid-May to mid-October); dry season (mid-October to November) and dry, cool season (December to February). Based on climatic and geographical conditions, Myanmar can be

Figure 2-1-1 Administration Map of Myanmar

Table 2-1-4 Progress in Expansion of Crop Area

Year	Gross Sown (mil. ha.)	Net Sown (mil. ha.)	Cropping Intensity (%)
1991-92	10.29	8.34	123
1992-93	11.01	8.71	126
1993-94	11.39	8.74	130
1994-95	12.14	8.95	136
1995-96	12.88	9.17	141
1996-97	12.31	9.28	133
1997-98	12.32	9.28	133
1998-99	13.31	9.67	138
1999-2000	14.65	10.10	145

Source: Settlement and Land Records Department (SLRD)

Although more and more waste land and fallow land are brought under crop husbandry, size of holding do not change significantly and most of the farm families are working on land less than 5 acre or 2 hectares (Table 2-1-5).

Table 2-1-5 Size of Land Holding (1999/2000)

Size of Holding	Per cent of Acreage	Per cent of Peasant Families
Under 5 acres	25.1	61.36
5 to 10 acres	30.9	24.25
10 to 20 acres	29.2	11.73
20 to 50 acres	12.4	2.50
50 to 100 acres	0.5	0.05
Over 100 acres	1.9	0.02

Source: Settlement and Land Records Department (SLRD)

(3) Soil

Depending on the parent rocks, physical features and vegetation, several types of soil are found in Myanmar. According to the soil analysis there are 24 different soil types (Figure 2) such as Fluvisol, Gleysol, Gley-Gleysol, Gleysol-calcaric, Gleysol-S, Vertisol, Catena of Iuvisol, Acriosol, Cambisol (Taw Chauk Mye), Ferrosol Rhodic, Ferrosol Xanthic, Arensol, Cambisol-orthic, Cambisol-Gelic, Cambisol-Histric, Cambisol-Chromic, Ferrosol-Plinthic, Lithosol, Andosol, Gleysol-Humic, Solonchak, Cambisol (In Dine Mye), Lithosol (Kyauk Kyi Mye Nu), and Cambisol Orthic (Chin Taung Mye).

However, there are only three agriculturally important soil groups: namely, Alluvial soils, black soils and red lateritic soils. It is estimated that alluvial soils occupy some 50 per cent of total sown area while black soils and lateritic soils stand about 30 per cent and 20 per cent respectively. Based on rainfall and soil types, six agro-ecological zones of Myanmar have been classified as: **R1S1, R1S2, R2S1, R2S4, R2S5,** and **R3S4** in which R stands for rainfall and S stands for soil type (Figure 2-1-3). The detailed definition of Rs and Ss are given below.

R1 Adequate rainfall zone with an annual rainfall of 2,500 to 4,000 mm. with 4 to 5 consecutive rainy months.

R2 Moderate rainfall zone with an annual rainfall of 2,000 to 3,500 mm. with 2 to 3 consecutive rainy months.

R3 Low rainfall or dry zone with an annual rainfall of 800 to 1,300 mm. with 1 or 2 moths of rainfall between 100 and 200 mm., 3 to 4 months of rainfall below 100 mm. and 3 to 4 consecutive dry months.

S1 Alluvial and Black Soils (Fluvisols, Gleysols)

S2 Alluvial and Lateritic Soils

S3 Black Soils

S4 Alluvial and Black Soils (Luvisols, Nitrosols)

S5 Lateritic Soil

(4) Water Resources

For crop growing, Myanmar enjoys various water resources such as rainfall, rivers, streams, lakes, and dams and reservoirs as well. The geographical locality of the country is gifted with the opportunity of getting regular rainfall from southeast monsoon. Four major river systems of the country - *Ayeyarwady, Chindwin, Sittaung, Thanlwin* and their tributaries - and lakes like *Inle, Inndawgyi* are valuable water assets of the country. Dams and reservoirs are other important sources for irrigation.

With a view to utilize rainfall, most of the crops are grown in rainy season, and some crops are grown after rainy season with residual moisture. Annual precipitation shows a large range from 600 mm. in central dry zone to 5,400 mm. in coastal strip depending on the regions since the topography, altitude, vegetation and forest cover are different from each others. In addition, the distribution of rainfall is not even. Consequently, in most cases, rainy season crops require supplementary irrigation, and winter or dry season crops, on the other hand, could be successful only with irrigation.

To enlarge the irrigated area, it could be safely said that Myanmar is gifted with rich water resources. According to the World Bank study in 1956, total annual inflow of water is estimated to be about 870 million acre-feet. Of the total inflow, only about 6 per cent have been utilized currently for irrigation purposes.

Figure 2-1-3-b Three Rainfall groups

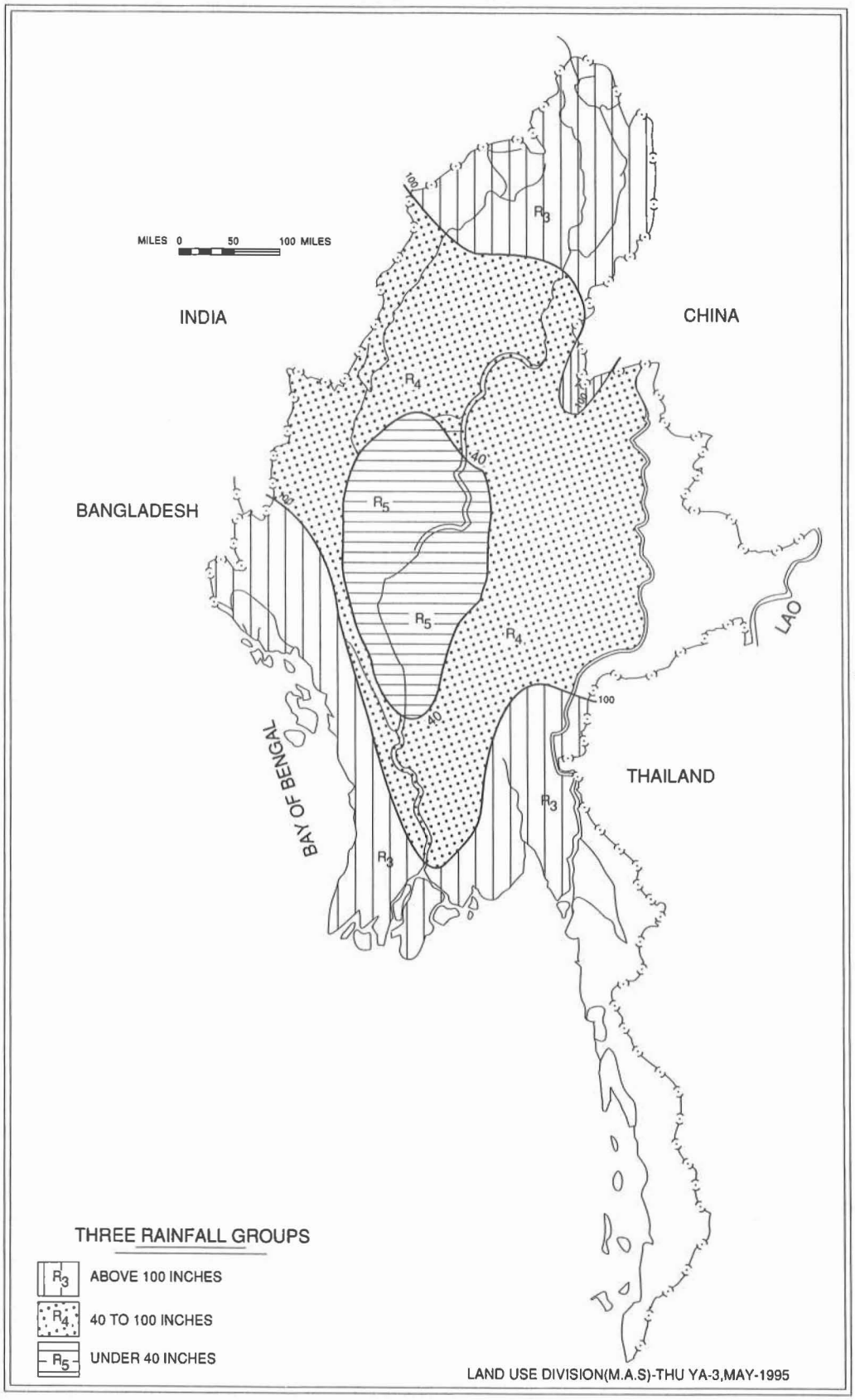


Table 2-1-8 Progress in Irrigated Area

(000' ha.)

Year	Net Sown Area	Irrigated Area	Irrig. Area per cent
1991-92	8,339	998	12.0
1992-93	8,714	1,110	12.7
1993-94	8,738	1,337	15.3
1994-95	8,951	1,555	17.4
1995-96	9,168	1,757	19.2
1996-97	9,277	1,556	16.8
1997-98	9,278	1,592	17.2
1998-99	9,580	1,692	17.5
1999-2000	10,102	1,748	17.3

Source: Settlement and Land Records Department (SLRD)

(5) Work Force in Agriculture

Myanmar's population in 1999/2000 is estimated to be about 49.13 millions with an annual growth rate of 2.0. Of the total population, about 40 per cent is the working labor force in all economic activities. Working labor force in agriculture sector reveals that the sector is the largest sector for employment, which employs more than 60 per cent of the total labor force.

Table 2-1-9 Work Force in Agriculture (million)

Year	Population	Total Work Force	Work Force in Agriculture				Agri %
			Crop	Livestock	Forestry	Total	
1991-92	41.55	16.01	10.52	0.37	0.18	11.08	69
1992-93	42.33	16.47	10.78	0.38	0.19	11.35	69
1993-94	43.12	16.82	10.97	0.39	0.19	11.55	69
1994-95	43.92	17.23	11.12	0.39	0.19	11.69	68
1995-96	44.74	17.59	11.27	0.39	0.19	11.85	67
1996-97	45.57	17.96	11.38	0.39	0.19	11.96	67
1997-98	46.40	18.36	11.51	0.40	0.19	12.09	66

Source: NPED, "*Report on Financial, Economic and Social Conditions of the Union of Myanmar*", various issues.

(6) Trained Man Power

Agriculture education is undertaken by Yezin Agriculture University for Bachelor in Agricultural Science (B. Agr. Sc.) and State Agricultural Institutes for Diploma in Agriculture. Moreover, Master in Agricultural Science degrees (M. Agr. Sc.) are also conferred by the Yezin Agriculture University. Most of the agricultural diplomas and degree holders enter into the public services and work in the Ministry of Agriculture and Irrigation starting from village managers. Village manager meets with the farmers and worked out for the development of agriculture. His main task is agricultural extension. With an objective to assist farmers, more village managers are appointed.

Importation of farm machinery and other agricultural inputs is highly encouraged by allowing tax exemption. Local production of machinery by governmental departments, co-operatives and private sector is also promoted by the arrangement of the *Myanma Industrial Development Committee* (MIDC) formed in July 1995. Under the guidance of the Committee, industrial zones were established and encouraged to produce agro-related machinery.

Government organizations not only import but also produce agricultural machinery such as power tillers, threshers, dryers, inter-cultivators, seeders, etc., and then distribute these to farmers. Number of farm implements distributed to farmers by public sector is given in the following table.

Table 2-1-12 Sale of Tractors, Water Pumps and Farm Implements

(number)

Year	Tractors	Power Tiller	Water Pumps	Thresher
1991-92	238	117	1305	58
1992-93	246	153	2936	1426
1993-94	1573	1977	2797	1461
1994-95	1381	7186	5821	472
1995-96	144	2431	2337	271
1996-97	385	4952	3373	583
1997-98	565	4364	1688	268
1998-99	658	4000	2107	412
1999-2000	-	4000	-	500

Source: NPED, "*Report on Financial, Economic and Social Conditions of the Union of Myanmar*", various issues.

Other services rendered by the departments cover tractor hiring, land development, training, and research. With a view to initiate transitional movement towards mechanized agriculture 23 villages are established as "*Model Mechanized Farming Villages*". Performance of mechanization in tillage operation is found out significantly improved.

Table 2-1-13 Utilization of Tractors & Power Tiller

Particular	Unit	1995/96	1996/97	1997/98	1998/99	99/2000
Tractor (Public)	No.	2820	3148	3421	3000	3000
Tractor (Private)	"	3000	3226	3984	5089	5244
Power Tiller (Private)	"	17000	21769	26130	31501	38903
Mechanized Tillage	000' ha-turn	3231	3336	2899	4503	4651

Source: Agriculture Mechanization Department (AMD)

(9) Inputs

In context with the market-oriented economic system, State's subsidies in agricultural inputs are reformed to a level of almost no subsidy at all. Among the agricultural inputs, fertilizer is the most important input since the introduction of high yielding varieties (HYVs)

Table 2-1-15 Fertilizer Distribution Price

(Kyats/MT)

	Urea	TSP	MOP
1963-64	800	590	-
1964-66	768	526	480
1966-69	600	526	480
1969-71	550	463	277
1971-72	440	463	277
1972-73	360	463	277
1973-88	360	1,244	598
1988-89	600	1,900	1,000
1989-90	2,160	1,900	1,000
1990-91	2,160	3,400	1,500
1991-92	2,160	5,000	4,000
1992-95	12,000	8,000	4,000
1995-96	16,000	12,000	7,000
1996-97	30,000	20,000	7,000
1997-98	40,000	44,000	33,000
1998-99	40,000	70,000	33,000
1999-2000	40,000	70,000	33,000

Source: Myanma Agriculture Service (MAS)

On condition that imported fertilizer price became higher and availability went down the use of bio-fertilizers is encouraged by developing several bio-fertilizers. These fertilizers like Effective Micro-Organism (EM), EM-Bocashi, Zepher, Bio-Composer, Bio-Super, Rhizobium, Gypsum, etc. are locally produced and distributed to farmers.

(10) Credit

Land, labor and capital together with management are used to produce agricultural goods. Without these, agriculture production could not be possible. Of these factors of production, capital plays an important role in the investment of machinery, draught cattle, farm development, irrigation facilities, etc. Given characteristics of agriculture like – time lag from sowing to harvesting, dependence on weather conditions, and subjected to fluctuating prices of agricultural produce – makes provision of credit to be a necessary measure. To lessen the capital burden on farmers and to assist in the development of agriculture, the government practices cheap rural credit policy through *Myanma Agricultural Development Bank* (MADB), a specialized farm credit institution (SFCI).

Main objective of MADB is to disburse necessary amount of loan to cover production cost with favorable interest rate in timeliness manner. The Bank educates farmers to change the concept of credit from some kind of privileged money (*Amadaw*) to borrowed money (loans). At the same time, loan rates and kinds of crops loaned are reviewed and made necessary changes. MADB has disbursed a variety of loans as annual loans, short-term loans, long-term loans and development loans. According to statistics from MADB, loans other than the annual loan amounted to 5,430 million Kyats for farm development and 59.64 million

Table 2-1-18 Advance Payment for Industrial Crops

(million Kyats)

	Jute	Sugarcane	Virginia tobacco	Total
1988-89	7.6	12.7	-	20.3
1989-90	7.7	12.7	0.6	21.0
1990-91	12.7	23.0	-	35.7
1991-92	15.6	72.9	6.0	94.5
1992-93	27.1	66.3	4.2	97.6
1993-94	19.6	-	5.1	24.7
1994-95	126.8	289.9	28.1	444.8
1995-96	181.3	254.6	44.6	480.5
1996-97	160.2	530.1	102.5	792.8
1997-98	200.0	518.7	159.5	878.2

Note: Before 1987-88, there were advance payments for cotton

Source: NPED, "*Report on Financial, Economic and Social Conditions of the Union of Myanmar*", Yangon, various issues,

MADB has also launched a rural saving program since October 1993 to mobilize rural savings. It renders mobile services in order to facilitate the rural savings. As of the end of July 2000, about 2 million farmers have opened saving accounts with the Bank and 2,404 million Kyats have been deposited.

(11) Crop Production

Variation in topography, soil types and climatic conditions allow the country to grow a variety of crops successfully. Although there are about 60 categories of crops, 22 of which are classified as important crops for agriculture sector. Among major crops cultivated include cereals (paddy, wheat, maize), oilseeds (sesame, groundnut, sunflower), culinary crops (chillies, onion, garlic, potato), industrial crops (sugarcane, cotton, jute, rubber), and plantation crops (fruit trees, coconut, banana). Paddy area is the largest and it covers about 43 per cent of total sown area. Pulses take its second place with 18 per cent following by sesame with 9 per cent of total sown area.

Of the total sown area about 1 million ha. or 7 per cent is under perennial crops like rubber, tea, fruit trees, etc. and the rests are under seasonal crops. It is estimated that about 65 per cent are cultivated in rainy season, while 25 per cent and 10 per cent are grown during winter season and dry season respectively.

Table 2-1-21 Yield per Hectare of Major Crops **(kg./ha.)**

	1995/96	1996/97	1997/98	1998/99	1999/2000
Paddy	2976	3064	3080	3129	3220
Wheat	856	961	1047	973	928
Maize	1701	1732	1920	1651	1668
Pulses	699	723	797	724	729
Groundnut	1151	1170	1211	1145	1142
Sesame	336	339	382	298	293
Sunflower	759	758	787	593	565
Cotton	509	563	666	545	545
Jute	914	915	973	898	912
Sugarcane	51168	49424	49711	44218	43385
Virginia Tobacco	869	947	1167	1169	1194
Rubber	528	566	566	484	503

(12) Agro-Industries

Agriculture sector is not only important for food security but also for raw materials for industry sector. Rice mills, pulses processing plants, edible oil mill, sugar mills, cotton mills and jute mills, etc., are established all over the country at strategic locations. According to Myanma Agricultural Produce Trading (MAPT), it owns 67 numbers of rice mills of which 36 are equipped with modern rice processing facilities. MAPT also owns 2 modern parboiling plants and 17 rice bran oil mills. It is also learnt that private-owned 596 rice mills are operated contracting with MAPT.

Under the Ministry of Agriculture and Irrigation, there are several mills and establishments too. Of which sugar mills are newly established. Formerly there were 6 sugar mills and now the number increases to 15 mills with the capacity as follows.

Capacity to Crush (ton/day)	No. of Mill
2000	7
1500	7
300	1

In cotton business, the Ministry has 56 mills and establishments producing cotton bale and other by-products.

	No.	Capacity (ton/year)
Cotton Ginning Mill	37	113,890
Baling Mill	11	46580
Linter Mill	3	7050
Cotton Seed Oil Mill	5	15520

The Ministry also operates jute and jute products plants to produce jute bale, gunny bags and carpet.

3. Livestock Breeding and Veterinary Department
4. Livestock Foodstuff and Milk Products Enterprise

Other Departments concerned with agriculture sector includes Myanma Agricultural Produce Trading (MAPT) (Ministry of Commerce), Co-operative Department (Ministry of Co-operative), Myanma Foodstuff Industries (Ministry of Industry No.1), Myanma Agricultural Machinery Industries (Ministry of Industry No.2) and among others.

(14) Agricultural Policy

In an agricultural country like Myanmar, agricultural policies play crucial role for the development of the country. During Myanmar King Eras, it was subsistence agriculture and agriculture policy centered to be food sufficiency all over the kingdom. The policy was totally changed when the country was colonized by the British. It was initiation of commercial agriculture and agriculture policy focused on area expansion to grow more rice to export and to collect more revenue for the government.

When Myanmar became an independent country in 1948, the very first national government practiced the policy to recover the agricultural production and to restore pre-war rice export because during the World War II, almost all of the production facilities and infrastructures were destroyed and draught cattle, major work force for agriculture, were depleted. In addition, insurrection broke out after independence made the situations worse. After taking time, agriculture production improved, however, political situation deteriorated. Splitting of ruling political party paved the way to "Care Taker Government", which lasted from 1958 to 1960. At that time the Government concentrated on law and order.

In 1962 military staged a coup and Revolutionary Government came to power. The Government established "*Burma Socialist Programme Party*" and planned economic system was introduced. *Twenty Year Long Term Plan* was formulated with five of Short Term *Four Year Plans*. *Annual Plans* were also formulated within the framework of short-term and long-term plans. Several reforms are introduced to revive the economy. In agriculture policy was to subsidize agricultural inputs such as fertilizers to win the acceptance of farmers. High Yielding Varieties (HYVs) commenced to grow. However, the economy of the country deteriorated and finally in 1988, the ruling of the government had to step down after mass riots spreading all over the country.

Then, the state power was assumed by the "*State Law and Order Restoration Council* (SLORC)". It was reorganized as "State Peace and Development Council (SPDC) in 1997. SPDC declared its political, economic and social objectives in 1997, it clearly stated the importance of the agriculture sector as follows:-

- to take agriculture as the base and try to develop the other areas of the economy as well,
- to see the proper evolution of market-oriented economic system,
- to invite the capital and technology from abroad and within the nation, and
- to let the full initiative of the people to come into play in order to develop the economy.

the Union of Myanmar Foreign Investment Commission (FIC) by Notification No. 12/88, dated 7 December 1998. FIC was then reorganized in 1994 by Notification No. 4/93. The Law provides attractive incentives to the foreign investors in the form of tariff and taxes. Repatriation of profit after deduction of all taxes and the prescribed funds are also provided by the Law. In addition, the Law guarantee the enterprise not to be nationalized during the permitted period.

According to the Foreign Investment Law, approved foreign investment projects under implementation in agriculture sector amounted to 3 number with the investment of 14.35 million US dollars by the end of September 2000. (Table 2-1-22)

Table 2-1-22 Foreign Investment of Permitted Enterprises (Sep./2000)

Sr. No.	Sector	No. of Permitted Enterprise	Approved Amount (million US$)
1	Agriculture	3	14.35
2	Livestock and Fisheries	20	283.37
3	Oil and Gas	51	2355.92
4	Manufacturing	134	1522.02
5	Hotel and Tourism	42	1054.41
6	Real Estate	18	1025.14
7	Mining	50	522.86
8	Transportation and Communication	13	280.77
9	Industrial Estate	3	193.11
10	Construction	1	17.27
11	Other Services	6	23.69
	Total:	**341**	**7292.91**

Source: National Planning and Economic Development (NPED)

The list of permitted enterprise in agriculture sector were-

(1) Cashew Nut Plantation Joint Venture Project
(with Myanmar Plantation Singapore Pte. Ltd.)
(2) Hybrid Rice Production Development Project
(with Beijing Shoufang Commerce Developing Co. Ltd., China)
(3) Development of Commercial Production of Tissue Culture Cultivars Project (with LK-Bio Research Pte. Ltd., Singapore)

In addition, following 3 projects are under implementation with the Ministry of Agriculture and Irrigation, although they are classified in other economic sectors.

(1) Mosquito Coil Production Joint Venture Project
(with Sumitomo Corporation, Japan)
(2) Nawaday Sugar Mill Joint Venture Project
(with Sutech Engineering Co. Ltd., Thailand)
(3) Rubber Glove Factor Project
(with Potencer International (USA) Inc.)

Table 2-1-24 On-going Projects of International Co-operation

Sr No.	Name of Project	Sponsor	Project Value
1.	Environmentally Sustainable Food Security and Micro-income Opportunities in the Dry Zone (Phase III)	UNDP	3.6 mil. USD
2.	Agricultural Market Information Service Project	FAO	0.272 "
3.	Safe Water Project	UNICEF	(material supply)
4.	Water and Sanitation Project	WHO	(Imple. supply)
5.	Seed Bank Project	JICA	100 mil.Yen
6.	Irrigation Technology Centre Project (Phase II)	JICA	650 mil. Yen
7.	Technical and Economic Cooperation with Thailand	Dept of Technical and Eco. Coop. (DTEC)	(training, study tour,Tech.Assist., Implements)
8.	Technical and Economic Cooperation with Singapore	Myanmar Tech. Assistance Fund (MTAF)	"
9.	Irrigation Project for Agro-Forestry Training Centre	(OISCA Int'l)	0.073 mil. USD
10.	Pilot Project on Capacity Building and Empowerment of Women Self-help Groups through Micro-credit and Social Mobilization	Centre on Inte- grated Rural Dev. for Asia and the Pacific (CIRDAP)	0.073 mil. USD
11.	Farming Systems Research and Extension Project	Group Research Exchanges Tech. (GRET)	(Quality seeds, Technology)
12.	Support for Agriculture & Natural Resource Management in Northern Rakhine State	European Union (EU)	0.6 mil. USD

Source: MOAI (2000), "Implementation of Agri. Projects", Yangon., pp.22-28.

(18) Agriculture Growth

In 1999/2000, agriculture sector's contribution to the national GDP registered about 43 per cent at constant price of 1985/86 or about 50 per cent at current price. In another words, agriculture's share in national GDP outnumbered any other economic sectors. The performance of agriculture sector deteriorated after 1980/81 and reached its minimum in 1988/89 reflection disturbances occurred during the year. It sustained after 1988, however, it has not been in stable condition due to unfavorable weather conditions and shortage of inputs. Growth rate of the sector stayed at 12.8 per cent in 1999/2000.

Table 2-1-26 · Dry Season Paddy Production

	Sown Area (000' ha.)	Harvested Area (000' ha.)	Yield (MT/ha.)	Production (000' MT.)
1992-93	332	325	2.88	936
1993-94	870	820	3.52	2885
1994-95	1077	1050	3.62	3804
1995-96	1221	1207	3.40	4103
1996-97	852	847	3.64	3082
1997-98	886	860	3.47	2980
1998-99	931	923	3.59	3311
1999-2000	1092	1092	3.56	3886

Source: Settlement and Land Records Department (SLRD)

Paddy policy in long-term is to grow 14 million acres (5.7 mil. ha.) of rainy season rice and 4 million acres (1.6 mil. ha.) of Dry season rice. And yield per unit area is targeted to obtain 100 baskets / acre (or 5 kg./ha.). Consequently, more rice areas are to be explored and at the same time measures to increase yield are to be undertaken.

b). Sugar Production

In addition to existing 6 sugar mills with daily crushing capacity of 7,800 tons, another 9 sugar mills with daily crushing capacity of 17,000 tons are established with an objective to promote sugar export. The addition of new sugar mills calls for record high raw material requirements. For all 15 sugar mills, it is estimated that sugarcane requirement will be amounted to 3720 thousand tons (3780 thousand metric tons). Trend in sugarcane production for industrial use reveals that sugarcane production for the whole country could meet the demand of the sugar mills, however, sugarcane in mill area could not satisfy the needs of sugar mills.

Table 2-1-27 Sugarcane Production

	Sugarcane Total		Mill Area	
	Sown Area (000' ha.)	Production (000' MT.)	Sown Area (000' ha.)	Production (000' MT.)
1994-95	52	2254	22	1004
1995-96	67	3250	35	1799
1996-97	82	4042	43	2196
1997-98	108	5137	39	2005
1998-99	126	5429	74	3360
1999-2000	134	5147	79	3541

Source: SLRD

To maintain the sugar quality and sugar recovery rate the sugarcane should be grown nearby the sugar mill. Thus, transport cost could be reduced and cane could be crushed in fresh. Thus, to explore new areas to cultivate sugarcane; to construct of farm roads to transport sugarcane from the field to the mill; and to manage the mill efficiently will become important tasks.

Table 2-1-29 Special Irrigated Crops Program (000' ha.)

	Base year	2001-02	2005-06
Sesame	58	111	149
Cotton	26	32	81
Sugarcane	8	20	54

Targeted area to irrigate amounted to more than 5 times of base year. So that how to use irrigation water efficiently, whether it is acceptable economically and how to avoid damage to other crops are questions to answer.

(20) Conclusion

For Myanmar, in a foreseeable future, agriculture would remain holding its leading role in national economy. Myanmar's richness in natural resources together with technology, investment and proper management would pave it ways to modernized and developed agriculture. In this endeavor, the efficient use of resources, technology level of the farmers, availability of investment, adaptation of quality varieties, international market situations, and environmental impact would consider the development level of agriculture sector.

2. Marketing

(1) Outline of Marketing

Myanmar has shifted its economy from planned economy to market-oriented economic system since 1988. Accordingly, farmers are free to produce, to process, to transport and to market their produces. State enterprises, which use agriculture produce as raw materials and or participating in agricultural export market, have to procure agricultural produces competing with private traders. Increase in price levels of agricultural commodities becomes a good incentive for farmers. Current trend in prices of major agricultural commodities is given in (Table 2-2-1).

Table 2-2-3 Agricultural Export (000' MT.)

	1995-96	1996-97	1997-98	1998-99	1999-2000
Rice	354.0	93.1	28.3	120.4	59.7
Maize	62.0	102.5	50.0	174.3	88.8
Peas and beans	609.6	594.8	768.9	621.5	650.7
Sesame seeds	50.3	52.5	51.7	42.2	21.5
Rubber	24.8	25.8	22.0	29.7	24.4

Source: Central Statistical Organization, (2000),"Selected Monthly Economic Indicators (May-June 2000)", Yangon, Table-5, pp-8-10.

On the other hand, Myanmar has to import some agricultural commodities which are not produced at all or which do not meet the demand. Principal import items include palm oil (edible oil), wheat flour, spices, etc. In addition, agro-chemicals like fertilizers and pesticides and farm machinery, and spare parts are also imported. The Government encourages importers of agro-chemicals, farm machinery, fuel (diesel), seeds, etc. by allowing them to enjoy tax exemption for importation of these goods.

(2) Domestic Marketing of Grains (Rice), Pulses and Oil Seeds

This section will discuss the domestic marketing of grains (rice), pulses and oil seeds in Myanmar based on FAO/DAP of MOAI [2000].

Let us begin by giving a general view of domestic trade flow for the foregoing farm produce. Surplus and deficit produce is shown by Sate/Division in Table 2-2-4.

According to this table, divisions Ayeyarawady, Bago and Yangon and Mon State are surplus regions while the divisions in the central dry zone such as Magway, Mandalay and Sagaing and Shan State are deficit in rice.

As for pulses, the central dry zone, Ayeyarawady and Bago Districts and Mon State are surplus regions that ship their products to cities such as Yangon and Mandalay where they are partly exported to overseas.

Main deficit regions for oil seeds include Ayeyarawady, Bago and Yangon and Mon State while surplus exists in the central dry zone. Since the country's total supply of oil seeds are not enough to meet the total demand, the shortage is covered by the import of palm oil.

Observed trade flows of rice as shown in the diagram are from the Lower Myanmar to the Upper Myanmar either directly or via large markets in Yangon City, Bago Division and Mandalay City.

business (e.g. production, price, transportation cost, packaging at major producing areas in the country).

Reference price used for determining the price of rice is that decided by bilateral negotiation between buyers and sellers at the Myanmar Rice and Paddy Wholesaler's Association's grain exchange center (near Yangon port). The reference prices used for pulses and oil seeds are the prices agreed at the grain exchange center organized by Division Trades and Industrialists of Yangon (located in Bayint Naung market). The prices agreed on a daily basis are recorded by the representatives and can be copied by any trader.

In addition to being the second largest city in Myanmar, Mandalay is the economic and cultural center of the Upper Myanmar and the hub for agricultural produce marketing in Central Myanmar in addition to playing the role of transit point for border trade with India and China. Mandalay region is also connected with Lower Myanmar by highway, railroad and canal.

In the case of pulses and oil seeds, crop exchange center, which has been functioning for 65years, is playing an important role in marketing. The prices agreed here on a daily basis are displayed consecutively on a blackboard and used as the country's reference price along with those in the Yangon market. This exchange center is run by a religious service club established by brokers, merchants and oil mills and existed as an independent private organization even under the centrally planned economic system.

Other markets that are playing important role in marketing include Kaing-tan market, which is a large market where wholesale and retail of all varieties of farm produce, and Kywe Se Kan market, which is functioning as transit station for farm produce from Mandalay and various producing areas (including border trade with China).

An important point when considering the efficiency of marketing is accessibility of market information for traders. According to a report from FAO/MOAI, 30% of farm households in neighboring regions, 20% of farm households in Mandalay market and 25% of farm households in Yangon market are informed of the prices. In addition, 14% of farm households in Mandalay market and 16% of farm households in Yangon market are obtaining information regarding supply situation in the market. Meanwhile, 60 to 80% of wholesalers in other town districts are informed about prices and supply situation in Mandalay and Yangon markets. Thus, accessibility of market information seems to be poor for farmer but fairly good for traders.

As stated above, the nationwide marketing system of farm produce centered on Yangon and Mandalay has relatively well-equipped transportation network including road network and vessels on Ayeyarawady River, although there exists a problem of transmission of market information to farmers. However, as suggested by low marketing margin rate shown in Table 2-2-5, marketing of rice, pulses and oil seeds are by and large efficient.

Chapter 3

Agriculture and Rural Socio-Economies in Surveyed Villages

1. Selection and Outline of Surveyed Area

(1) Selection of Surveyed Area

Rural areas of Myanmar are full of diversity that can be classified into: 1) delta region in Lower Myanmar; 2) semi-arid region in Upper Myanmar; 3) coastal region; and 4) hilly/mountainous region. Owing to extremely diverse modes of agricultural and rural economy in these four major regions, it is quite difficult to select sites for the survey.

Under these circumstances, a decision was made to conduct an intensive field survey by selecting a village from the delta region and another village from the semi-arid region. The coastal region is important for fisheries and perennial crops cultivation, while the hilly/mountainous region accounts for a large area and is inhabited mainly by ethnic minorities that are earning their livelihood through slash-and-burn cultivation in addition to being an important producing center for vegetables. However, we had little choice but to ultimately omit the latter two from the survey.

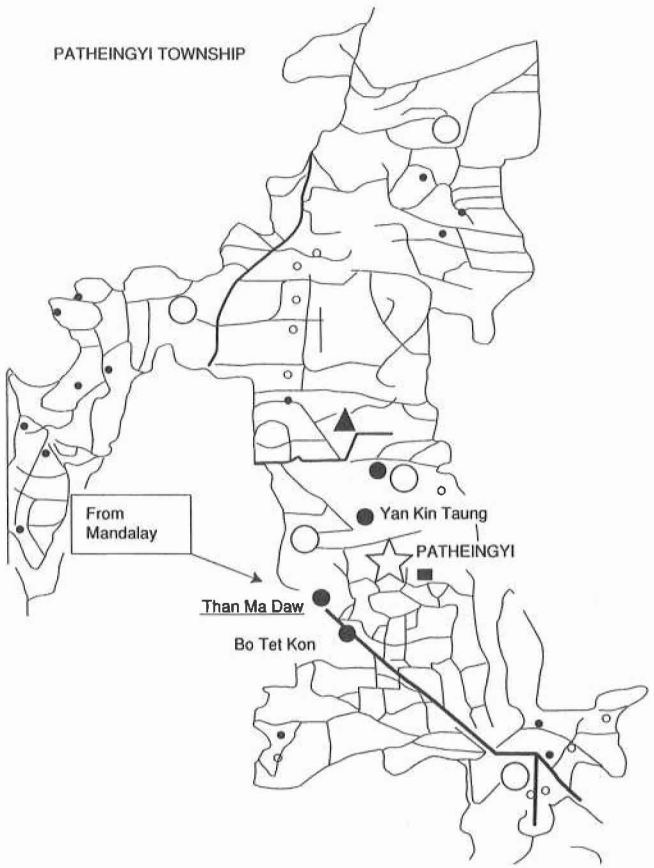
Selecting a 'typical' village to be included in the survey from the delta region and the semi-arid region was not an easy task. At last, a village that introduced pulses as the secondary crop after rainy season rice was selected from the delta region and a village under a traditional canal irrigation system practicing double cropping of monsoon and dry season rice or producing sesame as the secondary crop after rainy season rice was selected from the semi-arid region.

There is no question as to the importance of investigating the present situation of pulses production that rapidly emerged as an export crop after the liberalization of agricultural marketing in 1988. Moreover, it is very important to study the reality of Dry season rice that also attained remarkable growth during the first half of the 1990s from the viewpoint of its competition with the cultivation of sesame as a substitute crop that plays an important role as a material for edible oil.

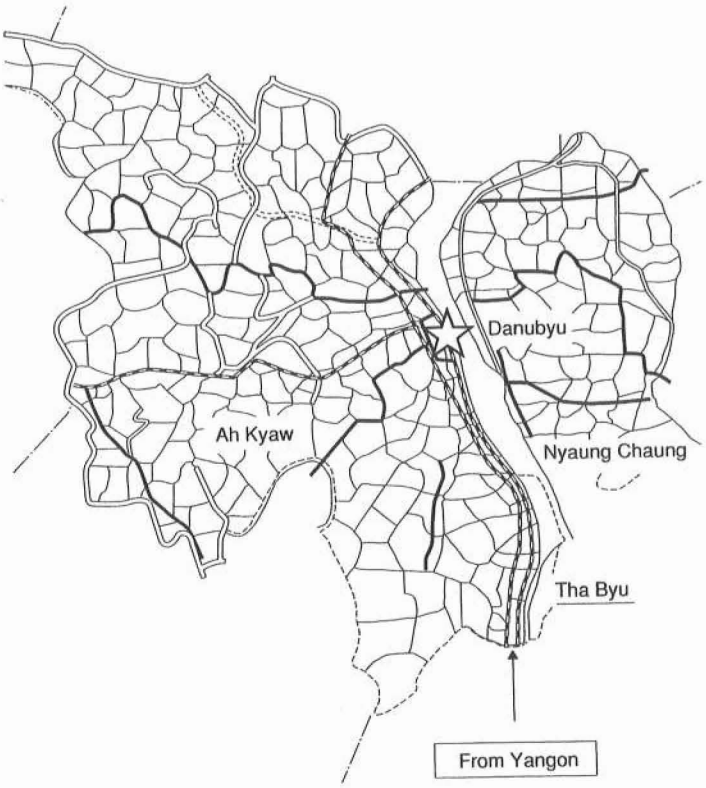
Those were the major reasons for the selection of research sites.

Figure 3-1-b

PATHEINGYI TOWNSHIP



DANUBYU TOWNSHIP



land utilization despite very little application of irrigation is attributed to the wide diffusion of pulses such as black gram that can be grown under rain-fed conditions in the dry season.

Planted area of rainy season rice in 2000-2001 totaled 91,643 acres, of which 80,948 acres (88.3%) were plowed with bullocks and remaining 10,695 acres (11.7%) by power tillers and/or tractors.

(3) Outline of the Surveyed Villages

Outline of surveyed villages is summarized in Table 3-1-1. A brief explanation is given in the following.

a) TMD Village in Patheingyi Township

TMD Village in Township P is a natural village that also comprises a sole village tract. Out of a total of 461 households in the village, only 159 households (34.5%) own the right to cultivate agricultural land and the rest are non-farm households comprised mainly of agricultural labor households. The village has a population of 1,875 with the average number of members in a household 4.07.

The village has a total area of 2,283 acres of which 2,207 acres are used as farmland. While cultivated acreage based on simple calculation amounts to a stupendous figure of 13.9 acres per farm household, the figures is significantly reduced when taking into account the existence of cultivators from other villages. According to a different statistics on the distribution of farm households by farm size, those falling under "less than 5 acres" category and "5 to 10 acres" category account for the majority at 68% and 25%, respectively.

Irrigation ratio is 100% and cropping intensity is as high as 227%. Double cropping of rainy season rice and Dry season rice is practiced in nearly half of the farmland. Double cropping of rainy season rice and sesame is practiced in the other half, with triple cropping of growing chick pea as the relay crop after rainy season rice and before sesame being practiced in more than half of the double cropped area.

There is a four-year elementary school in the village where 7 teachers (2 male, 5 female) are teaching 231 pupils. All teachers are commuting from outside the village including Mandalay City. There is no government clinic and a private doctor visits the village from time to time. Electricity is allegedly installed half a century ago, although the fact that 2 out of 3 rice mills in the village are operating on diesel engine alone indicates that availability of electricity at the household level is far from being sufficient. People are relying on water from tubewells (about 25m depth) for livelihood including drinking water. Firewood is used as fuel for cooking and purchased at 1,000 kyats per bullock cart (lasting 20 days for an average household).

However, the structure of houses in this village gives an impression of being far more affluent compared to Tha Byu Village in Danubyu Township. While considerable difference exists in terms of agricultural productivity as will be discussed later (as reflected in the large influx of seasonal agricultural laborers described later), it seems that the main reason rather lies in its proximity to Mandalay City. Figures such as the existence of more than 4 times as many power tillers, 20 times as many cars and 6 times as many motorcycles in a village with only about one-third population of Tha Byu Village symbolically show the affluence of TMD Village.

The difference in land prices is a good example indicating the impact of urbanization. Price of land allegedly reaches nearly 500,000 kyats per acre in TMD Village, while only about 60,000 kyats in Tha Byu Village. This difference cannot be explained by the difference in land rent alone. In fact, expansion of residential area of adjacent Mandalay City is taking place in the western edge of TMD Village and a part of the village had already been absorbed by Mandalay City.

Off-farm job opportunities such as wood processing and general store were also relatively abundant in the village. It was said that wood processing workshops get fairly large number of orders for furniture from the residents of Mandalay City. (It appeared, however, that very few households were making a living by commuting to Mandalay City, possibly due to the fact that job opportunities there were still limited. But on the other hand, according to a supplementary survey conducted on 3 sidecar (rickshaw) pullers in Mandalay City, job opportunities exist almost year-round and that they have a net income of 300 to 400 kyats per day. Since wages for agricultural laborers range between 150 and 200 kyats in TMD Village, the gap between the two is somewhat large. The reason behind this is not well known.)

b) Tha Byu Village in Danubyu Township

Tha Byu Village in Township D is a village tract and has a total of 14 natural villages including large and small. There are 1,323 households of which only 364 (27.5%) possess the right to cultivate agricultural land. The rest is non-farm households comprised primarily of labor households. It should be noted that, aside from traders (79 households), rice mill owners (10 households) and government employees (16 households), as many as 200 households are obtaining their livelihood solely from fisheries. While they have to migrate downstream seasonally for a few months, they apparently are able to earn sufficient income to enjoy a higher standard of living than agricultural labor households, provided that they own a boat (manual) and a fishing net. (Approximately 50 out of 200 households were "share tenants" that had no boat and fishing net and divided their catch with the owner of boat and fishing net.) Although it is rather risky to generalize, inland water fisheries in the delta region may be more important than we imagine. The village has a total population of 6,211 and average number of members per household is 4.69, about 15% higher than TMD Village.

The village has a total area of 3,474 acres of which 2,530 acres are used as farmland. Simple calculation shows that average farm size in this village is as large as 7.0 acres. This also appears to be overestimation because, according to another statistics on the distribution farm households by farm size, those falling under "less than 5 acres" category and "5 to 10 acres" category accounted for vast majority at 67% and 30%, respectively.

Rainfed cultivation seems to dominate in this village since there are only several small irrigation pumps. Cropping intensity, however, is as high as 206% because double cropping of rainy season rice and pulses (mostly black gram) is practiced in 1,978 acres (78.2%) out of 2,530 acres of farmland and triple cropping that grows jute in addition to rice and pulse is practiced in 174 acres (6.9%). Jute can only be grown in lowest land with plenty of water but still often requires supplementary irrigation using pumps.

There are 7 four-year elementary schools, and a ten-year elementary-cum-junior high school and a government clinic in the village. For drinking water, people rely on tubewells,

(2) Outline of Surveyed Households

Basic indicators such as owned and operated farmland, number of household members, number of labor force population, occupation of household head and other household members, other major income sources of household, and method of obtaining farmland are summarized for TMD Village and Tha Byu Village in Tables 3-2-2 and 3-2-3, respectively.

A few words will be added to explain each of these tables.

Average number of persons per household is 4.75 (2.07 male, 2.68 female) in TMD Village, of which 3.71 are economically active (1.68 male, 2.04 female), indicating that dependent population ratio is only 21.9%. Neither the household size nor the number of economically active population appears to have any relation to farm size of each household.

Turning our attention to employment situation, upper strata farm households owning 7 acres or more are mostly engaged full time in agriculture. In smaller farm households, however, household heads concentrate in farming while there are some among other household members who are engaged in agricultural labor or in off-farm jobs such as traders, wood processing workers and carpenters. On the other hand, among landless households the pattern in which the household head works as agricultural laborer while other members support the household economy by engaging in off-farm jobs is observed except for one household running a general store. As for other sources of household income in the village, livestock rearing such as poultry and dairy farming, fruit cultivation such as coconut, papaya, tamarind and mango come to the fore, although their importance is considerably lower compared to Tha Byu Village.

Average number of members per household is 5.13 (2.33male, 2.80 female) in Tha Byu Village, of which 3.13 are economically active (1.43 male, 1.70 female). Dependent population ratio therefore comes to 39.0%, noticeably higher compared to TMD Village. It can be considered that that figure for TMD Village is unusual for some reason. No difference in household size was observed among different strata in TMD Village also.

In terms of employment, dependency on agriculture in Tha Byu Village was higher than TMD Village on the whole. This is particularly true among farm households, except for D6 and D11 that had 8 acres of land, relying entirely on farming. On the other hand, most landless households are combining agricultural labor with small business. (There is no question as to the risk of generalization since the number of samples is limited. Fishing households were also intentionally omitted from the samples.) Tha Byu Village has more sources of other income compared to TMD Village including livestock rearing (pig, chicken, duck), as well as fruit cultivation (coconut, papaya, tamarind, mango), vegetables cultivation (yam, bitter gourd), betel leaf growing and forestry such as bamboo and some other trees for firewood. Cultivation of betel leaf seems to be quite profitable.

Table 3-2-3 Farm ownerhip, family structure, employment structure in WYC Village in Tha Byu Administrative Village of Township P

Household number	Ownerd farm	Rented farm	Farm managem	Number of working			Main occupation of	Other occupations of household members			Other source of income	Method of farmland acquisition
				Male	Female	Total						
D20	23.13	0	23.13	2(2)	5(4)	7(6)	Farmer	—	—	—	Chicken, house duck	Inheritance
D17	21.47	0	21.47	1(1)	3(1)	4(2)	Farmer	—	—	—	Wood	Inheritance
D13	5.48	12.00	17.48	2(2)	5(3)	7(5)	Farmer	—	—	—	House duck, fruit	Inheritance
D3	12.30	2.50	14.80	2(1)	4(1)	6(2)	Farmer	—	—	—	Chicken, vegetable	?
D18	11.07	0	11.07	0	2(2)	2(2)	Farmer	—	—	—	Chicken, vegetable	Inheritance
D14	8.83	0	8.83	2(2)	2(1)	4(3)	Farmer	—	—	—	Chicken, house duck, vegetable, fruit	Purchase
D6	8.00	2.00	10.00	3(3)	2(1)	5(4)	Farmer	Woodworker	Farm laborer	—	Pig, chicken, fruit	Inheritance
D11	8.00	2.00	10.00	2(1)	2(1)	4(2)	Farmer	Farm laborer	—	—	Chicken, fruit	Purchase
D4	7.17	0	7.17	2(1)	5(3)	7(4)	Farmer	—	—	—	Pig, chicken, vegetable, fruit	Inheritance
D21	6.43	0	6.43	2(1)	2(1)	4(2)	Farmer	—	—	—	Pig, chicken, vegetable, fruit	?
D22	6.43	0	6.43	2(2)	1(1)	3(3)	Farmer	—	—	—	Chicken, vegetable, fruit	Inheritance
D1	6.06	2.00	8.06	2(1)	3(2)	5(3)	Farmer	—	—	—	Pig, chicken, house duck	Inheritance
D24	5.74	0	5.74	1(1)	3(3)	4(4)	Farmer	Primary school teacher	—	—	Chicken, vegetable, fruit	Inheritance
D2	5.27	0	5.27	4(1)	5(3)	9(4)	Farmer	—	—	—	Chicken, house duck, vegetable, fruit	Inheritance
D23	5.22	0	5.22	3(1)	3(1)	6(2)	Farmer	General store apprentice	—	—	Vegetable	Inheritance
D8	5.03	0	5.03	2(1)	3(1)	5(2)	Farmer	—	—	—	Pig, chicken, fruit	Purchase
D5	4.38	0	4.38	3(1)	2(1)	5(2)	Farmer	—	—	—	Pig, chicken, house duck fruit	Inheritance
D12	4.00	1.50	5.50	3(2)	1(1)	4(3)	Farmer	—	—	—	Tree	Inheritance
D16	4.00	0	4.00	5(2)	1(1)	6(3)	Farmer	—	—	—	(Livestock), fruit	Inheritance
D7	3.70	0	3.70	1(1)	3(3)	4(4)	Farmer	—	—	—	Pig, chicken	Inheritance
D15	3.52	0	3.52	1(1)	3(3)	4(4)	Farmer	—	—	—	Pig, chicken, house duck fruit	Inheritance
D26	3.46	0	3.46	3(2)	5(1)	8(3)	Farmer	Rice mill	—	—	Pig, chicken, fruit	?
D30	3.00	0	3.00	2(1)	1(1)	3(2)	Farmer	Farm laborer	—	—	Pig, fruit	Inheritance
D10	2.43	0	2.43	3(2)	2(1)	5(3)	Farmer	—	—	—	House duck, fruit	Purchase
D9	1.10	0	1.10	4(4)	5(3)	9(7)	Farmer	Oil pressing mill	Rice mill	Midwife	Chicken, house duck, vegetable, fruit	Inheritance
D19	0	0	0	3(2)	4(3)	7(5)	Farm laborer	Carpenter	Peddler	—	Pig, chicken, house duck fruit	—
D25	0	0	0	5(2)	2(1)	7(3)	Farm laborer	Vegetable small trader	—	—	Fruit	—
D27	0	0	0	0	1(1)	1(1)	Farm laborer	Vegetable small trader	—	—	Fruit	—
D28	0	0	0	2(1)	2(1)	4(2)	Farm laborer	Vegetable small trader	—	—	Pig, chicken, fruit	—
D29	0	0	0	3(1)	2(1)	5(2)	Farm laborer	—	—	—	Chicken, fruit	—

Source: Prepared by author based on the August 2000 survey.

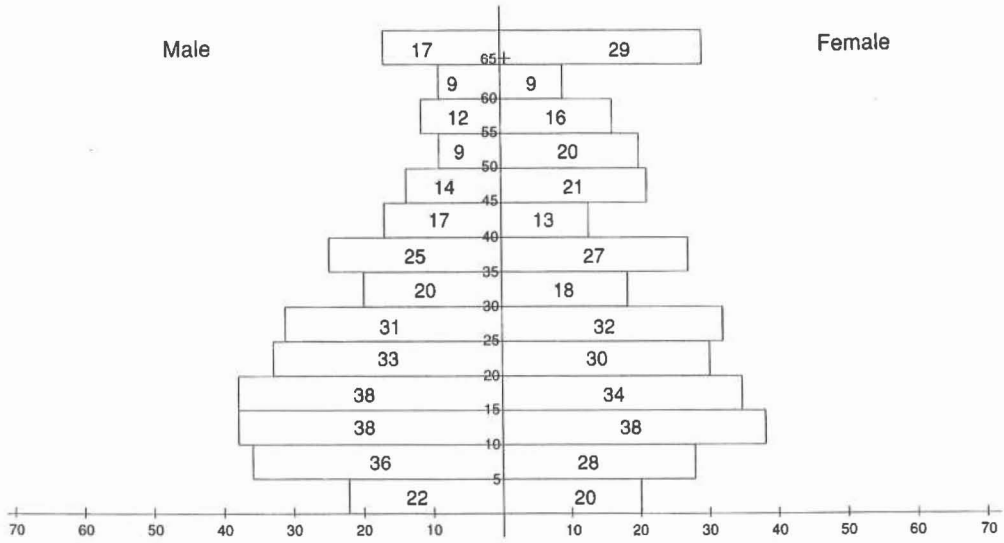
Table 3-3-1 Outline of Surveyed Villages

TMD Village of Township P			War Yone Chaung Village of Tha Byu, Township D		
Population			Population		
Male	924	persons	Male	321	persons
Female	951	persons	Female	335	persons
Total	1875	persons	Total	656	persons
Households			Households		
Farm households with land ownership	159	households	Farm households with land ownership	25	households
Landless households	302	households	Landless households	105	households
			Breakdown		
			Landless households	4	
			General laborer	87	
			Government official	1	
			Commerce	10	
			Rice milling	2	
			Battery recharging	1	
All households	461	households	All households	130	households
Average household scale	4.067	persons	Average household scale	5.046	persons
Population ratio by age		Ratio	Population ratio by age		Ratio
0～14 years	797	persons 42.51%	0～14 years	182	persons 27.74%
15～60 years	828	persons 44.16%	15～60 years	410	persons 62.50%
Above 60 years	250	persons 13.33%	Above 60 years	64	persons 9.76%
			1998 Fertility	14	‰
			Mortality	6.2	‰
			Natural increase rate	7.8	‰
			1999 Fertility	15	‰
			Mortality	7.7	‰
			Natural increase rate	7.7	‰
			2000 Fertility	16.8	‰
			Mortality	9.2	‰
			Natural increase rate	7.7	‰

Source: Created by author based on hearing survey

Though not in a clear form, population increase measures are being taken in Myanmar. For this reason, the Myanmar government is encouraging birth spacing from the viewpoint of maternal health but is not promoting family planning per se. Parents become eligible for government subsidy in receiving sterilization/hormone injection or in purchasing pills at low price after their fourth child is born. No such subsidy is available prior to that, however.

Figure 3-3-2 Population pyramid of WYC Village



A clear difference also exists in terms of household scale between TMD Village (4.07 persons) and WYC Village (5.05 persons), possibly owing to extremely small population of person between ages 15 and 50 that form and maintain households with both parents in TMD Village.

In reality, no significant difference exists in average number of births among married couples younger than age 50 between TMD Village and WYC Village at 3.35 and 3.44, respectively. Therefore, one can conclude that the difference in proportion of age groups that are most likely to form households with both parents is determining the scale of this household. While the reason behind such population structure of TMD Village is unknown, there is a possibility that landless agricultural laborers are migrating in considerable scale by leaving their children with their parents. The reason could not be confirmed in this study.

Ratio of dependent population is also largely affected. This ratio, obtained by dividing the sum of elderly dependent population and young dependent population by the population in economically active age between 15 and 60 years, was 162% for TMD Village, more than 2 times greater than 60% of WYC Village.

As for the utilization of family planning, the class of people that own their farm and have sufficient income go to hospitals in Mandalay, Danubyu and Yangon and actively practice family planning through sterilization and hormone injection after consulting a doctor once they have the number of children they desire.

A total of 23 households were either practicing or had desire to practice family planning. Among the 34 remaining households, 3 households were single households, 22 households no longer needed family planning due to wife's menopause and 9 households had not met the number of children they desired. Needless to say, these 34 households did not require family planning.

sense from the aspect of hygienics that villagers are using the water from pagoda well for drinking purposes.

Meanwhile, in WYC Village of Township D, 1 household was using rainwater and pond water, 1 household was using rainwater and river water, and the remaining 27 households were using rainwater and hand pumped water. The difference with TMD Village was the use of rainwater by vast majority of households. The major factor behind this difference appears to lie in the fact that TMD Village is located in semi-arid region and has precipitation of less than 1,000mm a year while WYC Village has sufficient precipitation of more than 2,000mm a year. Rainwater is generally said to be unsuitable for drinking in regions with little rainfall because airborne dust mixes with rainwater at the time of rainfall. We learned that rainwater is not used for drinking in WYC Village for some time after the rainy season begins because rainwater contains a lot of dust. From the viewpoint of hygienics, rainwater itself is safe and suited for drinking as long as it is stored properly.

Overwhelming majority of households were using hand pumped water in dry season and the remaining households were using pond water and water from Ayeyarawady River as drinking water. We asked these 2 persons why they were not using the pumped water. Their response was that the pumped water did not taste good. Since everyone used rainwater for drinking in the rainy season, they were using different water source depending on the season.

We asked the same question we asked in TMD Village about boiling the water before drinking it at WYC Village. Seventeen people said they normally boil the water before drinking and 12 said they do not. The percentage of boiling they water before drinking was higher among the elderly in WYC Village whereas people were drinking raw water regardless of age in TMD Village. We were not able to identify the reason for this clear difference between the two villages.

b) Toilet

Almost all households in both TMD Village and WYC Village were using ground permeation toilet. The survey showed that, among the landless farmer class, all but 3 had a toilet on the premises of their home. This is a system that digs a hole in the ground and places a lavatory bowl over it. Another hole is dug once the first hole is filled up after several years (permeation system). Another system found in the questionnaire called the siphon system is a system used by relatively affluent households that flushes the night soil into the hole instead of dropping it directly into the hole. After all, this is also a kind of permeation system.

As to a question about the use of night soil as fertilizer, 2 persons responded that they were using it as fertilizer. However, their purpose was to dig up the toilets that had been filled up several years before and turned into a soil-like state for reuse after the present toilet becomes full, as they do not have enough land to keep switching the location from one place after another. This system is effective to a certain extent as long as population density remains low. However, numerous problems may arise if population density increases and sufficient distance cannot be kept between the toilet and the well used for obtaining drinking water.

the marrying daughter was also seen among farmers who had little land to divide in both villages. However, it is a rational and a quite understandable choice. Some also responded that they would sell the land and divide the money if it becomes too small to support livelihood after the division.

We asked the landless farmers when they became landless, and most of them responded that their parents were also landless farmers. There was only one farmer in TMD Village who was born to parents that owned land. It was a case in which the person inherited an oxcart because he did not want to become a farmer and became landless as a result of selling the ox cart after the ox died. All landless farmers and their wives in WYC Village that were included in this survey had been born to landless parents. While the sample is too small for reaching any definite conclusion, the results did give an impression that differentiation of social class based on land ownership is advancing to some extent.

4. Economic Analysis of Sample Households

(1) Cropping System and Productivity

Table 3-3-5 shows the major cropping system adopted by the sample farm households in two villages surveyed.

In TMD Village, the combination of rainy season rice, chick pea and sesame accounted for 73% followed by the combination of rainy season rice and Dry season rice that accounted for 22%. However, these figures show quite a different picture from the average of the entire TMD Village because, as mentioned earlier, double cropping of monsoon and dry season rice takes up nearly half of the area in the village. According to a interview with an influential person in the village, it is because of the fact that our sample households tend to have their farm plots at the end of the irrigation canal. However, it seems not to be persuasive enough and this point will be taken up later in this report for further discussion.

Traditional dominant cropping system in TMD Village was rainy season rice followed by sesame only, and chick pea was only introduced rather recently between the two crops. While a considerable number of farmers started to grow chick pea before 1988, many farmers introduced this crop after that; i.e. 1 in 1988, 3 in 1990, 1 in 1991, 1 in 1993, 2 in 1995, 1 in 1996 and 1 in 1997. Concerning Dry season rice, the number of farmers that converted from rainy season rice/(chick pea)/sesame system to rainy season rice/Dry season rice system was 3 in 1997 and 1 in 2000. The initiative to such conversion of cropping system was the encouragement by the government according to some farmers and the voluntary introduction according to other farmers. It seems that the change of the cropping system in the village took place by both of the promoting factors.

On the other hand, in Tha Byu Village the cropping system of rainy season rice/black gram accounts for an overwhelming majority of 88%. Cultivation of cow pea in place of black gram also accounted for 6%. As mentioned earlier, jute can only be grown in the lowest land with plenty of water supply but still requires supplementary pump irrigation.

The cropping system of rainy season rice/black gram appears to have been practiced for a fairly long period of time in Tha Byu Village, although the black gram cultivation probably

Table 3-4-2 Farmland use and crop yield at surveyed farm households in TMD Village of Township P

House-hold number	Farming area	Cropping system (1)	Croppig system (2)	Yield (Bsk/acre)			
				Rainy season rice	Chick pea	Sesame	Dry season rice
P2	26.00	mR-ChP-Se		90	2.3	9.6	
P24	16.00	mR-sR (11.00)	mR-ChP-Se (5.00)	80	2.2	0	90
P15	14.00	mR-ChP-Se		78.5	1	7	
P23	12.98	mR-ChP-Se		75	0.7	5.5	
P8	12.04	mR-sR (8.00)	mR (4.00)	75			100
P5	11.49	mR-ChP-Se		65	1.8	4.0	
P9	8.53	mR-sR		70			100
P12	7.44	mR-ChP-Se		70	4.2	2.3	
P11	7.43	mR-ChP-Se		70	1.2	7.0	
P7	7.04	mR-ChP-Se (4.00)	mR-sR (3.00)	100	0	4	90
P6	7.00	mR-ChP-Se		93	7	10	
P16	7.00	mR-ChP-Se (5.50)	mR-ChP-sR (1.50)	90	5	7.3	100
P4	6.81	mR-ChP-Se		80	5	0	
P19	6.60	mR-ChP-Se		84.5	0.9	1.5	
P10	4.95	mR-sR (4.53)	mR (0.42)	80			100
P14	4.57	mR-ChP-Se		80	3	1	
P13	4.54	mR-sR		90			95
P21	4.45	mR-ChP-Se		87	7	4	
P1	4.24	mR-ChP-Se		90	0	1.7	
P20	3.03	mR-ChP-Se		80	7	7	
P3	2.99	mR-ChP-Se		80	11.4	7.3	
P22	2.75	mR-Se		75		0	
P17	0						
P18	0						
P25	0						
P26	0						
P27	0						
P28	0						

Source: Prepared by author based on the August 2000 survey.

(2) Possession of Draft Animals, Farm Machineries and Other Durable Consumer Goods

Tables 3-4-4 and 3-4-5 illustrate the possession of draft animals, farm machineries and other durable goods for sample households in two villages.

a) TMD Village

When compared with Tha Byu Village, TMD Village is clearly more advanced in terms of diffusion of power tillers and threshers. For instance, all upper strata farmers owing more than 8 acres of land have a power tiller although this is a fairly new phenomenon, as its dissemination did not start until the mid-90s. Twelve HP power tillers are most popular, although some of those introduced in recent years are equipped with more powerful 15 or 18 horsepower engines. They are expensive equipment costing between 300,000 and 400,000 kyats.

The fact that all but 2 farm households own a bullock cart indicates its importance for transportation. (It is by no means inexpensive and cost 25,000 to 50,000 kyats.) However, the number of households with draft cattle becomes less. The figures in parenthesis in the adult bullocks require special attention as they show seasonal ownership, and not permanent ownership. It reveals that 9 out of 16 farm households with adult bullocks own them only seasonally. This indicates the existence of a rational system of exchanging bullocks with the 'kaing'-dominated area on the other side of Ayeyarwaddy River, taking advantage of the seasonal difference in farming. Since 'kaing' can only be cultivated in the dry season as it goes under water during the rainy season, it requires bullock power at different time of the year with the area around TMD Village in Township P. It should be noted that, however, bullocks are not actually exchanged between the same households every year but procured on a case-by-case basis as need arises. There are cattle brokers in each region that intermediate bullocks trade for a commission of 1,000 kyats for one pair. Since a pair of bullocks costs about 80,000 to 120,000 kyats and expensive, seasonal ownership contributes considerably to save the cost of feeds and maintenance labor costs. TMD Village purchases bullocks in March and sells them in September. A broker intermediates an average of 20 pairs every season.

As for durable consumer goods, possession of extremely expensive automobiles and motorcycles has increased after the mid-90s among upper strata households owning more than 8 acres of land. In contrast, possession of bicycles that cost only around 20,000 to 25,000 kyats has spread to fairly lower strata. Diffusion of TV sets (90,000-100,000 kyats) and radio-cassette (20,000-25,000 kyats) is also noteworthy.

b) Tha Byu Village

Diffusion of power tillers in Tha Byu Village began just recently and can only be found in the largest farmers with more than 15 acres of land. Like TMD Village, power tillers have 12 to 18 horsepower. Irrigation pumps are diffused more widely compared to TMD Village because of its greater necessity. Five to six horsepower models are popular.

Diffusion of adult bullocks is more advanced here compared to TMD Village. Upper strata farmers with 7 or more acres of land usually own 2 to 3 pairs and this seems to be

Table 3-4-4 Asset holding status of surveyed households in TMD Village of Township P

Household number	Farming area	Tractor	Irrigation pump	Thresher	Ox cart	Adult draft cattle	Automobile	Motorcycle	Bicycle	Boat	TV	Radio-cassette	Clock	Bed	Chair	Table
P2	26.00	160,000(92)	20,000(85)	—	2	2+[2]	—	290,000(96)	1	—	1	1	2	2	2	1
P24	16.00	170,000(96)	—	250,000(93)	1	2+[2]	—	350,000(99)	2	—	—	1	2	2	2	1
P15	14.00	16.50,000(95)	250,000(90)	250,000(96)	1	[2]	—	—	1	—	1	1	2	1	—	1
P23	12.98	170,000(97)	—	10,000(99)	1	[2]	—	370,000(99)	1	—	—	—	1	1	2	1
P8	12.04	270,000(99)	250,000(96)	—	1	[2]	8,350,000(95)	340,000(99)	1	—	1	1	1	1	6	1
P5	11.49	370,000(99)	250,000(95)	—	1	[2]	—	—	1	—	1	—	2	1	5	1
P9	8.53	1,650,000(94)	—	130,000(94)	1	2	900,000(97)	—	1	—	1	1	2	1	2	1
P12	7.44	—	—	—	—	—	—	—	1	—	—	1	1	2	2	1
P11	7.43	—	—	—	1	2	—	—	—	—	1	—	1	1	2	1
P7	7.04	4,050,000(00)	—	—	1	[2]	—	—	1	—	1	—	1	—	2	1
P6	7.00	—	—	—	1	—	—	—	—	—	1	—	1	1	2	1
P16	7.00	—	—	—	1	[2]	—	—	1	—	1	1	3	1	2	1
P4	6.81	—	—	—	1	[2]	—	—	—	—	—	1	1	2	6	2
P19	6.60	—	—	—	1	—	—	—	—	—	—	1	2	1	1	1
P10	4.95	—	—	—	1	[2]	—	—	1	—	—	—	1	1	2	1
P14	4.57	—	—	—	1	[2]	—	—	1	—	—	—	1	1	—	—
P13	4.54	380,000(99)	—	—	1	2	—	210,000(92)	1	—	1	—	2	2	2	1
P21	4.45	—	—	—	1	—	—	—	1	—	1	1	1	—	2	1
P1	4.24	—	—	—	—	—	—	—	—	—	—	—	3	1	4	1
P20	3.03	—	—	—	1	2	—	—	1	—	—	—	—	—	2	1
P3	2.99	—	—	—	1	2	—	—	2	—	1	1	4	1	3	1
P22	2.75	—	—	—	1	—	—	—	1	—	—	—	—	1	2	1
P17	0	—	—	—	—	—	—	—	2	—	—	1	3	1	2	1
P18	0	—	—	—	—	—	—	—	1	—	—	—	—	1	2	1
P25	0	—	—	—	—	—	—	—	1	—	—	—	1	2	2	1
P26	0	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
P27	0	—	—	—	—	—	—	—	1	—	—	1	3	1	2	1
P28	0	—	—	—	—	—	—	—	—	—	—	—	1	2	—	1

Source: Prepared by author based on the August 2000 survey.

(3) Cost and Return Analysis of Agricultural Production

Information on cost and return of agricultural production was collected as much as possible from the sample farmers. The results are summarized in Tables 3-4-7 (rainy season rice), 3-4-8 (dry season rice) and 3-4-9 (non-rice crops).

Minimum explanations on the methodology will be given, avoiding unnecessary complications.

First, capital cost (i.e. land preparation by bullocks and power tillers, irrigation by pumps and other operations by farm implements and machineries) was evaluated by the prevailing rental cost of each capital goods, which theoretically contains all the costs such as operating cost, maintenance cost, depreciation cost and interest. If the farmers possess their own capital goods, the actual cost should be estimated separately but it requires enormous work and the error will be much larger.

Second, family labor expenses are evaluated by imputing with hired labor cost corresponding to type of work and duration as opportunity costs. However, there were some cases where working hours could not be estimated accurately and/or hired labor cost for the type of work could not be obtained, in which event rather bold assumptions were made to process the data.

Third, as land lease transactions did not exist except for a very limited cases land rent was not estimated and included in the 'operators' surplus'.

Fourth, interest on loans, including that from Myanma Agricultural Development Bank (MADB), was not included as a cost for the reasons stated later in the report.

Fifth, unit price of farm produce was basically calculated by using the weighted average of sales price. Home consumption, seeds and the portions not yet sold and kept as stock were assessed by the sales price of largest volume (except for the cases in which procurement by the government has the largest volume). Farm households that were not selling at all in the market at the time of the survey (with the exception of the government procurement) were excluded from the cost and return analysis.

Sixth, cost and return analysis was conducted only for the farmers who obtained 'normal' yield in the case of chick pea and sesame in TMD Village because of a particularly poor harvest of these crops as mentioned earlier.

Seventh, clearly 'abnormal' results were excluded from the analysis.

Explanation will be given in the following for each crop by comparing TMD Village and Tha Byu Village, with reference to the tables.

a) Rainy season rice

Gross revenue per acre was about 56,400 kyats in TMD Village and 39,400 kyats in Tha Byu Village. The large difference of nearly 40% is attributable to both the difference in yield and rice sales price. Internal marketing of rice in Myanmar basically flows from the delta region of Lower Myanmar to Upper Myanmar and so rice prices are considerably higher in the latter (though this is also caused by the difference in rice variety).

Let us investigate the cost structure of two villages. No difference exists between the labor costs at a little more than 13,000 kyats. However, the cost of current inputs mainly consisting of chemical fertilizers in TMD Village is 11,530 kyats, 1.8 times higher than 6,440

Dry season rice?

One reason is the technical constraint. TMD Village is located at the end of canal irrigation system so that it tends to experience relative shortage of irrigation water. In other words, they cannot grow Dry season rice even if they wanted to.

Another reason is that the history of Dry season rice cultivation is rather short in TMD Village and adjustments were still being made. Since introduction of Dry season rice in TMD Village had just started in 1997, not-a-few farmers may be taking a wait-and-see approach.

The last possible reason is capital constraint. As is obvious from the production cost of chick pea and sesame, these crops require much less current inputs and labor (including capital rental) and so the total cost is only 9,219 kyats per acre for two crops. This is less than 40% of the 23,948 kyats required for the production of Dry season rice. Let us assume that the required capital was borrowed entirely from a moneylender (or a relative, a neighbor or a friend) at a monthly interest rate of 10%. Assuming the average borrowing period for chick pea and sesame for 1 month and that for Dry season rice for 2 months, the interest would amount to 922 kyats for chick pea/sesame combination and 4,790 kyats for Dry season rice. Let us re-calculate the 'operators' surplus' by including these interests in the cost. The result is that the surplus will roughly be 49,000 kyats for Dry season rice and 42,100 kyats for chick pea/sesame combination, indicating that the gap between the two has narrowed considerably. If farmers are unable to get a loan even under the condition of monthly interest rate of 10%, the gap will narrow even further, even making chick pea/sesame cropping system more preferable to Dry season rice in some cases.

The seriousness of the situation seems to be clear from the simple estimation given above that the Myanma Agricultural Development Bank can only offer an extremely small loan of 1,000 to 4,000 kyats per acre (for rice).

The other is a comparison of profitability of dry season cropping between TMD Village and Tha Byu Village. To begin with black gram that accounts for vast majority of dry season cropping in Tha Byu Village, the 'operators' surplus' per acre comes to approximately 15,900 kyats, which is far less compared to 43,100 kyats for chick pea/sesame combination, not to mention 53,800 kyats for Dry season rice. The figure does not reach 30,000 kyats even if jute cultivation is added, which can be grown only in small portion of land.

Annual 'operators' surplus' per acre is calculated for main cropping systems in the following.

TMD Village of Township P	
Rainy season rice/chick pea/sesame (73.4%)	74,517 kyats
Rainy season rice/Dry season rice (21.8%)	85.254 kyats
Tha Byu Village of Township D	
Rainy season rice/black gram (88.2%)	35,621 kyats
Rainy season rice/cow pea (6.2%)	32,624 kyats
Jute/rainy season rice/black gram (2.6%)	43,259 kyats

Table 3-4-6 Production cost and profit of rainy season rice

	TMD Village of Township P	WYC Village in Tha Byu Administrative Village of Township D
Number of samples	18	16
Yield (B/acre)	80.1	71.9
Price (K/B)	680	535
Rice	54,461	38,666
Rice straw	1,919	703
Gross income (per acre)	56,380	39,369
Cost (per acre)		
Seed	2,610	1,969
Urea	4,889	2,253
TSP	3,232	1,174
MP	139	453
Agricultural chemicals	188	408
Diesel oil	471	184
Others	0	0
Ordinary cost total	11,530	6,440
Share (%)	20.5	16.4
Tilling/soil preparation	3,191	3,671
Rice nursery	49	192
Rice seedling pulling	563	626
Rice seedling transplantation	2,169	2,726
Irrigation	89	26
Fertilizer application/agricultural chemical spraying	142	95
Weeding	442	781
Harvesting	4,500	3,589
Threshing/dry-blowing	1,104	1,050
Tranportation	731	165
Others	20	0
Seasonal hire	396	243
Labor cost total	13,394	13,163
Share (%)	23.8	33.4
Total cost	24,924	19,603
Management surplus	31,456	19,766
Share (%)	55.8	50.2
Production cost per basket	311	273

Source: Prepared by author based on the August 2000 survey.

Table 3-4-8 Production cost and profit of crops other than rice

	TMD Village of Township P		WYC Village in Tha Byu Administrative Village of Township D		
Crop	Chick pea	Sesame	Black gram	Cow pea	Jute
Number of samples	3	3	22	1	3
Yield (B/acre)	6.9	8.0	7.3	8	438
Price (K/B)	3,100	3,333	3,498	2,500	75
Main product	21,390	26,667	25,698	20,000	32,825
Secondary product	3,000	1,223	588		
Cross income (per acre)	24,390	27,889	26,286	20,000	32,825
Cost (per acre)					
Seed	2,380	962	4,122	3,650	396
Urea			27		3,236
TSP					
MP					
Agricultural chemicals			481	438	1,009
Diesel oil					576
Others					
Ordinary cost total	2,380	962	4,630	4,088	5,217
Share (%)	9.8	3.6	17.6	20.4	15.9
Tilling/soil preparation	83	1,393	2,836	1,095	2,853
Sowing	30	65	94	55	87
Irrigation		19	55	36	1,820
Weeding		798	61		229
Harvesting	1,496	958	1,472	1,460	1,649
Threshing/dry-blowing	300	343	1,001	438	3,556
Tranportation	115	86	105		3,404
Others	24	167	177		408
Labor cost total	2,047	3,830	5,801	3,084	14,006
Share (%)	8.4	13.7	22.1	15.4	42.7
Total cost	4,427	4,792	10,431	7,172	19,223
Management surplus	19,963	23,098	15,855	12,828	13,602
Share (%)	81.8	86.6	60.3	64.1	41.4

Source: Prepared by author based on the August 2000 survey.

Village delivered only 10 baskets, the amount delivered at this village was as much as 45% greater. The response to our question about 14.5 baskets being greater than the prescribed amount was that the allocation to the Township is adjusted by apportioning greater amount to higher productivity areas while apportioning smaller amount to lower productivity areas such as deep water areas. This indicates that townships have certain degree of free decision. In addition, purchasing price of 320 kyats per basket was slightly lower than in TMD Village (presumably due to the difference in variety). The procurement price of rice was about half of the market price (about 600 kyats) but was fully paid in advance in June or July, about 5 months before the harvesting period in late November.

More farmers in Tha Byu Village were taking loans from Myanma Agricultural Development Bank than in TMD Village. The amount, however, was 1,000 kyats per acre or slightly more. Advance payment for procured rice amounted to 4,640 kyats per acre and is believed to be playing the function of a virtual loan to a considerable extent.

With regard to black gram, all sample farm households made deliveries except for one household (for an unknown reason). The amount of delivery was uniform at 2 baskets per acre (corresponding to 27.3% of average yield of 7.3 baskets). Moreover, farm households that cropped cow pea instead of black gram were also required to deliver 2 baskets of black gram for the area planted with cow pea. Purchasing price was 2,000 kyats per basket and the full amount was paid in advance in December. The amount also corresponded to about a half or slightly less than the market price of 4,000 to 4,500 kyats in March and April when the actual procurement was made. The advance payment farmers received amounted to 4,000 kyats per acre.

Lastly, some comments regarding the procurement system will be presented. When TMD Village and Tha Byu Village are compared, the latter clearly had heavier "burden" at the time the survey at least. According to an interview in Myanma Agricultural Produce Trade (MAPT), the agency in charge of procurement, extension of procurement system to sesame (30% of production) is scheduled to start shortly. The disparity in 'burden' probably will not change even after this policy change. As mentioned earlier, it is clear that Tha Byu Village is shouldering a heavier burden since the annual 'operators' surplus' per unit of farmland in TMD Village is 2 to 2.5 times higher than that in Tha Byu Village. Considering the present situation in which only a nominal amount is being charged as land revenue, the procurement system is functioning as a *de facto* taxation system. It seems therefore necessary to change at least to a more fair system to impose it proportionately to land productivity (and proportionately to income level by differentiating according to farm size) if the Government is going to maintain and expand the procurement system.

(5) Marketing and Application of Chemical Fertilizers

The marketing channels of chemical fertilizers can be divided broadly into the government channel through Myanma Agriculture Service (MAS) and private traders channel. The supply of fertilizer by MAS was heavily subsidized at one time. However, the subsidy was lifted almost totally around 1992 and the price differences with free market hardly exist at present (less than 10% maximum).

Although information is not accurate as we were not able to conduct a systematic

(6) International Competitiveness of Myanmar's Rice Sector

The author would like to take this opportunity to show his personal views regarding the international competitiveness of Myanmar's rice sector.

According to a rice merchant with whom we conducted an interview in Yangon, a bag (= 49kg) of rice cost 2,000 kyats at the time of survey. Since the price just one year before was 4,000 kyats, the rice price declined by as much as 45%. In a normal year, the merchant handles 20,000 bags per month and ships 60% of this to Upper Myanmar. This year, however, he totally stopped the shipment of rice during the past 6 months because rice price was too low also in Upper Myanmar.

Let us convert the rice price into dollars. The "black" exchange rate of 410 kyats to a dollar will be used as the exchange rate, as it is the actual rate used for transactions between exporters and importers. As a result, 2,200 kyats/bag is converted into $110/ton. International rice price was also very low at that time but it was $170-$200 per ton. One can conclude that the rice price in Myanmar was sufficiently lower than the international price and that it had enough international competitiveness. (For the reference, the price one year before of 4,000 kyats/bag can be converted into $199/ton with the same exchange rate. However, the conclusion remains the same because international rice price at the time was well over $250/ton.)

As mentioned earlier, the price for a bag of urea fertilizer was comparable to international price of 2,300 to 2,500 kyats (indicating that the import market of fertilizers was very efficient). The farmers in Myanmar were facing a very poor rice-fertilizer relative price as a result.

Therefore, if bold deregulation and liberalization of rice export which is currently under the monopoly of MAPT is conducted, the domestic rice price will definitely rise and it will bring enormous profit to rice farmers with marketable surplus. The volume of fertilizers applied will also increase if the rice-fertilizer relative price comes closer to the international standard.

Anyone can easily imagine that Myanmar can pursue the same path as Vietnam where the bold liberalization of rice export through Doi Moi policy framework in 1986 enabled the country to revive as a major rice exporter.

However, there is much doubt as to whether this is actually true because of the existence of a large number of landless non-farm households in rural Myanmar. Hired agricultural labor, which is their main source of income, can only earn 150 to 200 kyats per day (less than 50 cents). According to another survey by the author in a rice double cropping village in the suburb of Yangon, annual income of landless non-farm households amounted to a little less than 150,000 kyats including all sources such as cash income from fruits and chicken in their homestead area (number of samples was 12, conducted at the end of August 2000). This income level corresponds to the 'operators' surplus' of farmers with 2 acres of land in TMD Village and to those with 4 acres of land in Tha Byu Village.

Although income level is low, one can survive sufficiently as long as the prices remain at the present level. They are not so miserable as the landless rural households in India or Bangladesh. However, what will happen if borderless of economy progressed including the liberalization of rice export? It is quite doubtful that increase in wage rate and increase in

Gross profit: 55,000 baskets X 40 kyats/basket = 2,200,000 kyats
Expenses: Labor cost 4,500 kyats/month/person x 12 months
x 2 persons = 108,000 kyats
Maintenance and depreciation cost of milling machine
= 90,000 kyats
Fuel expenses = 418,000 kyats
Net profit = 1,584,000 kyats

As for rice trade, the rice mill collects 20,000 baskets of unhulled rice every year from farmers and ships it to its customers in Nyaung Done and Yangon. It is also selling rice to consumers in the village.

Buying price is decided through negotiation with farmers by taking into consideration the selling price for the customers in Nyaung Done and Yangon as well as quality of rice. Selling price is decided by calculating the suggested selling price by taking milling cost, labor cost and margin into consideration and negotiating with the broker based on this the price. Payment is usually made in cash on delivery.

Buying price of unhulled rice in the past year was 400 to 500 kyats per basket during the harvest season and 700 to 800 kyats per basket during the lean season. Selling price of milled rice to the broker was 2,000 kyats per bag for the former and 2,500 kyats per bag for the latter. Retail price in the village was 1,800 kyats per bag in December and January, and 2,300 kyats per bag in July and August. Net margin rate was 4 to 5 % during the harvest season and dropped to a negative figure during the lean season.

(3) Rice Mills in Township

There are 30 rice mills in the town district of Nyaung Done Township. Rice mill A, which is one of such rice mills, was built in 1989 for a total cost of 40 lakk and owns two 6-ton trucks (30 lakk). The mill hires 6 permanent laborers (receiving 6,000 kyats/month/person) and 18 daily casual workers (receiving 250 kyats/day/person). The mill has a milling capacity of 1,200 baskets per day and mills 50,000 baskets of rice every year. Milling charge is 25 kyats per basket (the mill receives the rice bran).

The mill also buys and sells rice and sells mostly to a broker at Bayint Market in Yangon. As for determination of price, the mill is buying at a price 15% lower than the market price at Bayint Market and the selling price to the broker is decided through negotiation.

(4) Brokers in Township

There are many rice brokers in the town district of Nyaung Done Township. They organize Township Rice Traders' Association, although the organization does not impose any regulations on the ordinary rice marketing practices.

Broker B started its business in 1990. It currently owns a 4-ton truck, purchased 2 years ago for 3 million kyats and uses it to collect rice from rice mills (4 rice mills) and farmers in Nyaung Done and other neighboring townships and to sell it to customers in

employees of cadastral bureau and MAPT. Loan application must be accompanied by presentation of a certificate from the village chief regarding the farming area, type of house and existence of assets such as livestock and ox cart as well as a certificate from MAPT about the household's rice delivery. The latter requirement is also playing the role of encouraging farm households to deliver rice to MAPT. The aforementioned asset quality is for measuring the repayment capacity and not for the purpose of securing collateral. In addition, production cost (i.e. inputs involving cash payment such as chemical fertilizers and agricultural laborers) and sales forecast are entered into the application, and loans are not offered to cases where production cost accounts for more than 60% of sales forecast. After going through this strict screening, 5 to 10 farm households form a group to obtain a loan and this group with assume collective responsibility in the repayment. The entire village was taking on the collective responsibility in the past. According to data from MADB, a total of 1,196,485 farm households have formed 184,646 groups in the entire country. Average number of farm households in a group is therefore 6.48. Loan is offered not only in the form of seasonal loan for planting crops but in medium (2 to 4 years) and long term (5 years or more).[2] In fiscal 1999/2000, 11,186 million kyats were furnished as seasonal loan and 6,150.82 million kyats were provided in the form of medium- and long-term loans.

Loans are offered to farm households with farming scale of 10 acres or less and farm households with greater farming scale are required to present a document stating the special reason for having to take out a loan. In this sense, it can be seen as a low interest loan for improving the welfare of small farm households or a means of dealing with credit rationing generated by low interest policy. However, the majority of farm households can be covered by targeting the loan to farm households with farming scale of 10 acres or less in Myanmar where average farming scale is approximately 5 acres. For instance, the percentage of farm households owning more than 10 scares of farming area in the 2 villages that were surveyed was merely 7.2% in Tha Ma Daw Village and 3.5% in Tha Byu Village.

Rate of consumer price increase in Myanmar is very high, marking 22.3% in fiscal 1992/93, 33.6% in fiscal 1993/94, 22.5% in fiscal 1994/95, 21.8% in fiscal 1995/96, 20.0% in fiscal 1996/97, 33.9% in fiscal 1997/98, 49.1% in fiscal 1998/99 and 13.4% in fiscal 1999/2000. Although inflation rate has been settling down in the recent years, loans offered at the interest rate shown in Table 3-6-1 turn out to be negative in real terms. This will hinder the development of banking system by depriving the motive to mobilize money and give rise to credit rationing whereby loan is concentrated among large-scale farm households as is known as credit rationing.

That is why the aforementioned strict screening has been put in place to prevent credit rationing. In addition, as shown in Table 3-6-2, the loan merely amounts to 4,000 kyats per hectare in the case of rice cropping. However, the amount of loan offered varies from region to region farmers in Tha Byu Village can only receive 1,000 kyats per hectare. This presumably reflects the fact that chemical fertilizers are hardly used in unirrigated regions. As the amount of loans from MADB is equal to (or slightly lower than) the cost of rice planting using agricultural laborers, farmers are obtaining loans to cover their planting cost. Setting a ceiling on the amount of these loans is also believed to be preventing credit rationing.

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[2] Main loans consisted of livestock, pumps and tractors.

Table 3-6-3 Disbursement of Short-Term Loans and Repayments (million kyats)

	Disbursement	Repayments	Repayment rate
1989-90	1617	1617	100.00
1990-91	1524	1524	100.00
1991-92	1533	1533	100.00
1992-93	1759	1759	100.00
1993-94	2609	2609	100.00
1994-95	2781	2781	100.00
1995-96	9014	9014	100.00
1996-97	9914	9919	100.00
1997-98	10245	10245	100.00
1998-99	10356	10358	99.99
1999-2000	11186	10783	99.39

A feature of MADB deserving special mention as an agricultural bank offering low-interest loans in a developing country is that MADB, unlike Gramin Bank and many of its replica banks, is that MADB mobilizes the savings its collects from farmers. This is believed to have an effect of restraining the moral hazard of the bank itself and, even though the amount of loan tends to be low, it is apparently maintaining a relatively sound financing operation.

MADB has launched a savings mobilization program in 1993 to increase its economic viability as a bank. Changes in the amount of savings at MDBA are shown in Table 3-6-5. To check the figures for fiscal 1999/2000, the amount of savings only accounted for 21.49% of the amount of short-term loans. Since there are a little over 2 million farm households with a savings account, this means that average amount of savings per farm household comes to only 1,119.78 kyats. The reason is lack of motivation to save money because real interest rate will be negative at the rate shown in Table 3-6-1 due to high inflation.

an average agricultural laborer) despite the fact that no money has been withdrawn in the last 6 years. According to Farmer A, the purpose is "not to save money but to facilitate the loan from Agricultural Development Bank by having an account." The purpose of his account therefore is not deposit. The case of Farmer B clearly shows the problem of Agricultural Development Bank's savings mobilization. Farmer B started to deposit money in 1995 to purchase an irrigation pump. However, he gave up the initial purpose because of the rapid inflation that reduced the real interest rate to negative figure and withdrew nearly the entire amount in 1999 to cover the planting cost of rice. His was a case where will to deposit money was taken away by heavy inflation tax.

Savings mobilization is necessary in realizing economic independence for sound bank management. Attention must be given to the fact that its unsatisfactory level is not caused by the problem of bank management per se but by macroeconomic policy in which real interest rate becomes negative due to high inflation.

Gramin Bank and its replicas are said to have many problems in soundness of their bank management because of their dependence on external capital for funds. In fact, it is not rare for repayment rate to fall below the 50% mark in many of these banks. MADB is maintaining sound bank management in this sense. It goes without saying that unavailability of foreign capital for political reasons exists in the background. Should the injection of foreign capital become possible as the situation turns for the better, MADB may face the same problem that is afflicting most agricultural credit institutions in the developing countries. Even if the bank becomes the object of some assistance, emphasis shall be placed on assistance that increases the economic independence of the bank rather than facile injection of funds.

Table 3-6-5 Savings Mobilization of MADB (million kyats)

	Fiscal year	Total amount of deposit
1	1993−94	76.93
2	1994−95	235.98
3	1995−96	458.99
4	1996−97	1056.73
5	1997−98	1373.88
6	1998−99	1963.37
7	1999−2000	2403.61

Complementary table: MADB in Danybyu

A case of MADB in Danybyu will be introduced here. As can be seen in the complementary table, the number of farm households that are receiving loans decreased in fiscal 1999. This was the result of abolishing the village banks and shifting the loan operation to MADB branches. According to the MADB branch manager in Danybyu, the reason for abolishment was the inefficiency of village bank operation originating from the difficulty in contacting farmers that are working in the field. Sure enough, the farmers will incur more cost by having to go to MADB to obtain a loan. However, it will restrain the occurrence of credit rationing by having a sort of self-selection effect.

Loans in this region are offered twice a year: the first time for rainy season rice (furnished between May and July and repaid between January through February) and the

including the salary for 500 employees.) In other words, the irrigation system is supported by stupendous amount of subsidy

Considering the fact that budget deficit is at the level of 5 to 6% of GDP, a need will arise to cover the operation and maintenance expenses of the irrigation system by raising the irrigation charge in the future.

8. Agricultural Laborers

The existence of non-farm households that account for nearly 40% of rural population is an aspect of rural economy in Myanmar that is worthy of special mention. Many of them are earning their livelihood as agricultural laborers which, in this sense, makes the rural structure in Myanmar closer to that of South Asia than that of Southeast Asia. Therefore, increase in labor absorption capacity of agriculture will become an important task for Myanmar's agricultural policy until industrialization starts to generate employment opportunities in full scale.

Another feature of Myanmarese agriculture is the fact that disequilibrium in the factor market originating from difference among farm households cannot be adjusted in the land lease market because private ownership of farmland is not permitted in Myanmar. It is adjusted instead by the development of hired labor market and draft animal rental market seldom observed elsewhere in Asian economies. This section will focus on the difference in hired labor market between TMD Village and Tha Byu Village. Farming calendars of these villages are shown in Table 3-8-1 for the purpose of discussion. TMD Village introduced Dry season rice cropping in the mid-'70s but it is in the rainy season rice the difference in hired labor is observed between the two villages. The comparison of these villages is expected to offer beneficial viewpoint in examining the impact of technological changes on rice cropping in the future.

Table 3-8-1 Farming Calendars in TMD Village and Tha Byu Village

	TMD Village	Tha Byu Village
June	Dry season rice harvest Seedling bed for rainy season rice	Seedling bed preparation
July August September	Sesame harvesting Rainy season rice seedling transplantation Weeding	Rainy season rice seedling transplantation
		Jute harvesting and peeling Weeding
October		
November December	Chick pea sowing Dry season rice seedling transplantation	Rice harvesting Black gram sowing
January		Cow pea harvesting
February	Chick pea harvesting	Black gram harvesting
March	Dry season rice harvesting Sesame sowing	
April		Jute planting
May		

Table 3-8-2 Annual Labor Calendar for an Agricultural Laborer Farmer C

June	Seed bed work (for about half a month). Receives15 kyats for sowing a basket of rice seeds. Daily wage is 300 kyats as he sows 20 baskets of seeds a day.
July	Sesame harvesting (for about half a month). Receives 200 kyats for a half-day's work.
From the latter half of July to the end of August. Planting of rainy season rice.	
	Husband: Creates seedling bundles from seed bed. Receives 30 kyats for making 100 bundles and taking it to the farm field. Daily wage ranges from 150 to 300 kyats.
	All children were transplanting rice seedlings and receiving 150 kyats (a day's work) by creating 100 bundles.
November	Hand sowing of chick pea (for about half a month). All household members receive 200 kyats for a half day's work.
December	Harvesting of rainy season rice. Engaged by all family members except for the wife.
	Harvesting0.5 basket of unhulled rice from 100 bundles of harvest 100 bundles usually correspond to 5 baskets of yield
	Threshing (about 10 days) 10 kyats for 100 bundlesWomen only
	Comes to 50-100 kyats a day
March	Dry season rice (for about half a month). Same as in the case of rainy season rice. Harvesting of chick pea (for about half a month). Receives 200 kyats for a half-day's work.
April	Sowing of sesame (for about half a month). Receives 200 kyats for a half-day's work.
June	Harvesting of Dry season rice.
	Harvesting (for about half a month). Receives 35,000 kyats per acre. Corresponds to 15 person/day.
	Dry season rice was introduced in 1997 and therefore has been converted into money wages.
	(note) Straws from high yield varieties are not bundled because they cannot be used for feed.

It is also necessary to explain about migrant agricultural laborers. Mostly comprised of female laborers, they are called "Kauk (rice) Saik (planting) See (group)" and engage in transplanting of rice seedlings and harvesting of rainy season rice. They allegedly started their seasonal migration in the mid-70s when high yielding varieties of rice were introduced to this village. The timing also coincides with the construction of Sedawgyi Dam and

a whole receive 6 baskets of unhulled rice. Each person receives 0.5 basket a day, which, in retail price, is substantial as it corresponds to approximately 300 kyats. Harvesting of Dry season rice is paid in cash in the amount of 3,500 kyats per acre. Since this is a day's work for 15 people, each laborer will receive 233 kyats per day. In addition, this work is performed by agricultural laborers in the village without the help of migrant laborers. Since Dry season rice was introduced only recently, it appears that labor is evaluated in the market without applying the practice of payment in kind as subsistence wage.

According to a farmer, it is difficult to change the wages for rainy season rice harvesting to cash because the payment of 0.5 basket per person as wage has been in existence since 80 years ago. Agricultural laborers rarely sell the unhulled rice they receive and consume the most of it at home. For this reason, the wage level of 0.5 basket strongly reflects its nature as subsistence wage rather than being an evaluation of market equilibrium wage.

(2) Tha Byu Village

Dry season rice is hardly planted in this village where the main cropping pattern consists of rainy season rice and pulses. Migrant laborers do not come to village as demand for hired agricultural labor is met by agricultural laborers in the village. Out of 1,323 farm households in this village, only 364 own their land and 759 are non-farm households. The rest are fishermen.

Let us examine the agricultural labor demand in this village from the farm work calendar of a agricultural laborer Farmer D (age 40) (Table 3-8-3). Other members of his family include a 42-year old wife, a 17-year old son, a 15-year old son, an 8-year old daughter and a 6-year old daughter. The couple's parents were also landless agricultural laborers. Annual working days of the householder is about 130 days which is about the same as the agricultural laborer in TMD Village, although the days of employment for Farmer D are believed to be longer compared to an average agricultural laborer because of his 2-month engagement in seasonal labor. After subtracting seasonal employment, number of days employed per year is smaller in Tha Byu Village where Dry season rice is not planted than in TMD Village.

the field to the premises of the landowner where the threshing is performed using draft animals owned by the farm household. Then, 7 baskets are handed over to the agricultural laborer. Land owner keeps the straws. Meanwhile, under the 1/10 (That Meda) system, harvested rice bundles are divided on the field and rice bundles are transported by the responsibility of respective parties. Landowners retain the right to select a bundle out of 10 bundles to offer to agricultural laborers but agricultural laborers choose their bundle in reality.[3] According to one landowner, adoption of the fixed amount system started as a result of moral hazard in which agricultural laborers started making larger bundles for themselves. It appears that additional work has been assigned to agricultural laborers under the Zaba Pei system to adjust the overvalued wage rate of the 1/10 (That Meda) system. In this manner, conventional harvesting wage system is being modified in response to changes in land productivity so that it will be closer to market equilibrium wages and subsistence wages.

At any rate, however, the fact that harvesting wages are paid in kind and that agricultural laborers are consuming them at home instead of selling them signifies that such payment in kind guarantees the minimum subsistence of agricultural laborers. The existence of agricultural laborers will face a serious challenge if market economy spreads or land-owing farmers starts demanding payment of wages in cash following an increase in price of rice due to export. Such situation can only be solved through labor absorption by urban industrial sector or through increased land productivity.

[3] Agricultural laborers can ask farm households to perform threshing can free of charge but farm households will keep the straws. A payment of 25 kyats per basket will have to be made when using a thresher for threshing.

Appendix 3-2 Production cost and profit at surveyed farm households in TMD Village of Township P (chick pea)

	P2	P24	P15	P23	P5	P12	P11	P6	P16	P4	P19	P14	P21	P1	P20	P3	Average year
Scale of farming	26.00	16.00	14.00	12.98	11.48	7.44	7.43	7.00	7.00	6.81	6.60	4.57	4.45	4.24	3.03	2.99	
Scale of chick pea farming	26.00	9.00	14.00	12.98	11.48	7.44	7.43	7.00	7.00	6.81	6.60	4.57	4.45	4.24	3.03	2.99	
Yield (B/acre)	2.3	2.2	1.0	0.7	1.7	4.0	1.3	7.0	5.0	5.0	0.9	3.3	6.7	0	7.0	1.3	6.9
Price (K/B)		3,000	3,000	3,000	3,000	2,800	3,000	3,000	3,100	3,000	3,000	3,000	3,300		3,000	3,000	3,100
Main product		6,600	3,000	2,100	5,100	11,200	3,900	21,000	15,500	15,000	2,700	9,900	22,110		21,000	3,900	21,390
Secondary product								3,000									3,000
Cross income (per acre)		6,600	3,000	2,100	5,100	11,200	3,900	24,000	15,500	15,000	2,700	9,900	22,110		21,000	3,900	24,390
Cost (per acre)																	
Seed		4,500	4,000	3,756	3,484			3,000					1,169		2,970		2,380
Urea		0	0	0	0			0					0		0		0
TSP		0	0	0	0			0					0		0		0
MP		0	0	0	0			0					0		0		0
Agricultural chemicals		750	429	751	78			0					0		0		0
Diesel oil		0	0	0	0			0					0		0		0
Others		0	0	0	0			0					0		0		0
Ordinary cost total		5,250	4,429	4,507	3,562			3,000					1,169		2,970		2,380
Share (%)		79.5	147.6	214.6	69.8			12.5					5.3		14.1		9.8
Sowing		56	71	324	144			71					45		132		83
Irrigation		100	143	324	52								90				30
Weeding				332													0
Harvesting		600	2,500	600	479			600					3,146		743		1,496
Threshing/dry-blowing		278	300	308	357			257					427		215		300
Tranportation		222	200										180		165		115
Others								71									24
Labor cost total		1,256	3,214	1,888	1,032			928					3,888		1,255		2,047
Share (%)		19.0	107.1	89.9	20.2			3.9					17.6		6.0		8.4
Total cost		6,506	7,643	6,395	4,594			3,928					5,057		4,225		4,427
Management surplus		94	-4,643	-4,295	506			20,072					17,053		16,775		9,963
Share (%)		1.4	-154.8	-204.5	9.9			83.6					77.1		79.9		81.8
Income (per acre)		316			558			20,072					17,369		18,030		
Total income (10,000 K)		0.3			0.6			14.1					7.7		5.5		

Source: Prepared by author based on the August 2000 survey.

Appendix 3-4 Production cost and profit at surveyed farm households in TMD Village of Township P (summer rice)

	P24	P8	P9	P7	P16	P10	P13	Average
Scale of farming	16.00	12.00	8.53	7.04	7.00	4.95	4.54	
Scale of summer ricefarming	11.00	8.00	8.53	3.00	1.50	4.53	4.54	
Yield (B/acre)	90	100	100	100	100	100	94.9	98.7
Price (K/B)	700	650	1,000	550		900	600	788
Cross income (per acre)	63,000	65,000	100,000	55,000		90,000	56,940	77,746
Cost (per acre)								
Seed		3,000	3,600			2,649	1,652	2,725
Urea		4,600	5,000			2,870	2,203	3,668
TSP		2,800	0			3,311	1,454	1,891
MP		0	0			0	0	0
Agricultural chemicals		0	0			773	0	193
Diesel oil		800	720			426	1,410	839
Others		0	0			0	0	0
Ordinary cost total		11,200	9,320			10,029	6,719	9,317
Share (%)		17.2	9.3			11.1	11.8	12.0
Tilling/soil preparation		3,300	1,882			3,863	4,670	3,429
Rice nursery		113	24				33	57
Rice seedling pulling						700		700
ce seedling transplantation		1,400	1,318			2,800	1,982	1,875
Irrigation			529			110		160
cultural chemical spraying		450				331	176	239
Weeding		300	1,000			442		436
Harvesting		345	14,353			3,500	4,163	5,590
Threshing/dry-blowing		3,000				1,300	198	1,125
Tranportation						556		139
Others								0
Seasonal hire			3,529					882
Labor cost total		8,908	22,635			13,602	11,222	14,631
Share (%)		13.7046	22.6			15.1	19.7	18.8
Total cost		20,108	31,955			23,631	17,941	23,948
Management surplus		44,892	68,045			66,369	38,999	53,798
Share (%)		69.1	68.0			73.7	68.5	69.2
Income (per acre)		44,892	68,821			77,293	38,999	
Total income (10,000 K)		35.9	58.5			35.0	17.7	

Source: Prepared by author based on the August 2000 survey.

Appendix 3-6 Production cost and profit (black gram) at surveyed farm households in WYC Village in Tha Byu Administrative Village of Township D

	D20	D17	D13	D3	D18	D14	D6	D11	D4	D21	D22	D1	D24	D2	D23	D8	D5	D12	D16	D7	D15	D26	D30	D10	D9	Average
Scale of farming	23.13	21.47	17.48	14.80	11.07	8.83	8.00	8.00	7.17	6.43	6.43	6.06	5.74	5.27	5.22	5.03	4.38	4.00	4.00	3.70	3.52	3.46	3.00	2.43	1.10	
Scale of black gram cr	23.13	21.47	17.48	6.30	11.07	8.83	7.00	8.00	7.17	6.43	6.43	4.06	3.00	5.27	5.22	5.03	4.38	4.00	3.50	3.70	3.52	3.46	1.50	2.43	1.10	
Yield (B/acre)	8.0	6.8	10.0	10	5	6	2.6	8.5	3.5	8	5	8	4.33	8.5	7.7	10	8	4	10	10.3	4.5	7.5	4.7	10	8	7.3
Price (K/B)	3,500	3,429	4,240	3,900	3,200	3,529	2,000	3,926	2,880	4,220	3,484	3,719	2,308	3,700	4,100	3,600	3,486	3,000	3,500	3,263	3,000	3,769	2,286	3,600	3,500	3,498
Rice	28,000	23,317	42,400	39,000	16,000	21,174	5,200	33,371	10,080	33,760	17,420	29,752	9,994	31,450	31,570	36,000	27,888	12,000	35,000	33,609	13,500	28,268	10,744	36,000	28,000	25,698
Straw	259				635	905		500	355		583	616	833		613		457	300			994					588
Gross income (per acre)	28,259	23,317	42,400	39,000	16,635	22,079	5,200	33,871	10,435	33,760	18,003	30,368	10,827	31,450	32,183	36,000	28,345	12,300	35,000	33,609	14,494	28,268	10,744	36,000	28,000	26,286
Cost (per acre)																										
Seed	4,792	3726	4,042		4,968	3,964		2,813	4,184	6,532	3,110	4,433	2,667	4,744	3,678	3,479	3,653	3,200	5,000	5,405	3,409	4,335		5,144	3,409	4,122
Urea	0	0	0		0	0		0	0	0	0	591	0	0	0	0	0	0	0	0	0	0		0	0	27
TSP	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
MP	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
cultural chemicals	138	105	712		542	0		450	181	0	109	197	800	95	1,121	716	411	480	1,200	284	0	809		1,420	818	481
Diesel oil	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
Others	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
Ordinary cost total	4,930	3,831	4,754		5,510	3,964		3,263	4,365	6,532	3,219	5,221	3,467	4,839	4,799	4,195	4,064	3,680	6,200	5,689	3,409	5,144		6,564	4,227	4,630
Share (%)	17.4	16.4	11.2		33.1	18.0		9.6	41.8	19.3	17.9	17.2	32.0	15.4	14.9	11.7	14.3	29.9	17.7	16.9	23.5	18.2		18.2	15.1	17.6
ng/soil preparation		2,701	1,387		10,659	1,495		1,800	4,000	2,488	1,500	1,182	2,000	2,486	1,724	2,400	2,009	2,160	4,114	1,135	1,705	4,624		9,000	1,818	2,836
Sowing	65	70	109					375	21	280	78	25	150	85	29	179		60	86	41	43	217		150		94
chemical spraying	22	23	109					225	14		39		33	57	268	20	23	40	57	27		58		200		55
Weeding								562		560		443					228									61
Harvesting	1,492	978	739		1,500	306		1,500	1,843	2,799	1,500	2,500	2,000	114	720	1,500	1,100	2,100	2,343	1,946	1,136	1,561		1,200	1,500	1,472
shing/dry-blowing	519	978	219		542	204		750	571	560	583	500	600	3,074	1,724	398	200	480	2,800	1,297	1,420	694		3,000	909	1,001
Tranportation	519	56	438			50				62		443	200	57	48		57					289			91	105
Seasonal hire	3,891																									177
Labor cost total	6,508	4,806	3,001		12,701	2,055		5,212	6,449	6,749	3,700	5,093	4,983	5,873	4,513	4,497	3,617	4,840	9,400	4,446	4,304	7,443		13,550	4,318	5,801
Share (%)	23.0	20.6	7.1		76.4	9.3		15.4	61.8	20.0	20.6	16.8	46.0	18.7	14.0	12.5	12.8	39.3	26.9	13.2	29.7	26.3		37.6	15.4	22.1
Total cost	11,438	8,637	7,755		18,211	6,019		8,475	10,814	13,281	6,919	10,314	8,450	10,712	9,312	8,692	7,681	8,520	15,600	10,135	7,713	12,587		20,114	8,545	10,431
Management surp	16,821	14,680	34,645		-1,576	16,060		25,396	-379	20,479	11,084	20,054	2,377	20,738	22,871	27,308	20,664	3,780	19,400	23,474	6,781	15,681		15,886	19,455	15,855
Share (%)	59.5	63.0	81.7		-9.5	72.7		75.0	-3.6	60.7	61.6	66.0	22.0	65.9	71.1	75.9	72.9	30.7	55.4	69.8	46.8	55.5		44.1	69.5	60.3
Income (per acre)	17,946	14,950	36,369		-1,576	16,468		25,752		23,963	11,201	20,596	5,360	20,994	23,168	27,507	20,790	4,360	20,929	24,839	7,349	17,401		16,236	20,905	
Total income (10,000	41.5	32.1	63.6			14.5		20.6		15.4	7.2	8.4	1.6	11.1	12.1	13.8	9.1	1.7	7.3	9.2	2.6	6.0		3.9	2.3	

Source: Prepared by author based on the August 2000 survey.

Appendix 3-8 Production cost and profit (jute) at surveyed farm households in WYC Village in Tha Byu Administrative Village of Township D

	D12	D26	D30	Average
Scale of farming	4.00	3.46	3.00	
Scale of jute farming	2.50	1.00	1.50	
Yield (B/acre)	400	500	413	438
Price (K/B)	75	75	75	75
Gross income (per acre)	30,000	37,500	30,975	32,825
Cost (per acre)				
Seed	24	525	640	396
Urea	2,640	4,400	2667	3,236
TSP	0	0	0	0
MP	0	0	0	0
gricultural chemicals	960	1,400	667	1,009
Diesel oil	288	720	720	576
Others	0	0	0	0
Ordinary cost total	3,912	7,045	4,694	5,217
Share (%)	13.0	18.8	15.2	15.9
lling/soil preparation	2,160	4,800	1,600	2,853
Sowing	60	150	50	87
Irrigation	960	2,500	2,000	1,820
ral chemical spraying	120	200	367	229
Weeding	1,080	1,600	2,267	1,649
Harvesting	3,200	4,800	2,667	3,556
ıreshing/dry-blowing	3,680	3,600	2,933	3,404
Tranportation	500	625	100	408
Labor cost total	11,760	18,275	11,984	14,006
Share (%)	39.2	48.7	38.7	42.7
Total cost	15,672	25,320	16,678	19,223
Management surplus	14,328	12,180	14,297	13,602
Share (%)	47.8	32.5	46.2	41.4
Income (per acre)	14,448	13,695	15,247	
Total income (10,000 K)	3.6	1.4	2.3	

Source: Prepared by author based on the August 2000 survey.

Chapter 4

Tasks of Agricultural and Rural Development in Myanmar

Agricultural and rural development in Myanmar is facing various tasks that are attributed to the country's diversity. The following will concentrate the main challenges including technical and institutional factors based on the results of our field survey.

1. Tasks of agricultural and rural development

(1) Infrastructure building

Infrastructure building for the transportation sector of Myanmar such as road, railroad, water transportation and port is extremely important in seeking agricultural and rural development within the market economic system. For instance, the road condition of National Highway Route 1 that connects Yangon and Mandalay is so poor that it is hard to believe it is the most important road in the country. Although excessive investment is currently being made for directly supporting the agricultural development through irrigation and drainage, more funds should be invested in areas that indirectly support agriculture such as road.

(2) Alleviation and Elimination of Regulations Related to Land Use

Very strong government guidance exists on the cropping system under state ownership of farmland (as exemplified by encouragement of rainy season rice cropping) that is hindering the development of more rational cropping. Moreover, change of land category such as conversion of paddy to tree farm or fish farm is strictly limited. These restrictions need to be alleviated and eliminated as soon as possible.

(3) Reduction of Government Intervention in Marketing

It is necessary to eliminate the delivery system for rice and privatize Myanmar Farm

shortage occurring in some cases. At the present, the labor-intensive farming system is playing an important role in agricultural development. Neverthless the possibility of facile relocation of labor will be a hindrance to agricultural development cannot be negated. It is necessary to think about creation of year-round employment opportunities by taking such risk into consideration. For this purpose, advancement of rural industry will be necessary in addition to diversification of agriculture through diffusion of labor-intensive crops such as sugar cane and jute.

(6) Agricultural Credit

Agricultural credit in Myanmar is offered by the Myanmar Agricultural Development Bank (MADB). The Bank is currently engaged in financing activities by incorporating the system of the Gramin Bank in Bangladesh.

While replicas of the Gramin Bank are seen extensively in developing countries, it has been indicated that many of them have ceased to function properly mainly because of inadequate screening/monitoring at the time of furnishing of loan and insufficient fulfillment of contract. In contrast, MADB takes advantage of the country's political system by having the Village Loan Application Screening Committee comprised of village committee chairman, cadastral department and AMS staff perform loan screening and monitoring. In addition, MADB is a state-owned bank and therefore has a powerful enforcement coercion system, which the Gramin Bank does not have, that enables it to add the repayment to land tax in the event of default. For this reason, the Bank enjoys a sound management including a nearly 100% repayment rate.

However, the amount of loan it offers is kept at an extremely low level because of its limited financial resources. Setting the political issue aside, a system that offers the loan with relative efficiency has been put in place in the event funding becomes available from international organizations. MADB is also conducting savings mobilization and can contribute to development as a financial institution. Although the level of savings mobilization is not necessarily sufficient at present, it is more a problem of macroeconomic management, than a problem of the bank itself in which real interest rate becomes a negative figure owing to high inflation rate . It is believed that MADB is capable of playing a substantial role once the macro economy stabilizes.

2. Population

(1) Population of Myanmar and Agricultural Development

Generally population growth is not regarded as an issue in Myanmar. Partly due to the existence of leeway for further agricultural development mentioned earlier, the country is believed to remain sufficiently competitive even after liberalization of farm produce advances. However, the situation will have to change for the reasons stated below.

responses. This situation contrasts largely with that in Laos and Cambodia..

However, people do not necessary have access to family planning at their pleasure as a result of population growth policy that is implicitly being followed. Assistance including sterilization operation is offered at government expense for the fifth child but no assistance is offered up to the fourth child.

Among farmers, those who have sufficient land and are well off (some by recommendation from their doctor) receive sterilization operation by paying their own expenses after giving birth to second or third child. In contrast, agricultural laborers have no exchange with doctors partly owing to difference in social status and are unable to benefit from doctors' advice or services. A reality also exists in which they reluctantly continue to bear children because they cannot afford the relatively expensive sterilization operation.

The affluent class can clearly follow family planning with their own will, maintain their affluence and become even more affluent. Meanwhile, poor agricultural laborers become poorer, fail to send their children to higher–grade schools and create a tragic situation of being caught in reproduction of poverty. It is of course not possible to make any generalization from a limited amount of case study. However, it is necessary to avoid a tragic situation in which poverty gives rise to poverty. In addition, having faith in rational decision of the Myanmarese people and enabling people who have the desire to practice family planning without much burden is important also from the viewpoint of improving people's welfare.

(5) Population Census

Needless to say, accurate understanding of population is necessary when designing plans to cope with issues such as population growth, economic development policy, and national development. It is impossible to formulate an effective development policy that would improve people' s welfare without conducting an accurate study about not only the scale of population but its structure and the issue of social class.

Unfortunately, the materials that are currently published in Myanmar lack consistency and contain many areas that are logically not understandable. While no positive statement can be made, the reality may become considerably different once an accurate census is conducted.

We are able to understand the fact that Myanmar is a multiethnic nation facing numerous difficult problems in connection with her ethnic minorities and transition from military regime. However, having accurate population statistics that are not biased by population growth policy will become the most important prerequisite in the process of drafting and effectively implementing a plan for development of agriculture and rural areas.

Chapter 5

Survey Members, Itinerary, and Collected Materials

1. Survey Members

(1) Committee in Japan

Dr. Kawano Sigeto	Emeritus Professor, The University of TokyoBoard of Directors, the Asian Population and Development Association (APDA).
Dr. Hara Yonosuke	Head, The Institute of Oriental Culture, The University of Tokyo.
Dr. Fukui Seiichi	Professor, Kobe University
Mr. Ohono Akihiko	Professor, Aoyama Gakuin University
Dr. Fujita Koichi	Associate Professor, Kyoto University
Dr. Takahasi Akio	Associate Professor, The University of Tokyo.
Mr. Hirose Tsuguo	Executive Director/ Secretary General, APDA
Mr. Kusumoto Osamu	Senior Researcher, APDA
Ms. Hoshiai Chiharu	Manager, International Affairs, APDA
Ms. Kato Yuko	Manager, External Relations, APDA

Ministry of Agriculture and Irrigation (Mandalay)
Patheingyi Township Office

1) Mr. Kyaw Thein, Deputy Divisional Manager
2) Mr. Kyaw Myint, Township Manager
3) Mr. Nwe Oo, Divisional Manager

Ministry of Agriculture and Irrigation (Danuphyu)
Danuphyu Township Office

1) Mr. Mya Sheinn, District Manager
2) Mr. Tun Khin, Township Manager
3) Mr. Chit Hlaing, Township Officer (Township Land Records Office)

Myanmar Agricultural Development Bank (Danuphyu)

1) Mr. Daw Yin Yin Than, Manager
2) Mr. Sein Win, Supervisor
3) Mr. Daw Aye Aye San, Deputy Supervisor
4) Mr. Aye Ko, Deputy Supervisor

Ministry for Progress of Border areas and National Races and Development Affairs

1) Lt. Col. Mr. Myint Swe, Deputy Director General, Department of Border Areas & National Races.
2) Mr. Aye Lwin, Deputy Director, Department of Border Areas & National Races.

Ministry of Forestry

1) Mr. Soe Tint, Director General, Planning & Statistical Department
2) Mr. Than Swe, Director, Planning & Statistical Department
3) Mr. Ngwe Soe, Deputy Director, Planning & Statistics Department

Myanmar Agricultural Products and Trade (MAPT)

1) Mr. Minn Hla Aung, Managing Director
2) Mr. Tin Shwe, General Manager, Paddy & Rice Department
3) Mr. Maw Paw, General Manager, Other Crop Department
4) Mr Ko Ko Gyi, General manager, Export Department
5) Mr. Than Tun Aung, General Manager, Milling Department
6) Mr. Myo Oo, Deputy General Manager (Export Department)
7) Mr. Ohn Kyaing, Deputy General Manager (Milling Department)
8) Mr. Myint Win, Deputy General Manager (Project Department)
9) Mr. Mya Sann, Manager (M.D Office)]
10) Mr. Hla Tha Tun, Manager (Export Department)

Ministry of Health

1) Dr. Hla Pe, Deputy Director General, Public Health Deaprtment
2) Dr. Htay Lwin, Deputy Director, Medical Care Department
3) Dr. Pe Win, Assistant Director, Medical Care Department
4) Dr. Khin Lin, Asistant Director, Department of Malaria
5) Dr. Daw Nyo Nyo Kyaing, Deputy director, Medical Care Department

Schedule of Preliminary Survey

From: 18th June — 25th June

June 18th (Sun)

- 11:00 Depart from Narita by JL 717 Arrive at Bangkok 15:15 (Kusumoto)
- 17:40 Depart form Bangkok by TG 305 Arrive at Yangon 18:30

June 19th (Mon.)

- Discuss about survey programme with local counter part
- Visit to the Embassy of Japan. Briefing on Agriculture and Rural Development of Myanmar.
- Visit to the JICA Office. Briefing on Technical assistance to Myanmar.
- Discuss about outline of Myanmar economy with Mr. Kudo Toshihiro, visiting researcher Institute of Economics

June 20th (Tue)

- Visit to Ministry of Agriculture and Irrigation, Discuss about survey programme.. briefing on Agricultural and Rural situation of Myanmar.
- Visit to Central Statistical Office. Briefing on statistical data on Agriculture , Rural development and Population. Material Collection.

June 21th (Wed)

- Visit to UNFPA,. Briefing on Population programme in Myanmar
- Visit to Ministry for Progress of Border areas and National Races and Development Affairs.Discuss about development Border area and its tasks.
- Visit to UNDP. Discuss about FAO-UNDP project and international cooperation in the field of agriculture and rural development. Material Collection at UNDP

June 22th (Thu)

- Visit to Ministry of National Planning and Economic Development. Briefing on National Development Programme.
- Visit to Ministry of Forestry. Department of Geology. Material Collection.
- Visit to Myanmar Agricultural Produce and Trade (MAPT). Briefing on agricultural production and its export.
- Visit to Ministry of Health.. Briefing on public health situation in Myanmar
- Visit to Ministry of Population and Immigration. Briefing on Population in Myanmar.

June 23st (Fri)

- Visit to Central Statistic Office, Material Collection.
- Visit to Ministry of Agriculture and Irrigation Discuss about survey programme for main survey .

Survey Schedule

From:30th July — 13th August

July 30h (Sun)

- 11:00 Depart from Narita by JL 717 Arrive at Bangkok 15:15 (Ohono, Kusumoto)
- 11:45 Depart from Kansai by JL 623 Arrive at Bangkok 15:30 (Fukui, Fujita)
- 17:40 Depart form Bangkok by TG 305 Arrive at Yangon 18:30

July 31tst(Mon.)

- Discuss about survey programme with local counter part
- Visit to the Embassy of Japan. Briefing on Agriculture and Rural Development of Myanmar.
- Visit to the JICA Office. Briefing on Technical assistance to Myanmar.
- Visit to UNDP. Briefing on international cooperation in the field of agriculture and rural development. Material Collection at UNDP

August 1st (Tue)

- Visit to Myanmar Agricultural Produce Trade (MAPT). Briefing on Agricultural export and its contribution to Myanmar Economy.
- Visit to Ministry of Agriculture and Irrigation, Briefing on Myanmar Agriculture and Rural Development, and survey programme. (Irrigation Department, Agriculture service, Planning department etc.)

August 2nd (Wed.)

- 06:30Depart from Yangon 07:55 arrive at Mandalay (6T807)
- Visit to Myanmar Agricultural Service Field Office at Patheingyi. Briefing on agricultural and rural situation in survey area.
- Interview survey for Village chief.

August 3rd (Thu.)

- Conduct hearing survey (at Patheingyi Township)

August 4th (Fri)

- Conduct hearing survey (at Patheingyi Township)

August 5th (Sat)

- Conduct hearing survey (at Patheingyi Township)

August 6th (Sun)

- 09:30 Depart from Mandalay 11:30 arrive at Yangon (HK 006)

August 7th(Mon.)

- Visit to Agricultural Office at Danubyu. Briefing on agricultural and rural situation in survey area

Collected Materials

1) Union of Myanmar, National; Report on Implementation of Social Development, 1997

2) Union of Myanmar, The Situation Human Development of the Union of Myanmar, 1997

3) Ministry for Progress of Border areas and National Races and Development Affairs, Progress of Border Areas and National Races Department, Yangon, 2000.

4) Ministry of Agriculture and Irrigation, Agriculture, Food and Nutrition Situation in Myanmar 1999, Yangon, 2000.

5) Ministry of Agriculture and Irrigation, Facts About Myanmar Agriculture Year 2000, Yangon, 2000.

6) Ministry of Agriculture and Irrigation, Myanmar Agricultural Development Bank Performance Profile of Myanmar Agricultural Development Bank, Yangon, 2000

7) Ministry of Agriculture and Irrigation, Outline of the Irrigation Department 1999, Yangon, 2000.

8) Ministry of Agriculture, Report on Myanmar Census of Agriculture 1993, Yangon, 1995.

9) Ministry of Agriculture, Agricultural Credit Policy and Operations, Yangon, 1995.

10) Ministry of Agriculture, Myanmar Agriculture Service, Study on the Changes of Rice Production in Myanmar, Yangon, 1995.

11) Ministry of Forestry, Forestry in Myanmar, Yangon, 1999

12) Ministry of Health, Health Care Delivery in Myanmar- National Health Plan, 2000

13) Ministry of Health and UNFPA, A Reproductive Health Needs Assessment in Myanmar, 1999

14) Ministry of Immigration and Population, Population Department- UNFPA, A Reproductive Health Needs Assessment in Myanmar, Population Department- UNFPA , 1999

15) Ministry of Immigration and Population, Immigration and Population Department, Population Changes and Fertility Survey 1991, Population Department- UNFPA , 1995

16) Ministry of Immigration and Population, Population Department- UNFPA, Fertility and Reproductive Health Survey 1997, Population Department- UNFPA , 1999

17) Ministry of Labour, Department of Labour-UNFPA, Handbook on Human Resources Development Indicators 1999, UNFPA 1999

31) No.6, R.T. Baban, Agricultural Development and Environmental Rehabilitation in the Dry Zone Project, End of Assignment Report of Water Harvesting and Localized Irrigation Consultant, UNDP-FAO,1995

32) No.7, Dr.Karyln Eckman, Agricultural Development and Environmental Rehabilitation in the Dry Zone Project, Consultant Report: Follow-Up Mission, UNDP-FAO,1995

33) No.8, F.R. Beernaert, Agricultural Development and Environmental Rehabilitation in the Dry Zone Project, Natural Resources Inventory in the Townships of Chaung U, Kyaukpadaung and Magway- Consultant Report, UNDP-FAO,Yangon,1995

34) No.9,Stephen R. Harris, Agricultural Development and Environmental Rehabilitation in the Dry Zone Project, Report of a consultancy Mission to the Union of Myanmar on Handling of Produce for Local Sale and Export, UNDP-FAO,Rome,1995

35) No.10, J.W.F. Cools, Union of Myanmar Agricultural Development and Environmental Rehabilitation in the Dry Zone, Farming Systems in The Dry Zone Final Mission Report, UNDP-FAO, The Netherlands, 1995

36) No.11, Dr.Karyln Eckman, Agricultural Development and Environmental Rehabilitation in the Dry Zone Project, Third Consultant Report, Rome, UNDP-FAO,1995

37) No.12, F.R. Beernaert, Sustainable Agriculture Development and Environmental Rehabilitation in the Dry Zone, Natural Resources Consultancy Training Course on Land Evaluation , Soil Survey and Soil Conservation, UNDP-FAO,Yangon,1995

38) UNDP, Human Development in Myanmar, UNDP Myanmar, 1998

39) UNDP, UNDP Human Development Initiative Myanmar Assessment Report, UNDP, 1996

40) UNDP, UNDP Human Development Initiative, UNDP

41) UNDP, UNDP' s Myanmar Human Development Initiative: An Assessment, UNDP

42) UNDP-FAO, Union of Myanmar Consolidated Report of the SPPD Mission, UNDP-FAO 1999

43) UNDP-FAO, SPPD Project MYA/98/03 Enhancing The Income of Small Scale farmers and the Landless Through Integrated Natural Resource Management, UNDP-FAO 1999

44) UNDP-FAO, Agricultural Marketing Study Dry Zone and Southern Shan State Phase1 Draft Report, UNDP-FAO 1999

45) FAO-UNDP, Report of the SPPD Missions, UNDP-FAO 1999

46) FAO, UNDP-FAO Work Plan-First Semester 1999, Food and Agriculture Organization of the United Nations, 1998

Questionnaire

No.

Questionnaire

for

Village Head

Name of the Village Tract:
Name of the Village Head:
Date:
Name of the Interviewer:

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Union of Myanmar

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2000

1) Size of the Village tract

Total: acres

1. Cultivated land: acres
   % of irrigated: %
2. Fallow/Culturable Waste: acres
3. Bush/Forest: acres
4. Pond/River: acres
5. Others (specify): acres

2) Use of Cultivated land

Cropping Pattern	Irrigated?	Area (acres)
	Y / N	
	Y / N	
	Y / N	
	Y / N	
	Y / N	
	Y / N	

3) No. of Villages and Population

Name of the Village	Ethnic Group	No. of Households			Population		
		Total	Farmers	Landless	Total	Male	Female
Total	N.A.						

No.

Name of Village Tract:

Name of Village:

Date:

Name of Interviewee:

Name of Interviewer:

Questionnaire

for village person

<Social – Demographic – Public Health>

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1. Basic Information

	Name	Sex	Age	Language	Ethnic Group	Language	Religion	Size of land ownership	Times of meals	Final Education
You		M / F								
Your spouse		M / F								

1) If you have no educational career, can you read and write Myanmar language? Yes[ ] No[ ]

2) If your husband or wife has no educational career, can he/she read and write Myanmar language? Yes[ ] No[ ]

3) Your ideal educational career for your children?

2. Social Structure

1) Who will inherit your property among your children?

2) When you got married, where did you live?
   1) your parents ( )
   2) near by your parents ( )
   3) spouse's parents ( )
   4) near by spouse's parents ( )

3) Number of Children
   a. How many children have you had so far?
   b. How many children do you have now?
   c. How many children do you want? (Ideal number of children)
   Boy ( ) Girl ( ) Total ( )

4) If you can have only one child, which do you prefer to have boy or girl? Boy ( ) Girl ( )

5) If you have boy and girl children, when they wish to go to school, but you have financial constraints. In this case, which will you choose either boy or girl? Boy ( ) Girl ( )

No.
Name of Village Tract:
Name of Village:
Date:
Name of Interviewee:
Name of Interviewer:

Questionnaire

for Village Person

<Agriculture, Households Economy>

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Q.1 Please tell us your households members

Name	Relation with HH	Sex	Age	Educational Background	Live Together?	Main Occupation	Subsidiary Occupation	Remittance
1	HH	M / F			Y / N			
2		M / F			Y / N			
3		M / F			Y / N			
4		M / F			Y / N			
5		M / F			Y / N			
6		M / F			Y / N			
7		M / F			Y / N			
8		M / F			Y / N			
9		M / F			Y / N			

Q.2 How many days did each members work in the following works during the last year?
And how much did he/she erned?

	Working days	Income	Working days	Income	Working days	Income	Working days	Income
1.Agri. seasonal wage labor								
2.Agri. daily wage labor								
3.Non-agri. wage labor								
4.Trading								
5.Rice mills and other manufacturing								
6. Artisan (carpentry, smithy, masonry, etc.)								
7. Transport								
8. Government employee								
9. Household industry								
10. Total								

Q.7 Please tell us about farm implements and machineries

	Number	HP	Year of purchase	Price when purchased	Re-purchased price	Repair and maintenance cost during last year	Expected duration
Bullock cart							
Plow (hte)							
Harrow (htun)							
Hoe (pantu)							
Small plow (htunji)							
Sickle (dazin)							
Knife (da)							
Power tiller							
Irrigation pump							
Sprayer							
Thresher							
Fan (for winnowing)							
Vehicle							
Boat							

Q.8 Please tell us about livestock holdings

	Number	Year of purchase	Price when purchased	Re-purchased price	Feed and other remarks
Bullock					
Calf					
Buffallo					
Baby bufallo					
Cow					
Mother Pig					
Piglet					
Chicken					
Duck					

Q.9 Sales of livestocks during last year?

	Number	Ave. sales price	To whom sold	Particular reasons of sale, if any	Net income
Bullock					
Calf					
Bufallo					
Baby buffalo					
Cow					
Mother Pig					
Piglet					
Chicken					
Duck					

Q.9 Did you lease in/out cattle or machineries?

Kind	Lease in/out	To/from whom	Rental rate	Crops and operations	Volume (acres, hours, etc.)
	I / O				
	I / O				
	I / O				
	I / O				
	I / O				

Q.10 Please tell us about holdings of durable consumer goods

	Number	Year of purchase	Price when purchased
Bed			
Chair			
Table			
Desk			
Radio-cassette			
TV-set			

	Number	Year of Purchase	Price when purchased
Clock			
Watch			
Camera			
Bicycle			
Motor Cycle			

Q.17 On which month is your family faced with deficiencies of rice most badly?

Q. 18 Have you borrowed rice during last three years? Yes[ ] No[ ]

If yes,

When
How much
From whom
Interest rate
Is it easy to borrow rice? Very easy[ ] Easy[ ] Difficult[ ] Very difficult[ ]

Q.19 Have you lent rice when requested last three years? Yes[ ] No[ ]

If yes,

When
How much
To whom
Interest rate

Q.20 Have you borrowed wages in advance during last three years? Yes[ ] No[ ]

If yes,

When
How much
From whom
Interest rate
Is it easy to borrow rice? Very easy[ ] Easy[ ] Difficult[ ] Very difficult[ ]

Q.21 Have you lent wages in advance during last three years? Yes[ ] No[ ]

If yes,

When
How much
To whom
Interest rate

Q.22 Please tell us about debt and credit (for the last three years)

1.Debt	Name of lender	Relations	When	How much	Interest rate	Terms & conditions	Collateral	Outstanding	Usage
1									
2									
3									
4									
5									

2. Credit	Name of borrower	Relations	When	How much	Interst rate	Terms & conditions
1						
2						
3						
4						
5						

Q.23 Suppose there are following loan sources

	Easiness	Amount of loans	Seriousness
Money lender			
Trader			
Relatives			
Friends			
Employers			
NGO			
Bank			

a) Easiness: Please order the sources according to the easiness of access (number 1 to 6 in order of easiness)
b) Amount: 1) enough, 2) nearly enough, 3) only small amount
c) Seriouness: Suppose that you borrowed from all the sources and that you are in short of money for repayment. Please order the sources according to the possible seriousness associated with default (number 1 to 6 in order of seriousness).