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Livelihoods and extension in Myanmar: Central Dry Zone

Strengthening institutional capacity, extension
services and rural livelihoods in the Central
Dry Zone and Ayeyarwady Delta regions
of Myanmar (ASEM/2011/043)

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Disclaimer

While this report is a product of the aforementioned project funded by ACIAR, the contents, opinions and interpretations presented herein are the authors' own. Data accuracy and analysis are the responsibility of the project team located at the Asian Institute of Technology.

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Abbreviations and acronyms

ac	acres
CSO	Civil Society Organisation
DoA	Department of Agriculture
FGD	focus group discussion
HH	household
LIFT	Livelihoods and Food Security Fund
LH	landholding
LL	landless
NGO	non-government organisation
YAU	Yezin Agricultural University

Executive summary

This data compendium presents the results of socioeconomic research conducted in 2014–15 for the project 'Strengthening institutional capacity, extension services and rural livelihoods in the Central Dry Zone and Ayeyarwady Delta regions of Myanmar', funded by the Australian Centre for International Agricultural Research (ACIAR).

The research was conducted in two parts: (1) a largely quantitative survey using a structured questionnaire administered by Yezin Agricultural University (YAU) and the Department of Agriculture (including students as enumerators); and (2) focus group discussions conducted by the Asian Institute of Technology, Bangkok, with support from YAU students. The research was conducted in four townships of the Central Dry Zone region: Kyaukpadaung, Chaung-U, Myingyan and Pwintbyu. The stratified random sample for the survey included representatives of landless and landholding households. The focus groups were divided based on landholding or landless status and gender. Separate interviews were conducted with village heads for community-level information.

Data reported here are separated into three major categories: (1) household characteristics, including data on age, household structure, education, labour availability, household economics and consumption; (2) production, covering agriculture, livestock and fisheries, as well as irrigation, inputs and expenses; and (3) support services, examining access to credit, information sources and capacity building. Where appropriate, data are compared to secondary information, bearing in mind that data in Myanmar are scarce and often incomplete.

This compendium highlights the importance of the Central Dry Zone as a major agricultural region for the country, despite challenges associated with water scarcity, soils and land tenure. It addresses the fragile balance of using land productively while avoiding soil erosion and salinity. Similarly, it highlights the social balance between landholders and the landless rural population, whose role in natural resource production (as labourers and livestock graziers) cannot be underestimated, and whose livelihoods are precarious due to lack of financial and technical support and extension.

These data are being made available so that other projects and researchers can use them for discussion, comparison, correction and analysis. We understand that socioeconomic research in Myanmar is relatively young and, therefore, we want to contribute to a community of practice that is able to use, apply and analyse these results for the development of rural Myanmar.

Introduction

The Australian Centre for International Agricultural Research (ACIAR) funded a four-year research program to help improve agricultural livelihoods in the Ayeyarwady Delta and Central Dry Zone regions of Myanmar. The program included conducting socioeconomic research to:

- support an understanding of farmer livelihoods and drivers of decision-making and change, to underpin agricultural research and extension services
- identify and support the implementation of effective farmer extension methodologies for agricultural technological change and adoption
- identify pathways for developing agricultural institutional capacity and policy change through collaborative institutional research with partner organisations.

This report summarises the key findings of baseline research conducted in the Central Dry Zone in 2014–15. It includes surveys to increase understanding of the conditions and changes related to the livelihoods of rural households in the Central Dry Zone region. In addition to contributing to the emerging body of data on household conditions in Myanmar, this report also forms the basis for ongoing research activities.

A companion report summarising baseline research in the Ayeyarwady Delta is also available (Htway et al. 2020. *Livelihoods and extension in Myanmar: Ayeyarwady Delta*. ACIAR: Canberra).

Study area

The Central Dry Zone is one of the most water stressed regions in Myanmar. Most farmers in the area are subsistence and small-scale farmers (NCEA 2010) and 40–50% of the rural population is landless (JICA 2010). The Central Dry Zone is a major region for the production of oilseed crops and pulses (Baroang 2013, Haggblade et al. 2013). However, crop productivity suffers from the uncertain rainfall pattern in the region (Matsuda 2013).

This survey was conducted in four townships within the Central Dry Zone: Kyaukpadaung, Chaung-U, Myingyan and Pwintbyu (see Figure 1).

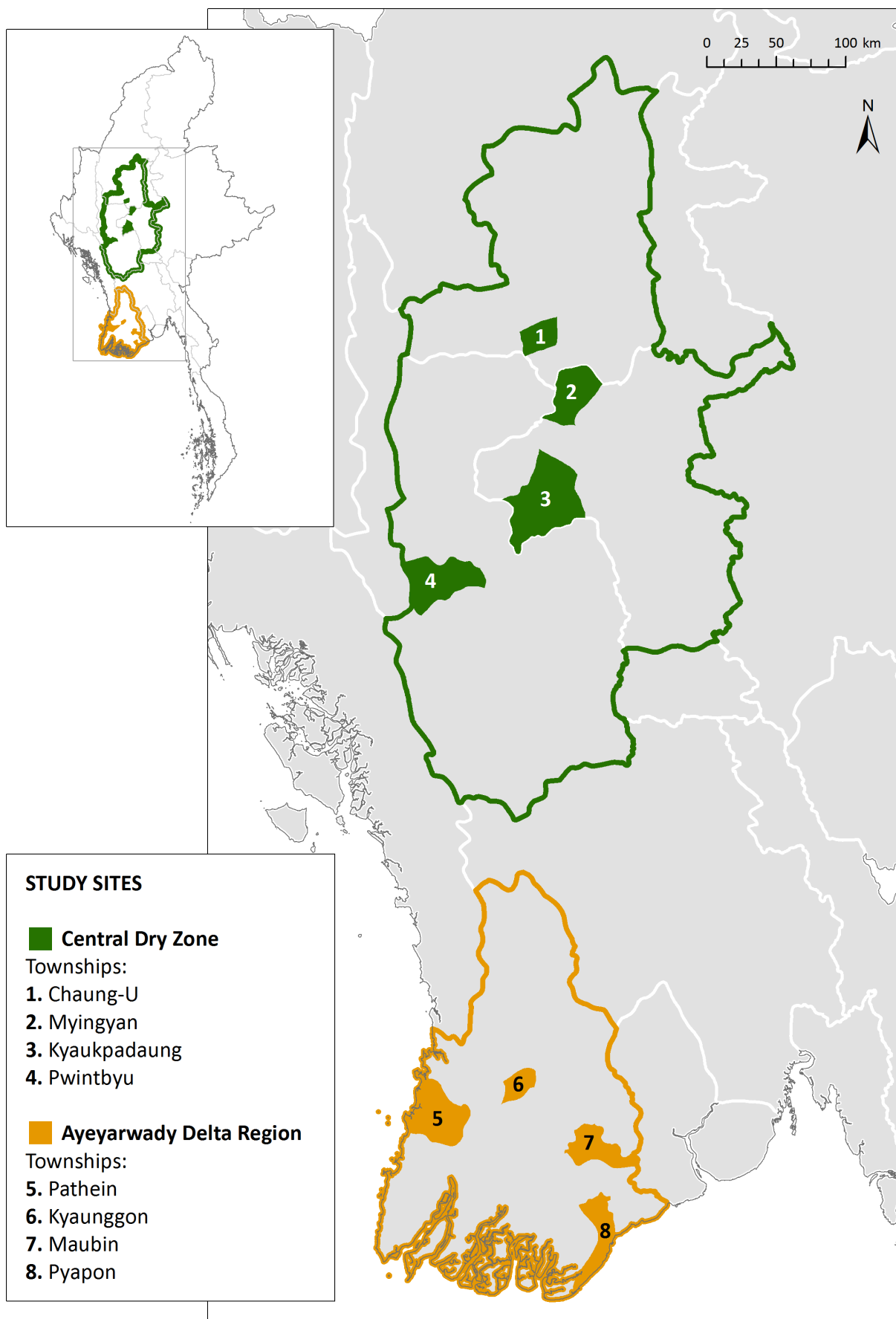


Figure 1: Study sites for the Central Dry Zone and the Ayeyarwady Delta

Methods

Townships and village selection

The townships and villages were selected in consultation with staff of the Department of Agriculture (DoA) offices at township and district levels. They met the following criteria:

- the diversity of farming systems and livelihood activities in the Central Dry Zone, based on the Japan International Cooperation Agency (JICA) typology categorising townships located east and west of the Ayeyarwady River (JICA 2010)
- the location of study villages (e.g. proximity and connectivity to the city)
- rainfall shocks ('stressed' versus 'non-stressed' villages, and irrigated area)
- sites shared with other ACIAR projects and Livelihoods and Food Security Fund (LIFT) study sites, as well as 'control' villages with no project intervention.

Household survey

The survey was designed in consultation with other ACIAR research projects related to legumes, fish, rice and cattle production. The initial survey questions were in a pilot project in the Ayeyarwady Delta in early 2014. They were then refined to reduce the burden on respondents by removing many of the detailed questions relating to labour and time use. It was decided that these could be better explored through other research methods. A pilot survey was conducted in the Central Dry Zone to test and adapt the survey for that area.

Separate surveys were conducted for households with access to land and landless households. The survey for landholding households allowed for detailed information on agricultural production. The survey for landless households allowed for more detailed information on labour and migration. Both surveys collected data on basic household demographics, income, expenditure, ownership of assets and access to services.

Proportional stratified sampling was used to reflect the percentage of households with and without access to land, as well as engagement in major activities (e.g. crop production, keeping livestock and fishing). A total of 760 interviews were conducted with separate questionnaires for landholding¹ and landless households (see Table 1).

The number of women in the sample was quite low in landholding households, where generally the household head was interviewed, in line with local custom. Women represent half of the total respondents from landless households, reflecting higher rates of women-headed households and higher migration rates.

¹ The term 'landholding' is used throughout this report to refer to households that have access to land. This is used in preference to 'land owning' as, in many cases, households do not have land title even though they may use the land or have traditional land use rights.

Table 1: Number of landholding and landless households surveyed, by township

Township	Landholding		Landless	
	Total	Women	Total	Women
Kyaukpadaung	128	17	77	45
Chaung-U	117	30	67	42
Myingyan	118	37	69	23
Pwintbyu	123	7	61	28
All townships	486	91	274	138

Focus group discussions

To understand the dynamics of livelihoods in the study area, information from the household survey was complemented by qualitative data collected through focus group discussions (FGDs). These were held in two of the six villages per township that took part in the survey. The villages were selected to capture the mix of livelihood and general conditions in the region. Two FGDs were held in each village, one each for landless and landholding households. Between eight and 15 people participated in each discussion.

During the FGDs, participants were asked about their resources, current livelihood and how decisions were made about livelihood activities. Participants were also asked how and why livelihoods in the village were changing or had changed, and the changes they expected in the future.

Data collection and analysis

The survey was held in October and November 2014. Staff and students from DoA, the Department of Agricultural Research, the Yezin Agricultural University (YAU) and the Asian Institute of Technology were trained and organised into four teams. Each team was assigned a township, and a team leader was responsible for ensuring data quality before leaving the survey villages. Masters students and staff from YAU and DOA staff entered and cleaned data. Statistical Package for the Social Sciences and Microsoft Excel software was used to analyse data and to present basic descriptive statistical analysis.

FGDs were facilitated and recorded by small teams from YAU and the Asian Institute of Technology, with the support of local DOA staff in each township. Transcripts of each FGD were recorded in Myanmar language and then translated into English. Their contents were analysed to identify key concepts, recurring themes and drivers of change and decision-making. The differences or similarities between the villages, and the relationship between landholding and landless households were also noted.

Limitations

Households in the area surveyed have better access to irrigation (53%) compared to the Central Dry Zone generally (12% of cultivated land) (JICA 2010). The over-representation of households with access to irrigation is partly due to the need to align the survey with other ACIAR projects, and DOA priority areas.

Household characteristics

This section summarises information relating to demographics, labour, housing and household assets, as well as basic household economics.

Demographics

Household size

Table 2 compares household size among landholding and landless households surveyed. The average number of people per household is larger for landholding households (5.42 people) than landless households (4.85 people).

It indicates landless households tend to be younger, with members receiving mostly primary school or monastery education, compared to landholding households. The sample does not show ethnic or religious diversity.

Table 2: Number of people per household

	Landholding			Landless			Combined		
	Average size	Largest	Smallest	Average size	Largest	Smallest	Average size	Largest	Smallest
Kyaukpadaung	5.5	10	2	4.8	9	2	5.2	10	2
Chaung-U	5.2	10	2	5.1	10	2	5.2	10	2
Myingyan	5.6	11	2	4.8	10	1	5.2	11	1
Pwintbyu	5.3	11	2	4.6	9	1	4.9	11	1
All townships	5.4	11	2	4.9	10	1	5.2	11	1

Women-headed households

The proportion of women-headed households surveyed across all townships, in the landholding and landless samples, is 17.5% (see Table 3). This is comparable to national statistics, which suggest 18.7% of households in rural areas are women-headed (Department of Population 2015:48).

However, there is significant variation between the landholding and landless samples, and between different townships. The proportion of households in the landholding sample that are headed by women is between 2.4% and 9.4%. In landless households, the lowest proportion of women-headed households is in Pwintbyu (9.8%) and the highest is in Chaung-U (23.9%).

Table 3: Women-headed households in sample

	Landholding		Landless		Combined	
	No.	%	No.	%	No.	%
Kyaukpadaung	12	9.4	11	14.3	23	11.2
Chaung-U	11	9.4	16	23.9	27	14.7
Myingyan	6	5.1	15	21.7	21	11.2
Pwintbyu	3	2.4	6	9.8	9	4.9
All townships	32	6.6	48	17.5	80	17.5

Age

The average age of household heads in landholding households is 53.3 years, compared to 46.7 years in landless households. The average age of household heads and all household members (including the household head) from landholding households is slightly higher than landless households (see Table 4). Landless households often comprise younger or newly established households, which is also reflected in the structure of households (see Table 5). Landless households tend to have more children aged under 14, and fewer family members aged 65 and above.

Table 4: Average age, by years

	Household head	All household members (including household head)
Landholding	53.3	33.8
Landless	46.7	28.4
Combined	50.0	31.1

Table 5: Age structure of sampled households

Age	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Household members including household head (%)					
Landholding households					
≤14	18.8	16.2	14.8	18.3	17.1
15–30	33.6	32.7	33.6	35.6	33.9
31–45	18.5	21.2	21.1	19.3	20.0
46–64	21.2	22.3	22.3	20.2	21.5
>65	7.9	7.6	8.1	6.6	7.6
Landless households					
≤14	32.1	21.6	25.6	30.6	27.2
15–30	30.4	36.3	31.5	30.0	32.1
31–45	21.6	18.1	22.1	20.9	20.7
46–64	12.8	18.7	16.5	16.3	16.2
>65	3.0	5.3	4.3	2.2	3.8

Education

Nationally, around 56% of people in Myanmar have received primary school education (Aung 2013). In our sample, education levels vary significantly between townships and also between landless and landholding households (see Table 6). Across all townships, the landholding households have greater rates of access/completion of high school level education compared to landless households, but it is still low (12.8%).

The proportion of household heads who are illiterate is generally higher in the landless sample than the landholding sample, except in Myingyan. Chaung-U has the highest illiteracy rates for household heads across both landless (7.5%) and landholding (6%) samples. Landholding households in Chaung-U also have the highest proportion of households with a high school education (14.5%) or a graduate education (3.4%), indicating variations in access to education.

In Pwintbyu, monastery education is more dominant in landless households while the proportion of household heads who completed monastery, primary and middle school education is almost equally distributed in landholding households.

Table 6: Highest level of education, household head

	Illiterate (%)	Monastery (%)	Primary school (%)	Middle school (%)	High school (%)	Undergrad/ diploma (%)	Graduate (%)
Landholding households							
Kyaukpadaung	0.8	18.8	28.1	36.7	13.3	0	0
Chaung-U	6.0	12.0	47.0	17.1	14.5	0	3.4
Myingyan	1.7	32.2	48.3	8.5	8.5	0	0.8
Pwintbyu	1.6	25.2	26.8	29.3	12.2	2.4	2.4
All townships	2.5	22.0	37.2	23.3	12.8	0.6	1.6
Landless households							
Kyaukpadaung	3.3	13.1	13.1	54.1	13.1	3.3	0
Chaung-U	7.5	9.0	67.2	11.9	3.0	3.0	0
Myingyan	0	39.0	53.2	5.2	2.6	0	0
Pwintbyu	2.9	40.6	30.4	18.8	2.9	0	2.4
All townships	3.3	26.4	42.1	21.2	5.1	1.1	0.7

Ethnicity and religion

Buddhism is the predominant religion in the Central Dry Zone. This is reflected in the dominance of Buddhism in the sampled households. Across all townships, more than 99% of landholding and landless household heads identify as Buddhist (see Table 7). Myingyan is the only township with any diversity, with a few households identifying as Christian (3.4% of landholding households and 1.5% of landless households).

Table 7: Religion of household head

Township	Buddhist (%)		Christian (%)	
	Landholding	Landless	Landholding	Landless
Kyaukpadaung	100	100	0	0
Chaung-U	100	100	0	0
Myingyan	96.6	98.5	3.4	1.5
Pwintbyu	100	100	0	0
All townships	99.2	99.6	0.8	0.4

Note: No respondents from any township or household type identified as Muslim or Hindu.

Table 8 shows the percentage of household heads belonging to different ethnicities. The majority of people who live in the Central Dry Zone are of the Bamar ethnic group. In our sample, 0.9% of landholding households in Chaung-U township are Kayin, and the rest of the sample are Bamar.

Table 8: Ethnicity of household head

Township	Bamar (%)		Kayin (%)	
	Landholding	Landless	Landholding	Landless
Kyaukpadaung	100	100	0	0
Chaung-U	99.1	100	0.9	0
Myingyan	100	100	0	0
Pwintbyu	100	100	0	0
All townships	99.8	100	0.2	0

Labour

The availability of labour per household has implications for how members can take part in different activities to secure their livelihood. For example, labour availability affects whether households have to hire or exchange labour to cope with peak periods. In rural Myanmar, labour for agriculture can be categorised into: (1) family labour (unpaid); (2) casual labour (hired for a day or several days for a specific farm operation such as transplanting); and (3) seasonally hired labourers employed for a whole season (Kurosaki 2006).

Family labour alone is often not sufficient for farming households to manage peak farming periods. The high percentage of landless households indicates a labour pool is theoretically available for farming households to draw on. FGDs suggest that the traditional patterns of labour exchange between landholding households (that hire labour) and landless households (that provide labour) are changing due to farm mechanisation and growing non-farm income opportunities.

This section presents information on labour availability and migration, focusing on areas of employment for landless households.

Labour availability

The dependency ratio indicates the proportion of working-age population to dependents (see Table 9). It is calculated based on the total number of dependents (people aged under 15, or 65 and over) divided by the working-age population (aged 15–64). This is expressed as a percentage. The dependency ratio indicates the labour available to support children and elderly members of the household and community.

According to survey results, there are 43.4 dependents for every 100 working-age people. This is slightly lower than the national statistics, which show a dependency ratio in 2014 of 52.5% for Myanmar as a whole (Department of Population 2015:22).

The dependency ratio is higher for landless households (54.1%) than for landholding households (32.76%), which is more in line with the national population. The dependency ratio in Kyaukpadaung is highest for both landholding (36.43%) and landless households (54.1%). For landholding households, it is lowest in Myingyan (29.7%) and for landless households, it is lowest in Chaung-U (35.1%).

Table 9: Dependency ratio (%)

	Landholding	Landless	Combined
Kyaukpadaung	36.4	54.1	45.7
Chaung-U	31.2	35.1	33.2
Myingyan	29.7	41.0	35.4
Pwintbyu	33.2	46.8	40.0
All townships	32.8	54.1	43.4

Labour migration

Table 10 and Table 11 indicate the number of people who migrate and the type of migration (seasonal, temporary or permanent). Information is based on household members who were away from home at the time of the survey.

Migration is higher in Kyaukpadaung and Myingyan compared to other townships. Crop production in these areas is less favourable so there are fewer opportunities for local agricultural work. Kyaukpadaung is also located on the Yangon–Mandalay National Highway 2 and may have greater access to migration-related information, such as job opportunities. It may also make travel easier, due to the road connectivity.

Landholding households have slightly higher migration than landless households, which may be due to their ability to cover travel costs. Although landless household members indicated an interest in migration to support alternative livelihood strategies, they are less able to cover the costs.

Table 10: Number of migrated household members

	Household members (no.)	Landholding Working-age sample (%)	Household members (no.)	Landless Working-age sample (%)	household members (no.)	Combined Working-age sample (%)
Kyaukpadaung	72	13.9	27	14.1	99	13.9
Chaung-U	28	6.1	17	6.7	45	6.3
Myingyan	55	10.8	24	9.0	79	10.2
Pwintbyu	45	9.2	15	6.9	60	8.5
All townships	200	10.1	83	8.9	283	9.7

Table 11 shows the type of migration by different households. In our surveys, temporary migration is significant in landholding and landless households of all townships. In Myingyan, temporary migration accounts for all cases of migration.

For landholding households, permanent migration is highest in Pwintbyu (26.7%); for landless households, it is highest in Chaung-U (23.1%).

Seasonal migration is less common. Seasonal migration is highest for landless households in Chaung-U township (15.4%). None of the landless households in Myingyan and Pwintbyu townships report seasonal migration. In Pwintbyu township, the farmers grow more than one crop per year, so landless households have job opportunities in their villages throughout the year.

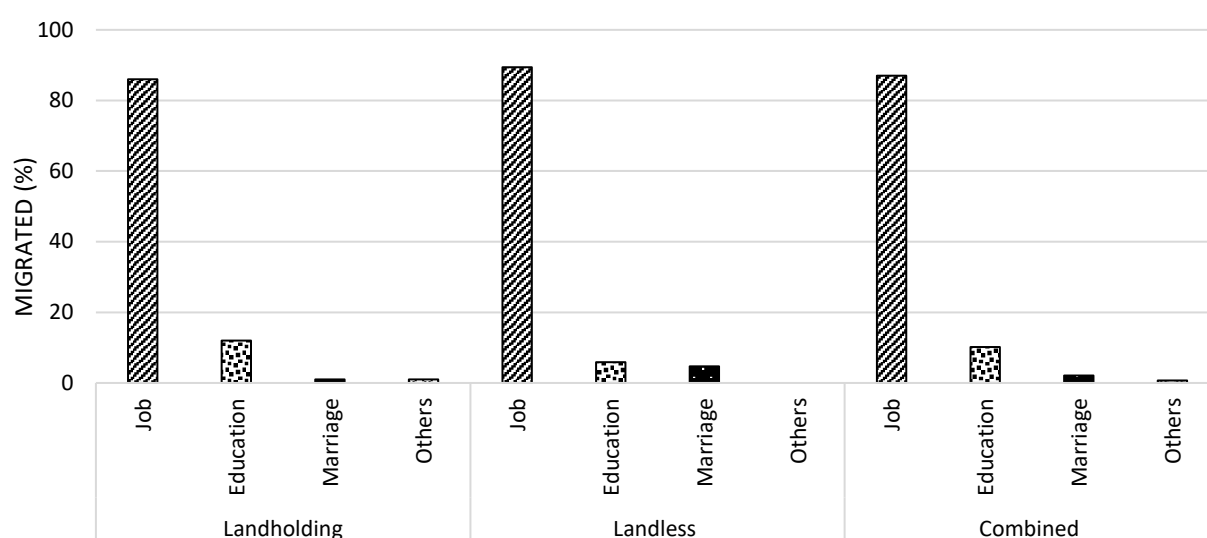
Table 11: Migration by type (seasonal, temporary and permanent) as a percentage of all migration

	Landholding (%)			Landless (%)			Combined (%)		
	Seas.	Temp.	Perm.	Seas.	Temp.	Perm.	Seas.	Temp.	Perm.
Kyaukpadaung	5.6	84.7	9.7	0	89.5	10.5	8.1	83.8	8.1
Chaung-U	7.1	92.9	0	15.4	38.5	23.1	17.8	77.8	4.4
Myingyan	3.6	85.5	10.9	5.6	88.9	5.6	3.8	87.3	8.9
Pwintbyu	8.9	64.4	26.7	0	100	0	6.7	73.3	20.0
All townships	6.0	81.5	12.5	23.2	81.9	4.8	8.1	81.6	10.2

Note: percentages are calculated based on household members who had migrated, as per Table 10.

Reasons for migration

The reasons for family members migrating include seeking a job, continuing their education and moving to their spouse's residence (see Figure 2). Seeking a better job is the most common reason for all types of migration in both landholding and landless households.

**Figure 2: Main reason for migration**

Landless households and labour—sectors, location and payment

This section focuses on information provided by landless households, and focuses on labour as a key livelihood activity.

Employment sectors

Agriculture is the major employment sector for landless households in the survey, with at least one member in each household working in agriculture (see Table 12). The second-highest area of employment is non-farm work such as carpentry, wood chopping, brick making, hand weaving, cigar making and small-scale trade. Landless workers who worked in fisheries are seen only in Pwintbyu township because of its location on the west bank of the Ayeyarwady River, which is a main source of fish.

In Myingyan township, the percentage of household members who work in the non-farm sector is higher than those who work in agriculture.

Table 12: Main sector of employment, landless households, by household members

Sector	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu	
	No.	%	No.	%	No.	%	No.	%
Agriculture	51	62.2	52	55.9	47	45.2	63	67.7
Fishery	0	0	0	0	0	0.0	6	6.5
Non-farm	31	37.8	41	44.1	57	54.8	24	25.8
Total	82	100	93	100	104	100	93	100

Table 13 shows landless workers based on the locations of their work in different sectors. Of those working in agriculture, more than 90% are employed within their village.

Of those employed in non-farm activities, most work in their village in Chaung-U, Myingyan and Pwintbyu townships, due to local industries like weaving and making cigars. In contrast, almost 60% of non-farm workers in Kyaukpadaung work outside their village.

Table 13: Landless workers, main location of work, by sector

Main location	Household members working in sector (%)											
	Kyaukpadaung			Chaung-U			Myingyan			Pwintbyu		
	Ag.	Fish.	Non-farm	Ag.	Fish.	Non-farm	Ag.	Fish.	Non-farm	Ag.	Fish.	Non-farm
Village	95.3	0	27.7	100	0	70.7	94.9	0	75.3	98.6	100	63.6
Outside village	1.2	0	59.6	0	0	29.3	5.1	0	24.7	0.9	0	27.3
Both	3.5	0	12.8	0	0	0	0	0	0	0.5	0	9.1
Total	100	0	100	100	0	100	100	0	100	100	100	100

Note: percentages are based on the number of landless workers, as per Table 12.

Seasonality of employment

Table 14 shows the percentage of landless households working based on their seasons of work. Landless households work in agriculture over more than one season. Even in the off season, they can work in land preparation such as ploughing, harrowing and weeding in preparation for the upcoming growing season. Households in Pwintbyu have the highest proportion of agricultural employment year round, and over the summer and rainy seasons. Labourers in Kyaukpadaung also reported agricultural employment over multiple seasons.

A majority of landless households working in the non-farm sector from all townships responded that they work the whole year. Whole-of-year employment in the non-farm sector is lowest in Pwintbyu (53.1% compared to 70–90% in other townships), linked to high year-round employment as agricultural labourers.

Table 14: Landless households, main season(s) of work, by seasons

Seasons	Household members working in sector (%)											
	Kyaukpadaung			Chaung-U			Myingyan			Pwintbyu		
	Ag.	Fish.	Non-farm	Ag.	Fish.	Non-farm	Ag.	Fish.	Non-farm	Ag.	Fish.	Non-farm
Pre-monsoon	1.2	0	10.6	5.8	0	0	5.2	0	7.7	5.7	12.5	6.3
Monsoon	17.4	0	2.1	16.8	0	0	17.2	0	0	4.2	12.5	12.5
Post-monsoon	16.3	0	2.1	29.9	0	4.3	29.3	0	7.7	5.2	12.5	0
Whole year	0	0	72.3	35.0	0	91.3	27.6	0	84.6	33.0	12.5	53.1
Pre-monsoon and monsoon	26.7	0	0	5.1	0	0	5.2	0	0	51.9	0	0
Monsoon and post-monsoon	1.2	0	10.6	1.5	0	4.3	1.7	0	0	0	0	0
Pre-monsoon and post-monsoon	37.2	0	2.1	5.8	0	0	13.8	0	0	0	0	0
Total	100	0	100	100	0	100	100	0	100	100	100	100

Gender participation in different sectors

Table 15 shows the proportion of men and women working in different sectors. Women represent the majority of the agricultural workforce in all townships except Myingyan (36.5%), though the proportion is almost even in Chaung-U (50.7%).

Women contribute significantly to agricultural tasks such as planting, seed broadcasting, weeding and harvesting. Traditionally, male labourers perform tasks that are perceived to be more difficult and risky, such as ploughing, harrowing, carrying harvested crops and pesticide spraying.

Women's participation in non-farm activities varies. Women in Pwintbyu take part in a relatively small proportion of non-farm activities (14.6%) compared to the other townships (35–55%) but account for the majority of the labour in fisheries (66.7%).

Table 15: Gender participation in labour by sector, landless workers

	Percentage of household											
	Kyaukpadaung			Chaung-U			Myingyan			Pwintbyu		
	Ag.	Fish.	Non-farm	Ag.	Fish.	Non-farm	Ag.	Fish.	Non-farm	Ag.	Fish.	Non-farm
Male	30.4	0.0	64.3	49.3	0.0	45.8	63.5	0.0	44.2	42.4	33.3	85.4
Women	69.6	0.0	35.7	50.7	0.0	54.2	36.5	0.0	55.8	57.6	66.7	14.6
Total	100	0.0	100	100	0.0	100	100	0.0	100	100	100	100

Wages

Table 16 compares the average duration of work and wage rates by the type of payment agreement (advanced, daily or monthly payment) across the main employment categories for landless households.

- *Advanced payment* provides payment to labourers in the off season for work that will be undertaken in the peak labour periods.
- *Daily payment* is on a day-by-day basis, with wages varying depending on labour availability and whether or not meals are provided.
- *Monthly payment* is not common and when used it is usually for managing all tasks throughout the year.

Average wage rates reflect kyat payments and exclude the provision of meals or payment in rice or other goods. In the past, payment was mostly in rice or peanuts; however, this is becoming rare, and combined cash and in-kind payments are more common.

Normally, the majority of landless households working in agriculture and the non-farm sectors are daily wage labourers. However, when they face financial problems or food shortages, they ask landholding households for advanced payment for their labour. In some cases, landholding farmers give advanced payment to secure their labour force in agricultural peak seasons such as during planting, weeding and harvesting. The average wage per day for advanced payment is higher in Pwintbyu than in other townships.

In all payment systems, wages for non-farm work are higher than wages from agriculture. Under the daily wage system, landless households work more days on non-farm than agricultural labour, reflecting the seasonality of agricultural work.

Monthly payment is not common in any sector.

Table 16: Average wages and duration of employment by sector and payment type, landless households

Sector	Type of wage	Average	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu
Agriculture	Advance	Duration (days)	44.7	14.3	N/A	0
		Kyat/day	1,803.6	2,500.0	N/A	0
	Daily	Duration (days)	99.6	61.1	99.1	199.7
		Kyat/day	1,594.5	4,307.6	2,296.6	2,069.7
	Monthly	Duration (month)	2	12	12	0
		Kyat/month	40,000	90,000	45,000	0
Fishery	Advance	Duration (days)	0	0	0	20
		Kyat/day	0	0	0	1,500
	Daily	Duration (days)	0	0	0	27.4
		Kyat/day	0	0	0	2,598.9
	Monthly	Duration (month)	0	0	0	0
		Kyat/month	0	0	0	0
Non-farm	Advance	Duration (days)	17.5	15	0	30
		Kyat/day	7,500	5,000	0	3,000
	Daily	Duration (days)	172.2	249.0	199.7	76.8
		Kyat/day	5,990.2	3,373.0	2,069.7	8,268.5
	Monthly	Duration (month)	8.8	10.5	0	9.3
		Kyat/month	42,600	187,142.9	0	43,000.0

Note: Excludes data relating to overseas labour migration.

Housing, assets and energy

This section presents results relating to household resources and assets, including housing materials, buildings, agricultural tools, vehicle ownership, and energy and water sources for both landholding and landless households.

Housing

The average residential area owned by landholding and landless households in the surveyed townships is shown in Table 17. Residential area includes the area used for housing as well as sheds and household gardens. Unsurprisingly, landholding households in Chaung-U, Myingyan and Pwintbyu have more than twice the residential area of landless households. However, the residential area of landholding households in Kyaukpadaung township is slightly smaller than in landless households.

Table 17: Average residential area per household (acres)

Type of household	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Landholding	0.21	0.59	0.44	0.55	0.45
Landless	0.22	0.22	0.22	0.22	0.22

The materials used to build houses may indicate household wealth, the availability of local resources, and vulnerability to extreme weather events like cyclones. Table 18 shows materials used for the walls of houses. Most landholding households use wood (49.8%), followed by bamboo (26.4%). Only 9.1% of landholding households have brick-walled houses.

In comparison, the homes of most landless households have walls made of bamboo (62%), which is cheaper than wood. Only 22% of landless households have wooden houses, and less than 2% have brick.

Differences exist at the township level. In Pwintbyu, about one-third of landless and landholding households have a mix of wood and bamboo as their main building material.

In Myingyan, more than half of the sample have bamboo structures.

Roofing materials also vary across the sample, as shown in Table 19. The majority of landholding households use corrugated iron. Of landless households, the main roofing material in Kyaukpadaung and Myingyan is corrugated iron, while more than half the homes in Chaung-U use bamboo, and in Pwintbyu they use thatch (see Table 19).

A handful of landless households in each township indicated they do not have their own house and are staying with relatives. This is indicated by 'none' in Table 18 and Table 19.

Table 18: Main wall material, by township

Housing material	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landholding households										
Wood	77	60.2	72	61.5	36	30.5	57	46.3	242	49.8
Bamboo	39	30.4	28	23.9	63	53.4	13	10.6	143	29.4
Cement	0	0	0	0	8	6.8	0	0	8	1.6
Brick	12	9.4	17	14.5	6	5.1	9	7.3	44	9.1
Toddy wood	0	0	0	0	4	3.4	0	0	4	0.8
Wood and bamboo	0	0	0	0	1	0.8	44	35.8	45	9.2
None	0	0	0	0	0	0	0	0	0	0
Total	128	100	117	100	118	100	123	100	486	100
Landless households										
Wood	8	13.1	16	23.9	22	28.6	15	21.7	61	22.3
Bamboo	50	82.0	45	67.2	49	63.6	26	37.7	170	62.0
Cement	0	0	1	1.5	2	2.6	0	0	3	1.1
Brick	1	1.6	2	3.0	2	2.6	0	0	5	1.8
Toddy wood	0	0	0	0	1	1.3	0	0	1	0.4
Wood and bamboo	0	0	2	3.0	0	0	27	39.1	29	10.6
None	2	3.3	1	1.5	1	1.3	1	1.4	5	1.8
Total	61	100	67	100	77	100	69	100	274	100

Table 19: Main roofing material, by township

Roofing material	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landholding households										
Corrugated iron	126	98.4	106	90.6	108	91.5	99	80.5	439	90.3
Palm frond	1	0.8	1	0.9	6	5.1	0	0	8	1.6
Bamboo	0	0	3	2.6	0	0	0	0	3	0.6
Thatch	1	0.8	7	6.0	4	3.4	24	19.5	36	7.4
None	0	0	0	0	0	0	0	0	0	0
Total	128	100	117	100	118	100	123	100	486	100
Landless households										
Corrugated iron	51	83.6	20	29.9	61	79.2	27	39.1	159	58.0
Palm frond	6	9.8	3	4.5	10	13	0	0	19	6.9
Bamboo	0	0	37	55.2	2	2.6	0	0	39	14.2
Thatch	2	3.3	6	9.0	2	2.6	41	59.4	51	18.6
None	2	3.3	1	1.5	2	2.6	1	1.4	6	2.2
Total	61	100	67	100	77	100	69	100	274	100

Table 20 shows additional structures or buildings owned by landholding and landless households. Across all townships, the majority in both samples have toilet facilities, though there are slightly fewer in landless households (72.3%), compared to landholding households (92.8%). This compared to households nationally (85.6%) and in rural areas (81%) (Department of Population 2015).

Landless households have fewer additional structures compared to landholding households. For landless households, the most commonly owned structure after sanitation is a pig shed (13.1%). This is highest in Kyaukpadaung (27.9%), which also has the highest proportion of landless households raising pigs (see Table 43).

For landholding households, pig sheds are uncommon. Although involvement in cattle rearing is similar across the four townships (see Table 43), cowshed ownership is relatively low in Chaung-U township. Ownership of crop storage is higher in Chaung-U (33.3%) and Pwintbyu (68.4%) than in the other two townships. This is due to the availability of irrigation, which provides greater flexibility, and resources for storing harvests and selling them based on price.

Table 20: Ownership of additional structures and buildings

Additional building	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landholding households										
Cowshed	66	51.6	39	33.4	73	61.8	87	70.7	265	54.5
Pig shed	11	8.6	10	8.5	13	11	6	4.9	40	8.2
Henhouse	3	2.3	0	0	0	0	1	0.8	4	0.8
Crop storage	4	3.1	39	33.3	13	11	78	63.4	134	27.6
Fodder storage	4	3.1	51	43.6	45	38.1	33	26.8	133	27.4
Toilet	121	94.5	109	93.2	101	85.5	118	96	451	92.8
Other	7.8	6.2	13	11.1	7	5.9	26	21.3	56	11.5
Landless households										
Cowshed	1	1.6	4	6	4	5.2	2	2.9	11	4.0
Pig shed	17	27.9	7	10.4	4	5.2	8	11.5	36	13.1
Henhouse	2	3.3	2	3	0	0	0	0	4	1.5
Crop storage	0	0	8	11.9	1	1.3	0	0	9	3.3
Fodder storage	0	0	0	0	0	0	0	0	0	0
Toilet	52	85.2	45	67.2	54	70.1	47	68.1	198	72.3
Other	3	4.9	0	0	5	6.5	2	2.9	10	3.6

Tools, vehicles and other assets

Household ownership of agricultural tools indicates investment in agriculture, and the level of mechanisation and intensification. Ownership by farming households is shown in Figure 3. Though landless households may invest in tools to support service provision and wage labour, these questions were not asked as part of the survey of landless households.

Across all townships, ownership of basic agricultural tools, such as buffalo-driven ploughs, buffalo-driven harrows, dibble sticks (or: dibber; essentially a device to punch holes into the soil), spades, machetes, crowbars and hoes is significantly higher than ownership of other agricultural tools and vehicles.

Ownership of hand tractors, motor ploughs, rice threshers, rice mills and water pumps is higher in Chaung-U and Pwintbyu. These towns have greater irrigation areas for paddy land compared to Kyaukpadaung and Myingyan. It is likely that farmers from irrigated areas have a greater incentive and more resources to invest in farm machinery to support multiple cropping seasons. However, only a small number of households own expensive machines such as rice threshers, rice mills and rice harvesters. Many farmers rent, rather than buying these machines outright.

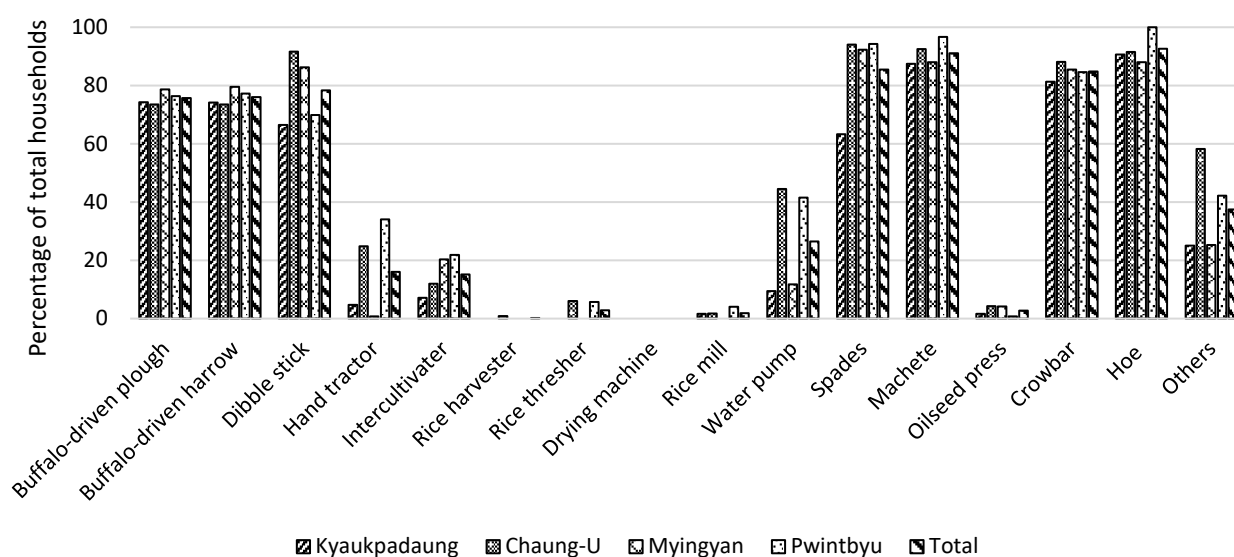


Figure 3: Ownership of agricultural equipment, landholding households

The most common forms of vehicles owned in landless and landholding households are motorcycles and bicycles. Ox-driven carts are also common in the landholding households (see Table 21). Ownership of vehicles in the landless households is lower than in landholding households. Only a few landholding households and none of the landless households own a truck.

Bicycle ownership is higher in Chaung-U and Pwintbyu than in Kyaukpadaung and Myingyan (see Table 21).

Fishing is not common in the Central Dry Zone, so boat ownership is low in the surveyed townships. Chaung-U has the highest boat ownership among landholding households (30.8%), compared to 0–5% in the other townships.

Table 21: Vehicle ownership, by percentage of landless and landholding households

Type of vehicle	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	LH*	LL†	LH	LL	LH	LL	LH	LL	LH	LL
Large truck	0	0	0.9	0	0	0	0	0	0.2	0
Small truck	0.8	0	0	0	0	0	3.3	0	1	0
Pick-up truck	0	0	0	0	0	0	1.6	0	0.4	0
Passenger truck	0.8	0	0.9	0	0	0	0	0	0.4	0
Tricycle	0	0	2.6	4.5	0	1.3	1.6	0	1	1.5
Motorcycle	65.6	23	80.4	56.8	79.6	59.7	84.4	14.5	77.4	39.4
Bicycle	24.2	18	77.7	80.6	53.3	32.5	82.2	60.8	58.8	48.2
Ox-driven cart	61.7	0	61.6	1.5	71.2	0	69.9	1.4	66.1	0.7
Hand-driven cart	0.8	0	5.1	0	0	0	0	0	1.4	0
Boat	0	0	30.8	0	5.1	3.9	0.8	0	8.8	1.1
Boat engine	0	0	0	0	0	0	0	0	0	0
Htaw-Hla-Gyi	0	0	2.6	0	3.3	0	5.7	0	2.9	0
Others	0	0	1.7	1.5	0	1.3	2.4	0	1	0.7

* LH = landholding households

† LL = landless households

‡ A Htaw-Hla-Gyicomprises a tractor engine and self-assembled tray.

Table 22 shows ownership of selected assets by landholding and landless households.

In general, ownership of assets is lower in landless households compared to landholding households. A charcoal or firewood stove is the most commonly owned asset for both samples.

Landholding households tend to own more TVs (54.5%) than radios (25.2%), while this is reversed for landless households (41.2% own a radio and 27% own a TV). There is some variation between townships, with more landholding households in Pwintbyu owning a TV (85%).

Mobile phone ownership is almost three times higher among landholding households than among landless households. Landholding households tend to have higher ownership of more expensive assets than landless households. Additionally, Chaung-U and Pwintbyu townships, which have high cropping intensity and greater access to irrigation, have higher living standards if judged by ownership of assets such as refrigerators and computers.

Table 22: Ownership of selected assets, by percentage of landless and landholding households

Asset	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	LH*	LL†	LH	LL	LH	LL	LH	LL	LH	LL
Firewood/ charcoal stove	99.3	96.7	96.6	95.5	99.2	98.6	98.4	96.7	98.3	91.2
Gas stove	0	0	0	0	0	0	0	0	0	0
Electric stove	0	0	0	9	0	0	0	0	0	2.2
Radio	72.7	37.7	68.5	46.3	60.1	52.2	74.0	37.7	25.2	41.2
TV	42.2	23.0	44.4	32.8	46.6	34.7	84.5	23.0	54.5	27.0
Mobile phone	62.5	29.5	58.3	23.9	58.4	17.4	78.0	29.5	64.4	23.4
Computer	1.6	0	10.3	0	1.6	0	4.1	0	4.3	0
Battery	61.1	49.1	35.9	22.4	54.2	23.1	30.0	49.1	45.5	33.2
Solar panel	26.6	18.0	33.4	20.9	44.9	0	10.6	18.0	28.7	13.1
Inverter	20.3	6.6	14.6	1.5	29.6	2.9	21.1	6.6	21.4	4.0
Generator	14.9	1.6	6	0	8.5	0	11.4	1.6	10.3	0.7
Voltage regulator	5.5	0	4.3	0	9.3	4.3	27.6	0	11.7	1.1
Refrigerator	0	1.6	9.4	4.5	0	0	8.1	1.6	4.3	1.8
Other	20.3	26.3	28.2	18	11.8	13	42.3	26.3	25.7	19.3

* LH = landholding households

† LL = landless households

Energy sources

As many as 84% of rural households across Myanmar had no access to electricity in 2014 (World Bank 2015).

Table 23 shows wood is the main energy source used for cooking in landholding and landless households. However, the percentage of households that use fuel wood is higher in landless households than landholding households. Only 2.5% of landholding households and 3.3% of landless households use electricity for cooking. Households in Chaung-U have the most varied energy sources, including charcoal and rice bran.

Table 23: Energy sources for cooking, by percentage of landless and landholding households

	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	LH*	LL†	LH	LL	LH	LL	LH	LL	LH	LL
Wood	94.5	100	53.0	80.6	97.5	98.7	61.8	84.1	77	90.9
Charcoal	0	0	23.1	0	1.7	1.3	6.5	8.7	7.6	2.6
Electricity	2.3	0	6.8	13.4	0	0	0.8	0	2.5	3.3
Rice bran	0	0	17.2	0	0	0	1.6	4.3	4.5	1.1
Sawdust	0	0	0	0	0	0	0	0	0	0
Two sources	3.1	0	0	6	0.8	0	25.9	2.8	7.6	2.2
Three sources	0	0	0	0	0	0	3.3	0	0.8	0

* LH = landholding households

† LL = landless households

Table 24 shows the energy sources for lighting. For landholding households, the main sources are electricity (39.3%), battery (22.8%) and solar (14.4%). Landless households' top energy sources are similar: battery (31.8%), electricity (23%) and solar (16.4%). More landless households use candles (13.8%) compared to landholding households (3.3%).

Landholding and landless households in Kyaukpadaung have far less access to electricity for lighting than those in the other townships, and rely more on batteries. Additionally, about 20% of landholding and landless households in Pwintbyu township use rice husk boilers as their energy source.

Table 24: Energy sources for lighting, by percentage of landless and landholding households

	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	LH*	LL†	LH	LL	LH	LL	LH	LL	LH	LL
Battery	45.3	52.5	12.0	20.9	22.9	36.4	9.8	18.8	22.8	31.8
Electricity (government/ private)	35.2	4.9	44.4	37.3	34.7	27.3	43.1	20.3	39.3	23.0
Candle	3.9	11.5	2.6	6.0	3.4	6.5	3.3	31.9	3.3	13.8
Solar	12.5	13.1	33.3	20.9	0.8	29.9	11.4	0	14.4	16.4
LED	0.8	0	0	0	0	0	0	2.9	0.2	2.9
Petrol	0	0	4.3	0	31.4	0	8.9	2.9	10.9	0.7
Rice husk boiler	0	18.0	0	6	0	0	21.1	21.7	5.3	10.9
Two sources	2.4	0	2.6	0	6.6	0	2.4	1.4	3.5	0.4
Three sources	0	0	0.9	0	0	0	0	0	0.2	0

* LH = landholding households

† LL = landless households

Water sources

Table 25 and Table 26 show the sources of water for drinking and other household uses.

They are based on the resources available to local communities and household types.

Tube wells and open wells are the main source of drinking water for the majority of landholding and landless households across the sample.

For other household uses, 82.1% of landless households use tube wells as their main source of water, compared to 68.9% of landholding households. In Pwintbyu township, tube wells are the main water source for all households.

Table 25: Main source of drinking water, by percentage of landless and landholding households

	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	LH*	LL†	LH	LL	LH	LL	LH	LL	LH	LL
Open well	16.4	19.7	9.4	4.5	36.4	1.3	0	98.6	15.4	30.7
Tube well	54.7	47.5	77.8	86.6	39.8	93.5	97.6	0	67.5	58
Rainwater	3.1	0	0.9	1.5	16.1	0	0	0	4.9	0.4
Pond	1.6	13.1	0	0	5.1	3.9	0	0	1.6	4
Stream/river	13.3	19.7	7.7	1.5	0	1.3	0	0	5.3	5.1
Canal/dam	0	0	0.9	6	0	0	0	0	0.2	1.5
Purified drinking water	0	0	2.6	0	0	0	2.4	1.4	1.2	0.4
Two sources	11.0	0	0.9	0	2.5	0	0	0	3.7	0

* LH = landholding households

† LL = landless households

Table 26: Main source of water for household use, by percentage of landless and landholding households

	Kyaukpadaung		Chaung-U		Mingyan		Pwintbyu		All townships	
	LH*	LL†	LH	LL	LH	LH	LL	LH	LL	LH
Open well	14.1	21.3	7.7	6	41.5	3.9	0	0	15.6	7.3
Tube well	45.3	45.9	78.6	86.6	52.5	90.9	100	100	68.9	82.1
Rainwater	0.8	0	0.9	0	0.8	0	0	0	0.6	0
Pond	13.3	13.1	0	0	1.7	3.9	0	0	3.9	4
Stream/river	13.3	19.7	8.5	1.4	0	1.3	0	0	5.6	5.1
Canal/reservoir/dam	0.8	0	3.4	6	3.4	0	0	0	1.8	1.5
Two sources	12.5	0	0.9	0	0	0	0	0	3.5	0

* LH = landholding households

† LL = landless households

Household economics

This section presents basic information on household income, expenditure and costs for different activities.

Income

Respondents were asked to indicate the primary and secondary income sources of each household member during the survey period. Table 27 and Table 28 show the primary income source for household heads and other family members from landholding and landless households.

Nearly all household heads of landholding households indicated that agriculture is their primary income source. For landless households, the primary income source for household heads is labour (49.6%), followed by livestock (12.4%). Among landless household heads across the townships, Mingyan has more diverse sources of primary income.

Table 27: Primary income source by household member, landholding households

	Kyaukpadaung				Chaung-U				Myingyan				Pwintbyu				All townships			
	Household head		Other members		Household head		Other members		Household head		Other members		Household head		Other members		Household head		Other members	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Agriculture	115	98.3	164	49.0	114	98.3	237	73.4	100	91.7	186	55.7	122	100	195	70.1	451	97.2	782	61.6
Livestock	0	0	1	0.3	1	0.9	3	0.9	3	2.8	9	2.7	0	0	0	0	4	0.9	13	1.0
Fishery	0	0	0	0	0	0	0	0	0	0	1	0.3	0	0	0	0	0	0	1	0.1
Labour	1	0.9	87	26.0	1	0.9	31	9.6	2	1.8	71	21.3	0	0	16	5.8	4	0.9	205	16.1
Trade/ commerce	0	0	27	8.1	0	0	13	4.0	2	1.8	20	6.0	0	0	20	7.2	2	0.4	80	6.3
Staff	1	0.9	28	8.4	0	0	19	5.9	0	0	25	7.5	0	0	33	11.9	1	0.2	105	8.3
Services	0	0	17	5.1	0	0	7	2.2	0	0	10	3.0	0	0	6	2.2	0	0	40	3.1
Handicraft	0	0	11	3.3	0	0	9	2.8	0	0	11	3.3	0	0	7	2.5	0	0	38	3.0
Two sources	0	0	0	0	0	0	4	1.2	2	1.8	1	0.3	0	0	1	0.4	2	0.4	6	0.5
Total	117	100	335	100	116	100	323	100	109	100	334	100	122	100	278	100	464	100	1270	100

Table 28: Primary income sources by household member, landless households

	Kyaukpadaung				Chaung-U				Myingyan				Pwintbyu				All townships			
	Household head		Other members		Household head		Other members		Household head		Other members		Household head		Other members		Household head		Other members	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Agriculture	0	0	0	0	0	0	0	0	11	16.2	35	20.6	0	0	0	0	11	4.5	35	6.0
Livestock	2	3.8	2	1.6	18	30.0	40	24.4	14	20.6	19	11.2	0	0	1	0.8	34	14.0	62	10.6
Fishery	0	0	0	0	0	0	0	0	1	1.5	1	0.6	0	0	0	0	1	0.4	1	0.2
Labour	31	58.5	98	78.4	33	55.0	89	54.3	29	42.6	91	53.5	46	74.2	112	87.5	139	57.2	390	66.4
Trade/commerce	5	9.4	7	5.6	2	3.3	7	4.3	5	7.4	4	2.4	3	4.8	7	5.5	15	6.2	25	4.3
Staff	0	0	1	0.8	2	3.3	7	4.3	2	2.9	3	1.8	0	0	0	0	4	1.6	11	1.9
Services	5	9.4	0	0	1	1.7	9	5.5	1	1.5	6	3.5	12	19.4	6	4.7	19	7.8	21	3.6
Handicraft	10	18.9	17	13.6	4	6.7	12	7.3	1	1.5	10	5.9	1	1.6	2	1.6	16	6.6	41	7.0
Two sources	0	0	0	0	0	0	0	0	4	5.9	1	0.6	0	0	0	0	4	1.6	1	0.2
Total	53	100	125	100	60	100	164	100	68	100	170	100	62	100	128	100	243	100	587	100

Landholding households were asked about secondary income sources (data not shown). Their responses highlight that few household heads have a secondary income source. In Kyaukpadaung, some households have labour as a secondary source (14.8%) while others have a jaggery business (8.6%). Livestock is the secondary income source for household heads in Myingyan (22%) and in Pwintbyu (17.1%).

Table 29 shows the estimated average annual income by income source for landholding and landless households. It includes cash income only and excludes the value of food produced for home consumption. In landholding households, agriculture contributes the highest share of annual income while other income sources contribute smaller proportions.

For landholding households, income from agriculture is almost four times higher in Pwintbyu (83.5%) compared to other townships. This could be due to high yields in this township (see Table 40) and much higher cropping intensity (see Table 41). Investment in agriculture is also highest in Pwintbyu (see Table 42). Livestock accounts for a higher share of income in Myingyan (13.7%) than other townships, while the remittance income of landholding households is higher in Kyaukpadaung (13.8%) and in Myingyan (12.4%), where migration is common.

In landless households, agriculture contributes more income in Kyaukpadaung (42.2%) and in Pwintbyu (45.1%), while livestock is the main source in Chaung-U (48.9%). Income from handicrafts provides the highest income in Myingyan (38.4%). Handicrafts include weaving clothes and/or baskets and, in particular, making cigars, which people can do in their home or village.

The average annual income is significantly higher in landholding households than in landless households. Among landholding households, the average annual income in Pwintbyu township is notably higher than in other townships. In landless households, Chaung-U has the highest average annual income.

Table 29: Average annual income, by source

Income source	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	%	Avg. income	%	Avg. income	%	Avg. income	%	Avg. income	%	Avg. income
Landholding households										
Agriculture	48.1	971,341	69.9	2,240,624	46.6	1,285,946	83.5	6,740,000	61.9	2810000
Livestock production	8.5	142,594	4.3	83,636	13.7	310,394	1.9	88,028	7.1	155,332
Fishery	0	0	0.4	11,111	1.6	34,197	0	2,049	0.5	11,496
Labour	16.1	283,973	7.3	133,932	11.5	184,943	2.1	51,935	9.3	165,082
Trade	2.2	50,879	4.0	183,889	2.6	166,780	5.0	6,02,012	3.4	250,525
Services	4.2	108,126	5.5	454,556	7.8	238,898	4.1	385,154	5.4	293,389
Remittance	13.8	319,766	5.0	134,017	12.4	1,000,169	2.6	197,805	8.5	409,383
Rent	0	781	1.7	63,248	0.2	2915	0.2	29,106	0.5	23,506
Home business	7.1	189,992	2.0	47,013	3.8	96,801	0.5	42,398	3.4	95,591
Total	100	2,067,452	100	3,352,025	100	3,321,043	100	8,140,000	100	4,220,000
Landless households										
Agricultural labour	42.2	326,069	26.7	619,785	19.1	320,707	45.1	535,640	33.3	450,550
Livestock	6.3	48,700	48.9	1,134,012	9.2	153,500	7.8	93,014	18.0	357,306
Fishery	0	0	0.1	2,686	4.5	74,866	2.3	26,962	1.7	26,128
Marketing	4.7	36,393	5.0	115,559	9.3	156,662	17.6	209,072	9.2	129,422
Handicraft	21.4	165,054	8.7	202,977	38.4	643,654	2.0	23,731	17.6	258,854
Service	0	0	4.0	92,723	1.9	31,168	12.2	144,500	4.5	67,098
Remittances	16.7	128,885	5.6	129,552	16.2	270,909	12.6	149,275	12.8	169,655
Rent	0	0	0.1	2,238	1.5	25,064	0	0	0.4	6,825
Home business	8.7	67,401	0.9	21,268	0	0	0.4	4,782	2.5	23,363
Total	100	772,503	100	2,320,805	100	1,676,534	100	1,186,979	100	1,489,205

Expenditure

Average annual expenditure is compared for landholding households (see Table 30) and landless households (see Table 31). Distributions of annual expenditure for household costs are similar between landholding and landless households and across the townships. In both household types, the main expenditure is for food, purchasing rice, social affairs and fuel.

Landless households allocate a higher proportion of spending for food and rice.

Landholding households in Chaung-U and Pwintbyu spend proportionately less than in other townships on purchasing rice because they have some areas of lowland rice production compared to the mostly dryland areas of Kyaukpadaung and Myingyan.

Landholding households can devote more money to social affairs and fuel for machinery than landless households. This is a seasonal cost and is tied to religious obligation and social cohesion in the community.

Table 30: Average annual expenditure, by expense type, landholding households

Expense		Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Rice	Kyat	318,450	185,969	345,361	91,842	235,739
	%	19.4	11.1	21.1	4.1	14
Other food	Kyat	620,846	850,209	655,135	1,050,198	793,051
	%	37.6	39.1	35.7	43.4	39.0
Health	Kyat	90,367	252,658	105,754	148,736	147,945
	%	5.4	8.5	5.1	6.1	6.3
House maintenance	Kyat	147,102	562,821	97,169	147,276	235,103
	%	4.2	7.6	3.7	5.2	5.1
Vehicle/ machinery purchase and repair	Kyat	5,547	38,650	22,881	18,951	21,117
	%	0.2	1.8	1.2	0.8	1.0
Fuel for machinery	Kyat	96,688	305,896	202,672	247,850	211,043
	%	5	8.1	9.6	10.4	8.2
Fuel for cooking	Kyat	5,114	41,242	10,799	22,424	19,573
	%	0.3	2.1	0.6	1.0	1.0
Fuel for lighting	Kyat	29,411	32,993	17,777	51,786	33,111
	%	2	1.6	1.1	2.4	1.8
Water for household uses	Kyat	23,068	14,715	254	2,188	10,233
	%	1.3	0.8	0	0.1	0.6
Education	Kyat	221,239	240,201	227,000	357,017	261,566
	%	9.9	7.3	9.5	11.1	9.5
Recreation	Kyat	19,758	26,838	32,203	59,512	34,545
	%	0.8	0.9	1.7	2.2	1.4
Social affairs	Kyat	132,031	179,957	141,606	204,528	164,242
	%	8.2	8.8	8.1	8.5	8.4
Other	Kyat	94,547	70,496	51,492	126,047	86,275
	%	5.7	2.3	2.6	4.8	3.9
Total	Kyat	1,804,166	2,802,644	1,910,104	2,528,356	2,253,545
	%	100	100	100	100	100

Table 31: Average annual expenditure, by expense type, landless households

Expense		Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Rice	Kyat	281,975	414,633	353,899	360,085	352,648
	%	23.7	18.9	29.7	23.0	23.8
Other food	Kyat	575,512	898,903	507,410	712,081	673,477
	%	48.4	41	42.6	45.5	44.4
Health	Kyat	34,877	141,970	47,307	108,601	83,189
	%	2.9	6.5	4.0	6.9	5.1
House maintenance	Kyat	27,238	237,552	7,351	65,261	84,350
	%	2.3	10.8	0.6	4.2	4.5
Vehicle/ machinery purchase and repair	Kyat	10,893	46,515	24,325	8,461	22,549
	%	0.9	2.1	2.1	0.6	1.4
Fuel for machinery	Kyat	30,816	208,208	108,318	41,044	97,096
	%	2.6	9.5	9.1	2.6	5.9
Fuel for cooking	Kyat	10,254	15,164	18,247	20,638	16,076
	%	0.9	0.7	1.5	1.3	1.1
Fuel for lighting	Kyat	20,616	13,119	15,805	28,436	19,494
	%	1.7	0.6	1.3	1.8	1.4
Electricity	Kyat	738	18,233	779	4,826	6,144
	%	0.1	0.8	0.1	0.3	0.3
Water for household uses	Kyat	17,143	4,281	662	261	5,587
	%	1.4	0.2	0.1	0	0.4
Education	Kyat	58,557	69,184	36,052	57,304	55,274
	%	4.9	3.2	3.0	3.7	3.7
Recreation	Kyat	1,148	25,161	10,844	11,971	12,281
	%	0.1	1.1	0.9	0.8	0.7
Social affairs	Kyat	69,812	86,119	55,078	68,232	69,810
	%	5.9	3.9	4.6	4.4	4.7
Other	Kyat	49,262	14,478	5,065	78,644	36,862
	%	4.1	0.7	0.4	5	2.6
Total	Kyat	1,188,842	2,193,518	1,191,141	1,565,845	1,534,837
	%	100	100	100	100	100

Production

This section provides context on key farming activities and farm-based livelihood activities. It focuses mainly on landholding households but landholders and landless households have significant connections in terms of labour. It covers all agricultural activities found in the study area, providing data for cultivated area, land use, land ownership, irrigation, crops and cropping intensity, agricultural inputs, livestock and fisheries.

Land ownership and access

Under Myanmar Government policy, residents are only entitled to agricultural land if they are willing to cultivate it. This has been the government's response to rising absentee land ownership since the 1990s (Dora 2016). The survey did not explicitly ask for respondent's land title status. Instead, we assume that landholders are entitled to the land they cultivate, whether through an official land title or by traditional ownership.

The State owns all land, including agricultural land, and there are restrictions on selling, transferring and mortgaging agricultural land, meaning farmers operate as tenants.

According to the new Farmland Law (2012), low land, upland, silty land, hill-side cultivation land, perennial crop land, nipa palm land, garden land or horticultural land, and alluvial land are classified as farmland.

Table 32 shows the majority of land area in the sample villages is rainfed dryland (Ya) (59.86%), which is suitable for oilseed crops, pulses, chilli and cotton. Irrigated areas of low land (paddy land for growing rice, or Le) account for the second-largest portion. Generally, upland is rainfed and low land (paddy land) is irrigated, as a result of government projects to support paddy production.

Table 32: Land type as a percentage of total area cultivated, townships survey

Land type	Total cultivated area (%)				
	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Low land (paddy land) rainfed area (Le)	9.34	2.65	1.03	0.26	2.81
Low land (paddy land) irrigated area (Le)	5.10	38.29	3.79	66.35	28.40
Upland rainfed area (Ya)	84.12	41.82	90.56	20.97	59.86
Upland irrigated area (Ya)	0	8.77	2.99	2.51	3.60
Silty land rainfed area (<i>Kaing Kyun</i>)	0.18	3.47	0.18	4.77	2.14
Silty land irrigated area (<i>Kaing Kyun</i>)	0	3.93	0	3.17	1.73
Forest rainfed area	0.54	0.31	0.30	0.09	0.29
Garden—rainfed area	0	0.31	0.48	0.64	0.39
Garden—irrigated area	0	0.45	0	1.23	0.43
Pasture—rainfed area	0.72	0	0.66	0	0.35
Total	100	100	100	100	100

Of the four townships, Pwintbyu has the highest percentage of irrigated paddy land, facilitated by government irrigation projects that support paddy-growing areas. In all other townships, rainfed Ya (upland) is the most commonly cultivated type of land. Households in Chaung-U have the highest percentage of irrigated upland areas (8.8%), and the second-highest irrigated paddy land areas (38.3%).

Focus group discussions (FGDs) highlighted the importance of silty land (Khaing Kyun), which was not covered by the survey. This type of land is important for some households, which take advantage of low water levels on the Ayeyarwady riverbanks and small islands to grow crops during summer. The soils are very fertile, very productive and suitable for most types of crop.

Table 33 shows the average acres by land type owned by landholding households. Across all townships, rainfed upland (Ya) is the largest area of land owned by households on average. However, there are significant differences between townships. Average rainfed upland area in Myingyan is 10.5 acres (4.2 hectares), which is much higher than in the other townships: ranging from 1.9 acres (0.7 hectares) in Pwintbyu to 5.5 acres (2.2 hectares) in Kyaukpadaung. Pwintbyu township has the highest amount of irrigated low land area (paddy land) per household.

Table 33: Average land ownership per landholding household, by land type (acres)

Land	Average acreage per household				
	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Total low land (paddy land) rainfed area	0.6	0.2	0.1	0	0.2
Own low land (paddy land) — rainfed area	0.6	0.3	0.1	0	0.3
Rent-in low land— (paddy land) rainfed area	0	0	0.4	0	0.1
Rent-out low land (paddy land)—rainfed area	0	0.1	0	0	0
Total low land (paddy land)—irrigated area	0.3	3.2	0.4	6.1	2.5
Own low land (paddy land)—irrigated area	0.3	3.0	0.4	5.8	2.4
Rent-in low land (paddy land)—irrigated area	0	0.1	0	0.3	0.1
Rent-out low land (paddy land)—irrigated area	0	0.1	0	0	0
Total upland (Ya) rainfed area	5.5	3.5	10.5	1.9	5.3
Own upland (Ya)—rainfed area	5.4	3.4	9.8	1.9	5.1
Rent-in upland (Ya)—rainfed area	0.2	0	0.6	0	0.2
Rent-out upland (Ya)—rainfed area	0	0	0.1	0	0
Total upland (Ya)—irrigated area	0	0.7	0.3	0.2	0.3
Own upland (Ya)—irrigated area	0	0.7	0.4	0.2	0.3

Land	Average acreage per household				
	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Rent-in upland (Ya)—irrigated area	0	0	0.1	0	0
Rent-out upland (Ya)—irrigated area	0	0.1	0	0	0
Total silty land (Khaing Kyun) rainfed area	0	0.3	0	0.4	0.2
Own silty land (Khaing Kyun)—rainfed area	0	0.3	0	0.4	0.2
Total silty land (Khaing Kyun)—irrigated area	0	0.3	0	0.3	0.2
Own silty land (Khaing Kyun)—irrigated area	0	0.4	0	0.4	0.2
Rent-out silty land (Khaing Kyun)—irrigated area	0	0.1	0	0.1	0.1
Total forest	0	0	0	0	0
Total garden—rainfed area	0	0	0.1	0.1	0
Total garden—irrigated area	0	0	0	0.1	0
Total pasture	0	0	0.1	0	0

Land size stratification matches the official definition set by the World Bank and Myanmar Development Research (World Bank and Myanmar Development Research 2013). Kyaukpadaung has the smallest average land ownership per household, while Myingyan has the highest land ownership (see Table 34).

According to the official census, any farm under 50 acres (20 hectares) is considered a small agricultural holding. In the four surveyed townships, more than two-thirds of households cultivate land smaller than 10 acres (4 hectares) and only around 6% of households are able to cultivate more than 20 acres (8 hectares). This confirms that the Central Dry Zone can be called a region with smallholding farmers.

A larger proportion of medium-sized and large landowners/cultivators can be found in Myingyan and Pwintbyu townships.

Table 34: Land area owned/cultivated by area (acres), landholding households

Land class		Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
		Owned	Cultivated	Owned	Cultivated	Owned	Cultivated	Owned	Cultivated	Owned	Cultivated
Small (<10 ac)	No.	111	110	87	89	76	68	85	82	359	349
	%	86.7	85.9	74.3	76.1	64.4	57.6	69.1	66.7	73.8	71.8
Medium (10.01–20 ac)	No.	17	18	23	21	30	57.6	29	31	99	106
	%	13.3	14.1	19.7	17.9	25.4	36	23.6	25.2	20.4	21.8
Large (>20 ac)	No.	0	0	7	7	12	30.5	9	10	28	31
	%	0	0	6	6	10.2	14	7.3	8.1	5.8	6.4
Total	No.	128	128	117	117	118	11.9	123	123	486	486
	%	100	100	100	100	100	118	100	100	100	100
Minimum	Ac	0.35	0	0	0	0	100	0	1	0	0
Maximum	Ac	20	20	29	29	60	0.3	53	47	60	60
Average	Ac	6.4	6.5	8.2	8.2	10.9	60.0	9.0	9.3	8.6	9.0

Irrigation

This section considers access to irrigation for the landholding households. Irrigation reduces the risk of crop loss, and can enable double cropping or production of alternative crops.

Since 1988, the Myanmar Government has made considerable efforts to expand irrigation in the Central Dry Zone. According to the Ministry of Agriculture and Irrigation (MOAI), irrigation infrastructure in the region covers around 5% of the total area and 12% of cultivated land (JICA 2010).

Nationally, the net irrigated crop area was 15.5% of the net area sown in 2009, up from 12.6% in 1988 (MOAI 2013). National data shows 37% of the area was irrigated with pumps, 31% with canals, 11% with tank storage and 7% with wells (MOAI 2013).

Irrigation is only available for crop production in some parts of the Central Dry Zone. Table 35 shows access to irrigation by landholding households in the sample. Only half of households surveyed have access to irrigated land; however, there is significant variation between townships. Kyaukpadaung has the least access to irrigation (14.8%) compared to 100% of households in Pwintbyu and 74% in Chaung-U. Pwintbyu and Chaung-U townships are located on the west bank of the Ayeyarwady River, where the government has provided irrigation infrastructure.

Table 35: Access to irrigation, landholding households

	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Irrigation	19	14.8	87	74.4	31	26.3	123	100	260	53.5
No irrigation	109	85.2	30	25.6	87	73.7	0	0	226	46.5
Total	128	100	117	100	118	100	123	100	486	100

Households cultivate different crops, depending on their access to irrigation water and the type of irrigation. Table 36 shows access to the different types of irrigation. Flood irrigation is used for rice cultivation, furrow irrigation is applied to upland (Ya) crops (such as pulses and oilseed) and sprinklers are used to grow vegetable crops. Around half of landholding households in Pwintbyu and Chaung-U use furrow irrigation to produce pulses. In townships with less access to irrigation, flood irrigation is the main method used, focusing on rice production. Fields are flooded using diesel pumps or gravity flow.

Table 36: Type of irrigation, by system, landholding households

Irrigation system	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Flood	19	14.8	80	68.4	24	20.3	120	97.6	243	50
Furrow	3	2.3	60	51.3	8	6.8	71	57.7	142	29.2
Sprinkler	0	0	0	0	0	0	28	22.8	28	5.8

Note: percentage is based on all households; households may have access to more than one type of irrigation system.

Minimum and maximum areas irrigated, and average areas irrigated per household, are shown in Table 37. Pwintbyu has a higher average irrigated area per household than other townships for all

types of irrigation systems (flood, furrow and sprinkler). This indicates major private and government investments in irrigation infrastructure in this township.

Table 37: Household area irrigated, by method

	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Flood-irrigated area (acres)					
Minimum	0.5	0.6	0.2	0.75	0.2
Maximum	5	23	4	32	32
Average	2.36	3.88	1.48	6.25	4.69
Furrow-irrigated area (acres)					
Minimum	0.5	1	1	0.25	0.25
Maximum	0.8	21	20	26	26
Average	0.6	4.41	4.81	4.99	4.64
Sprinkler-irrigated area (acres)					
Minimum	0	0	0	1	1
Maximum	0	0	0	13	13
Average	0	0	0	4.04	4.04

Table 38: Household water sources for agricultural production

Water source	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Rainwater	109	85.2	30	25.6	87	73.7	0	0	226	46.5
Tube well	0	0	30	25.6	1	0.8	2	1.6	33	6.8
Open well	0	0	0	0	1	0.8	0	0	1	0.2
Stream/river	0	0	11	9.4	3	2.5	0	0	14	2.9
Canal/reservoir	19	14.8	36	30.8	25	21.2	109	88.6	189	38.9
Two sources	0	0	10	8.5	1	0.8	12	9.8	23	4.7
Total	128	100	117	100	118	100	123	100	486	100

Table 38 confirms earlier patterns of inter-township variability in water access. Rainwater is the main water source for agriculture in Kyaukpadaung and Myingyan. As indicated earlier, Chaung-U and Pwintbyu have much better access to irrigation, with their main sources being canals or reservoirs in Pwintbyu, and a mix of canals, reservoirs, tube wells and rainwater in Chaung-U.

Irrigation is predominantly a private initiative or concern. Certainly, irrigation with small diesel pumps and sprinklers is a private matter. In some cases, households may share tube wells but they are usually privately operated.

Canal irrigation is fed by rainwater reservoirs or irrigation dams and is part of the government's irrigation infrastructure investments. The area irrigated by government projects has increased fourfold since independence (MOAI 2013).

Table 39 shows household access to irrigation by land size and irrigation method. Overall, around half of landholding households with different land classes use flood irrigation.

In Myingyan and Kyaukpadaung townships, which are poorly supplied by irrigation, households with small landholding sizes (<10 acres) have easier access to flood irrigation water than households with larger areas for farming. Table 39 shows that only small-scale farmers in these townships have flood-irrigated land to grow rice for home consumption and large-scale farmers grow commercial upland crops.

Nearly half of large-scale farmers (20.01–180 acres or 8–73 hectares) use furrow irrigation systems, while around 30% of small-scale farmers (<10 acres or 4 hectares) and medium-scale farmers (10.01–20 acres or 4–8 hectares) use this method. It highlights the greater capacity of farmers with larger land areas to grow pulses or onions compared to small-scale and medium-scale farmers.

In Pwintbyu, 44.8% of medium-scale farmers grow vegetables using sprinkler irrigation, which is much higher than other farmers in the township. The reason is that small-scale farmers cannot afford sprinkler irrigation and large-scale farmers mostly focus on large-scale commercial crops.

Table 39: Households' irrigation access by land size and irrigation type

Land size (acres)	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Flood-irrigated land										
<10	18	16.2	58	66.7	18	23.7	82	96.5	176	49.0
10.01–20	1	5.9	17	73.9	5	16.7	29	100	52	52.5
20.01–180	0	0	5	71.4	1	8.3	9	100	15	53.6
Total	19	14.8	80	68.4	24	20.3	120	97.6	243	50.0
Furrow-irrigated land										
<10	3	2.7	45	51.7	2	2.6	50	58.8	100	27.9
10.01–20	0	0	11	47.8	4	13.3	14	48.3	29	29.3
20.01–180	0	0	4	57.1	2	16.7	7	77.8	13	46.4
Total	3	2.3	60	51.3	8	6.8	71	57.7	142	29.2
Sprinkler-irrigated land										
<10	0	0	0	0	0	0	13	15.3	13	3.6
10.01–20	0	0	0	0	0	0	13	44.8	13	13.1
20.01–180	0	0	0	0	0	0	2	22.2	2	7.1
Total	0	0	0	0	0	0	28	22.8	28	5.8

Crop production

This section presents data on crop production for landholding households. It includes information on cropping intensity, average yields and input costs.

The Central Dry Zone region is known as the oil pot of Myanmar because it is a major production area for oilseeds such as sesame, peanuts and other pulses. Paddy cultivation is only seen on the west bank of the Ayeyarwady River, which offers greater access to irrigation.

Crops grown

Table 40: Average yield, by crop type

Crops	Average yield (tonnes/acre)					National average*
	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships	
Green gram	0.12	0.45	0.32	0	0.28	0.49
Black gram	0	0.32	0.08	0.28	0.24	0.53
Cow pea	0.08	0	0.08	0.04	0.08	NA
Pigeon pea	0.16	0.28	0.20	0.24	0.24	0.53
Chickpea	0.20	0.45	0.24	0.49	0.36	NA
Lab lab bean	0.24	0	0	0	0.08	NA
Butter bean	0.12	0.28	0.12	0.81	0.32	NA
Garden pea	0	0	0	0.45	0	NA
Sesame	0.08	0.24	0.16	0.28	0.20	0.24
Peanuts	0.28	0.40	0.28	0.97	0.49	0.65
Sunflower	0.12	0.28	0.16	0.12	0.16	0.65

* National average according to MOAI (2013); townships based on survey data.

Current crop yields in the Central Dry Zone are low and average yields of all major crops are less than the national average for those crops (see Table 40). Yield is influenced by the availability of water (including irrigation) and applications of manure for production.

Table 41 shows cropping patterns and cropping intensity in the townships studied. In general, multiple crops are successively grown on the same land each year. Pwintbyu has the highest cropping intensity, which is consistent with the access to irrigation in the township (see previous section). The lowest cropping intensity is in Myingyan, which may be due to limited access to irrigation, and the high degree of rainfed dryland.

Across the townships, households practise single cropping, inter-cropping, mixed cropping, cover cropping, relay cropping and crop rotation on both rainfed and irrigated farms. Farmers base their decisions about crops on the availability of water resources (Thein et.al. 2009).

Typically, dryland farmers focus on rice and other horticultural crops for subsistence. Commercial rice cropping can be found on the west bank of the Ayeyarwady River and in irrigated areas, while commercial horticulture only takes place in a few regions of the Central Dry Zone (Cho 1999).

Rainfed agriculture in the region mostly consists of oilseed crops. Sesame and peanuts are common across the Central Dry Zone, especially sesame in the pre-monsoon season (Swe 2012).

Farmers who can access irrigation follow various cropping patterns, including rice–peanut–fallow peanuts; rice–peanut; pigeon pea–sesame; rice–green gram; rice–rice; rice–rice–chickpea; sesame–onion; peanuts–chilli; and peanut–pulses–onion (Swe 2012; Phyo 2014).

Table 41: Cropping pattern and intensity

	Average area (acres)				Average cropping intensity
	Pre-monsoon	Monsoon	Post-monsoon (winter/summer)	Perennials	
Kyaukpadaung	4.86	3.61	3.12	0	129.06
Chaung-U	3.61	5.08	4.37	0.98	148.82
Myingyan	5.00	9.62	2.88	0	107.29
Pwintbyu	6.74	6.99	5.33	1.92	201.82
All townships	5.29	6.39	4.21	1.63	146.95

Expenditure on cropping

The household survey collected information on cropping costs in the previous 12 months for landholding households. This survey did not cover the amount spent on human labour in agricultural production, but future studies will focus specifically on labour.

The data show that machinery purchases account for the highest percentage of costs (38% of total costs in agricultural production), followed by the costs of fertiliser (see Figure 4).

Table 42 shows the percentage of households that bought agricultural inputs in the previous 12 months and the average cost of each input used in production. Data reveal that almost 90% of households across the sample spent money on fertiliser but only 16% of households bought agricultural machines. These items form the most significant cost for landholding households, and only a few households made this investment for crop production.

Among the surveyed townships, landholding households in Pwintbyu and Chaung-U are more likely to invest in machines for crop production than the other two townships. As in other areas of Asia, irrigation (and the subsequent potential for multiple crops as well as time pressure when harvesting and re-sowing crops) is one aspect that triggers mechanisation processes.

Table 42: Agricultural input costs (average kyat, and percentage of total expenditure)

Items		Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Seed	Kyat	12,200	40,100	40,500	123,000	53,700
	%	3.6	5.3	19.3	7.1	7.0
Fertiliser	Kyat	72,100	181,000	72,300	408,000	183,000
	%	21.2	23.8	34.4	23.5	24.0
Pesticide	Kyat	15,800	175,000	10,800	233,000	108,000
	%	4.7	23.0	5.1	13.4	14.2
Weedicide	Kyat	531	855	144	77,600	20,000
	%	0.2	0.1	0.1	4.5	2.6
Manure	Kyat	20,500	9,402	33,800	15,200	19,700
	%	6.0	1.2	16.1	0.9	2.6
Buying machinery	Kyat	205,000	221,000	26,800	711,000	294,000
	%	60.4	29.1	12.7	41.0	38.5
Repairing machinery	Kyat	8,727	85,600	20,900	75,500	47,100
	%	2.6	11.3	9.9	4.3	6.2
Fuel	Kyat	4,723	44,900	4,992	92,500	36,700
	%	1.4	5.9	2.4	5.3	4.8
Other	Kyat	0	2051	0	228	551
	%	0	0.3	0	0	0.1
Total	Kyat	339,580	759,908	210,236	1,736,028	762,751
	%	100	100	100	100	100

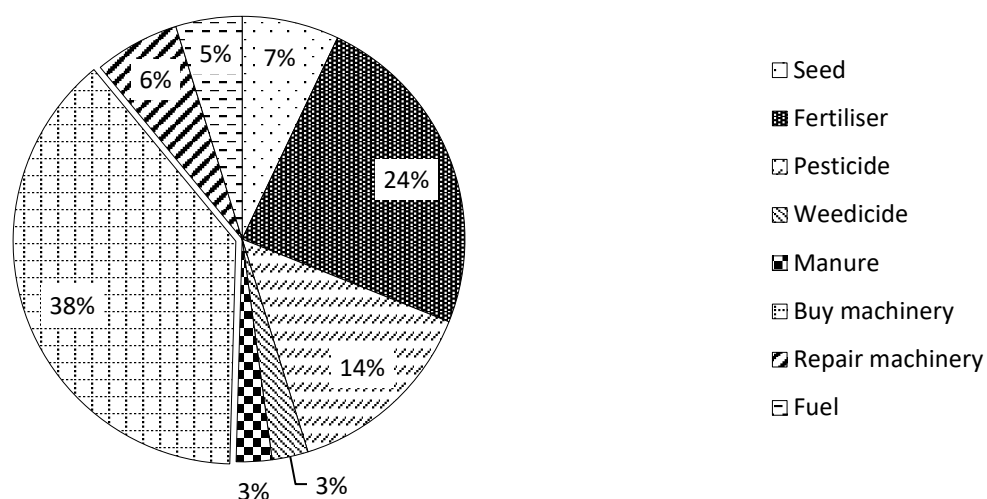


Figure 4: Expenditure on agricultural inputs (percentage of total spending)

Livestock

This section indicates rates of ownership and use of livestock. Livestock is an important component of agricultural livelihoods in the Central Dry Zone. Cattle are used as the main draught animal for preparing land and transporting goods such as rice bundles and firewood. Manure from livestock is an important source of organic fertiliser for crop production.

Animal ownership in the surveyed townships is shown in Table 43. Across all townships, 78% of landholding households raise cattle, compared to just 13.9% of landless households. More than 20% of both landless and landholding households raise chickens.

The main animal raised by landless households is pigs (33.9%), followed by chickens (24.5%). Chaung-U is a little different, with 26.9% of households surveyed raising cattle. This was explored in the FGDs. One village in Chaung-U is located near a condensed milk factory, and landless households in the village rear dairy cows to sell milk to the factory. FGDs highlighted that livestock rearing is diverse and localised, even within the same township.

Table 43: Households that raise livestock

Livestock	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landholding households										
Buffalo	0	0	1	0.9	0	0	0	0	1	0.2
Cattle	101	78.9	89	76.1	97	82.2	92	74.8	379	78.0
Pig	21	16.4	15	12.8	14	11.9	16	13.0	66	13.6
Chicken	49	38.3	23	19.7	33	28.0	39	31.7	144	29.6
Duck	0	0	0	0	1	0.8	3	2.4	4	0.8
Goat	4	3.1	3	2.6	11	9.3	0	0	18	3.7
Sheep	2	1.6	1	0.9	1	0.8	0	0	4	0.8
Landless households										
Buffalo	0	0	0	0	0	0	0	0	0	0
Cattle	6	9.8	18	26.9	9	11.7	5	7.2	38	13.9
Pig	30	49.2	19	28.4	19	24.7	25	36.2	93	33.9
Chicken	16	26.2	13	19.4	11	14.3	27	39.1	67	24.5
Duck	0	0	0	0	0	0	0	0	0	0
Goat	3	4.9	5	7.5	6	7.8	0	0	14	5.1
Sheep	0	0	0	0	7	9.1	0	0	7	2.6

Table 44 shows the maximum, minimum and average number of livestock raised by households. In general, it shows the average number of animals per household is lower for landless households compared to landholding households. However, there are exceptions based on township and livestock type. In Chaung-U, landless households have a slightly higher average number of cattle due to the factory nearby; landless households in Pwintbyu have slightly larger flocks of chickens; and landless households in Myingyan have larger herds of sheep (noting that sheep are uncommon in landholding households).

Over the previous five years, the average number of animals raised by households in the surveyed townships had not changed significantly (see Table 45).

Table 44: Animals per household, 2014

Township	Cattle (no.)	Pig (no.)	Chicken (no.)	Goat (no.)	Sheep (no.)
Landholding households					
Kyaukpadaung (no. of HHs*)	101	21	49	3	1
Minimum	1	1	1	7	20
Maximum	15	3	40	20	20
Average	2.9	1.62	9.06	13.67	20
Chaung-U (no. of HHs)	89	15	23	2	1
Minimum	1	1	1	4	25
Maximum	12	9	50	30	25
Average	2.97	2	13.35	17	25
Myingyan (no. of HHs)	97	14	33	9	1
Minimum	1	1	2	13	28
Maximum	31	17	100	81	28
Average	4	2.79	12.12	49.11	28
Pwintbyu (no. of HHs)	92	16	39	0	0
Minimum	1	1	1	0	0
Maximum	11	8	30	0	0
Average	3.03	1.94	10.85	0	0
All townships (no. of HHs)	379	66	144	14	3
Minimum	1	1	1	4	20
Maximum	31	17	100	81	28
Average	3.23	2.03	10.93	36.93	24.33
Landless households					
Kyaukpadaung (no. of HHs)	6	30	16	3	0
Minimum	1	1	1	4	0
Maximum	10	3	18	30	0
Average	2.83	1.27	6.87	19.33	0
Chaung-U (no. of HHs)	18	19	13	5	0
Minimum	2	1	1	5	0
Maximum	34	5	30	36	0
Average	9.78	1.53	7.54	15.6	0
Myingyan (no. of HHs)	9	19	11	6	7
Minimum	1	1	2	2	10
Maximum	10	15	20	50	80
Average	3.33	2.05	8.64	31.17	33.43
Pwintbyu (no. of HHs)	5	25	27	0	0
Minimum	1	1	1	0	0
Maximum	3	4	50	0	0
Average	1.4	1.6	13.52	0	0

* HHs = households

Table 45: Population changes, average number of animals per households

		Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Landholding households (average number of animals)						
Cattle	Typical herd size (past 5 years)	2.71	2.79	4.32	2.92	3.2
	2013	2.89	2.76	4.12	3.03	3.22
	Consumed (no., 2013)	0	0	0	0	0
	Sold (no., 2013)	1.39	2	3.62	1.18	2.26
	Lost (no., 2013)	1	2	3.33	1	2.14
	Bought (no., 2013)	1.43	2.33	1.62	1.5	1.56
Pigs	Typical herd size (past 5 years)	1.48	1.91	1.79	1.94	1.74
	2013	1.67	2.4	2.56	2.31	2.17
	Consumed (no., 2013)	0	0	0	0	0
	Sold (no., 2013)	2.17	3.88	2.8	1.8	2.52
	Lost (no., 2013)	0	0	2.5	0	2.5
	Bought (no., 2013)	1.57	1.4	1	1.33	1.39
Sheep	Typical herd size (past 5 years)	17.5	25	44	0	29.6
	2013	17.5	25	44	0	29.6
	Consumed (no., 2013)	0	0	0	0	0
	Sold (no., 2013)	4	0	20	0	12
	Lost (no., 2013)	2	0	0	0	2
	Bought (no., 2013)	0	0	0	0	0
Goat	Typical herd size (past 5 years)	20	14.67	56.43	0	39.92
	2013	13.5	14.67	52.86	0	33.43
	Consumed (no., 2013)	0	0	1	0	1
	Sold (no., 2013)	5.5	0	12.67	0	10.88
	Lost (no., 2013)	1	0	5.17	0	4.57
	Bought (no., 2013)	9.5	0	0	0	9.5
Chicken	Typical herd size (past 5 years)	7.64	11	16.77	7.06	9.59
	2013	12.21	12	15.65	11.65	12.66
	Consumed (no., 2013)	5.62	3.5	7	8.88	6.22
	Sold (no., 2013)	7.78	7.57	18.82	12.72	10.92
	Lost (no., 2013)	11.07	2.75	6.4	9.71	9.08
	Bought (no., 2013)	2	5	5	2.5	2.58

Landless households (average number of animals)						
Cattle	Typical herd size (past 5 years)	2	11.6	3.4	2.9	5
	2013	2.4	12.6	4.9	2.7	5.7
	Consumed (no., 2013)	0	0	0	0	0
	Sold (no., 2013)	3	3.5	1.3	1.3	2.3
	Lost (no., 2013)		2.3		1	0.8
	Bought (no., 2013)	1.5	6	1	0	2.1
Pigs	Typical herd size (past 5 years)	1.2	1.3	1.5	1.6	1.4
	2013	1.3	2.1	1.3	1.7	1.6
	Consumed (no., 2013)	0	0	0	0	0
	Sold (no., 2013)	1.5	3.3	1.3	2.6	2.1
	Lost (no., 2013)	1	6	1	1.3	2.3
	Bought (no., 2013)	1.2	1	1.5	1.4	1.3
Sheep	Typical herd size (past 5 years)	0	36.3	51	0	18.1
	2013	0	36.3	47.6	0	18.1
	Consumed (no., 2013)	0	0	0	0	0
	Sold (no., 2013)	0	11.7	18	0	5.8
	Lost (no., 2013)	0	3	3.3	0	1.5
	Bought (no., 2013)	0	0	0	0	0
Goat	Typical herd size (past 5 years)	20.8	19.6	25.5	0	13.5
	2013	18.5	32.5	32.8	0	17
	Consumed (no., 2013)	0	0	0	0	0
	Sold (no., 2013)	10	10	7.2	0	6.7
	Lost (no., 2013)	7	3	5	0	3.3
	Bought (no., 2013)	4	0	0	0	1.3
Chicken	Typical herd size (past 5 years)	9	8.7	12.9	7.2	9.4
	2013	8.2	11.2	15.3	14.4	12.3
	Consumed (no., 2013)	2.3	2.5	3	3.8	2.9
	Sold (no., 2013)	8	13	9.2	14.5	11.2
	Lost (no., 2013)	13	12.5	2	10.8	9.6
	Bought (no., 2013)	0	0	0	0	0

Table 46 shows the percentage of animals sold, lost or consumed as a total of household animals. In landholding households, chickens are the only animal consumed (17.9% of the flock), but many chickens are also sold (46.3%) or lost (22.2%). In landless households, very few chickens are consumed (2.4%) compared to those sold (26.7%). In the previous year, pigs were sold by both landholding households (84%) and landless households (42%), but both kept most of the cattle, sheep and goats.

Table 46: Percentage of animal population (average per household) consumed, sold or lost, 2013

Livestock	Percentage of total household animals			
	Consumed	Sold	Lost	Starting population in 2014 (% of 2013 herd)
Landholding households				
Cattle	0	10.6	1.3	88.1
Pigs	0	84.7	3.6	11.7
Sheep	0	32.4	1.3	66.2
Goats	0.2	18.6	6.8	74.4
Chickens	17.9	46.3	22.2	13.5
Landless households				
Cattle	0	11.8	3.3	84.9
Pigs	0	42.2	5.7	52.0
Sheep	0	0	0	0
Goats	0	16.0	6.2	77.7
Chickens	2.4	26.7	17.1	53.8

Table 47 shows that most households keep livestock as an extra source of income. Many landholding households also keep cattle as draught animals for agricultural activities.

Landless households keep cows for generating extra income by selling milk or renting the animals to farmers. In some cases, cows provide milk for household consumption. A few households raise pigs for household consumption, especially for village charities or other donations; however, most are reared for extra income. Households keep more goats and sheep compared to other animals, and mostly for commercial purposes as part of the system of owning, renting or sharing animals.

Chickens are the only type of animal kept for household consumption—consistent with Table 46.

Table 47: Main reasons for rearing livestock (percentage of households)

Reasons	Cattle	Pigs	Chickens	Goats	Sheep
Draught	72.7	0	0	0	0
Household consumption	0	3.1	27.5	0	0
Extra income	12.9	96.9	65.9	100	100
Draught and extra income	14.4	0		0	0
Household consumption and extra income	0	0	5.2	0	0
Other	0	0	1.4	0	0
Total	100	100	100	100	100

Note: the calculation is based on the number of households that rear the respective livestock.

Overall, it costs more to raise cattle than other animals (see Table 48). Landholding households reported that their biggest investment is in sheds and structures for raising cattle. For landless households, the highest cost for cattle is feed because they don't have access to crop residues for this purpose.

Feed costs are also the main expense for pigs and chickens—households typically use rice bran, crop residues and household waste as feed. The feed costs are lower for goats and sheep, due to

the practice of free grazing in open fields, making other costs, such as for buildings and health care (vaccinations and treating diseases) more prevalent (see Table 48).

Table 48: Average cost of livestock production (kyat)

	Expense type	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Landholding households						
Cattle	No. of HHs	99	70	91	91	351
	Building	45,879	13,143	57,901	144,286	67,980
	Feed	47,323	7,986	130,326	66,715	66,025
	Raising	0	0	10,154	3,907	3,645
	Health	2,954	2,886	5,108	5,665	4,201
	Reproduction	253	14	747	77	288
	Total	96,408	24,029	204,236	220,649	142,140
Pigs	No. of HHs	21	10	16	16	63
	Building	2,381	13,000	8,125	3,250	5,746
	Feed	89,224	91,760	151,894	105,250	109,613
	Raising	0	0	0	0	0
	Health	1,786	2,000	4,031	4,688	3,127
	Reproduction	0	150	250	0	65,87,302
	Total	93,390	106,910	164,300	113,188	118,573
Chickens	No. of HHs	47	16	23	37	123
	Building	0	0	0	0	0
	Feed	9,732	1,013	6,283	7,629	7,320
	Raising	0	0	0	0	0
	Health	0	0	0	0	0
	Reproduction	0	1,500	0	0	195
	Total	9,732	2,513	6,283	7,629	7,515
Goats	No. of HHs	4	3	7	0	14
	Building	10,000	16,667	90,000	0	51,429
	Feed	0	0	0	0	0
	Raising	0	0	0	0	0
	Health	1,000	0	19,000	0	15,500
	Reproduction	0	0	0	0	0
	Total	11,000	16,667	109,000	0	61,214
Sheep	No. of HHs	2	0	1	0	3
	Building	0	0	0	0	0
	Feed	17,500	0	0	0	7,000
	Raising	0	0	0	0	0
	Health	0	0	22,500	0	9,000
	Reproduction	0	0	0	0	0
	Total	17,500	0	22,500	0	16,000

Landless households						
Cattle	No. of HHs	7	13	11	9	40
	Feed	75,000	949,715	109,986	91,250	306,487.8
	Raising	0	0	0	2,000	2,000
	Health	4,750	18,100	4,375	2,500	7,431.25
	Reproduction	0	5,000	16,000	62,500	27,833.33
	Building	50,000	150,000	15,000	0	71,666.67
	Total	129,750	1,122,815	145,361	158,250	389,044
Pigs	(No. of HHs)	28	10	18	27	83
	Feed	2,516	27,760	31,729	6,027	17,008
	Raising	1,730	1,250	0	0	2,980
	Health	1,730	3,500	2,000	6,611	3,460.25
	Reproduction	1,500	1,500	1,500	7,500	3,000
	Building	20,756	15,167	12,000	11,250	14,793.25
	Total	28,232	49,177	47,229	31,388	39,006.5
Goats	No. of HHs	4	5	8	0	17
	Feed	0	0	3,000	0	3,000
	Raising	0	0	0	0	
	Health	25,000	3,500	2,200	0	10,233.33
	Reproduction	0	0	1,000	0	1,000
	Building	66,667	82,500	64,000	0	71,055.67
	Total	91,667	86,000	70,200	0	82,622.33
Sheep	No. of HHs	0	4	8	0	12
	Feed	0	1,500	2,950	0	2,225
	Raising	0	0	0	0	0
	Health	0	1,500	3,125	0	2,312.5
	Reproduction	0	0	0	0	0
	Building	0	15,000	31,667	0	23,333.5
	Total	0	18,000	37,742	0	27,871
Chickens	No. of HHs	16	5	7	27	55
	Feed	16,694	6,000	9,025	16,018	11,934.25
	Raising	0	0	0	0	0
	Health	0	0	15,000	0	15,000
	Reproduction	0	0	0	0	0
	Building	0	0	0	0	0
	Total	16,694	6,000	24,025	16,018	15,684.25

Table 49 breaks down the number of households that own livestock, based on land size. Data confirm that a greater percentage of landholders with larger land area keep cattle while those with smaller areas also keep pigs and chickens. Few households keep goats or sheep. Because cattle are the main draught animals used for preparing land, large-scale farmers need to raise them for crop production. Small-scale farmers still need to keep other livestock such as pigs, chickens, sheep and goats for extra income or household consumption.

Table 49: Landholding households tending livestock

Land size (acres)	Cattle		Pigs		Chickens		Goats		Sheep	
	No.	%	No.	%	No.	%	No.	%	No.	%
>0–10	264	73.5	58	16.2	118	32.9	18	5.0	4	1.1
10.01–20	89	89.9	8	8.1	25	25.3	0	0	0	0
20.01–180	26	92.9	0	0	1	3.6	0	0	0	0
Total	379	78.00	66	13.6	144	29.6	18	3.7	4	0.8

Note: percentages are based on the total number of households in each land size.

Support services

Survey participants were asked questions about their access to support services, including loans and participation in different types of training events or extension services in the preceding 12 months.

Access to services varies significantly, depending on whether households own land, with landless households often having access to fewer services.

Credit

Households were asked if they had taken a loan in the past 12 months. Most of the responses reflect loans from formal providers. Enumerators reported participants are not comfortable discussing informal loans, such as those provided by family, friends or through other unofficial mechanisms. However, family, friends, moneylenders and shopkeepers have been found to be the main providers of credit (LIFT 2012). It is likely that if informal loans had been included, the percentage of households (especially landless households) in the samples that had taken out a loan would be higher.

Access to credit

In the previous 12 months, 80.9% of households in the landholding sample and 56.9% in the landless sample accessed credit (see Table 50).

Table 50: Households accessing loans in the previous 12 months, landholding and landless

	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landholding	90	70.3	101	86.3	96	81.4	106	86.2	393	80.9
Landless	44	72.1	42	62.7	41	53.2	29	42	156	56.9

Table 51 shows access to loans by land ownership. Within the landholding sample, there are no significant differences in the number of households accessing loans, though farmers with 10–20 acres are slightly more likely to have accessed a loan through formal means.

Table 51: Number of households that accessed loans, by land ownership

Land class (acres)	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landless	44	72.10	42	62.70	41	53.20	29	42.00	156	56.90
<10	77	69.40	74	85.10	59	77.60	72	84.70	282	78.60
10–20	13	76.50	21	91.30	28	93.30	26	89.70	88	88.90
>20	0	0	6	85.70	9	75.00	8	88.90	23	82.10
Total	90	70.30	101	86.30	96	81.40	106	86.20	393	80.90

Table 52 shows the main sources of credit for households that had taken a loan in the previous 12 months.

Provision of financial services in rural areas remains a challenge. Government loans are characterised by low average interest rates (see Table 53) but are generally less flexible, requiring repayment at the fixed date. The amount available under government loans varies, depending on the crops grown. Households growing rice can access 1,000,000 kyat per acre (up to 10 acres) compared to 20,000 kyat for upland crops.

In the following four tables, 'NGO' (non-governmental organisation) refers to credit provided by international organisations such as Pact and the United Nations Development Programme. Their interest rates are low, and landless households can access credit; however, NGOs' coverage across townships varies significantly.

'CSO' (civil society organisation) refers to locally run, community-based organisations and cooperatives such as Mya Sein Yaung. Similar to NGOs, CSOs provide loans with low interest rates but their strength and presence across townships varies. Private loans have significantly higher interest rates on average, but are more flexible in terms of timeframes for loan repayment compared to government loans.

Of the landholding households that had taken a loan, most (64%) accessed government-provided loan services, followed by CSO, NGO and private sources (see Table 52). Unable to access government loans, landless households are more reliant on NGO, private and CSO loans than landholding households. Variations between NGO and CSO loan provisions in different townships reflects the uneven geographic coverage of these organisations across the region.

In Chaung-U and Pwintbyu, most of the landholding households receive loans from government sources because they grow more rice than households in the other two townships. According to respondents in the Kyaukpadaung and Myingyan township FGDs, households are reluctant to take advantage of government loans because of the strict repayment terms and uncertainty of crop yields.

Table 52: Loan access by provider, number of households that accessed credit

Credit sources	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landholdings households										
Government	60	46.9	95	81.2	57	48.3	100	81.3	312	64.2
NGO	39	30.5	14	12.0	2	1.7	3	2.4	58	11.9
Private	13	10.2	6	5.1	9	7.6	15	12.2	43	8.8
CSO	24	18.8	35	29.9	65	55.1	12	9.8	136	28.0
Landless households										
Government	0	0	0	0	0	0	0	0	0	0
NGO	26	48	33	53	8	17	7	21	74	38
Private	16	30	0	0	8	17	22	65	46	23
CSO	12	22	29	47	31	66	5	15	77	39

Note: based on all loans taken, including multiple loans (up to four) for some households. Percentage is calculated based on the number of households that accessed a loan per township.

Credit conditions

Table 53 compares the average interest rates charged for credit. While government loans have significantly lower interest rates, they are less flexible in terms of purpose for loan and repayment options compared to other kinds of credit providers. Private loan providers have the highest interest rates, with very flexible timeframes. On average, landless households reported paying higher interest rates for NGO and CSO loans than landholding households. Landholding households reported paying higher interest rates for private loans compared to landless households. According to FGDs, the amount and duration of private loans are largely based on merit and social relations (for loan duration, see Table 54).

Table 53: Average interest rate by type of provider (%)

Source	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Average interest rate (%)					
Landholding households					
Government	0.9	0.8	1.0	0.8	0.9
NGO	2.5	0.8	3.0	0.8	2.1
Private	4.7	4.0	4.1	4.9	4.6
CSO	1.7	1.5	1.5	1.4	1.5
Landless households					
Government	–	–	–	–	–
NGO	1.6	2.3	2.5	2.8	2.3
Private	3.8	–	2.6	4.1	3.2
CSO	3.5	1.0	2.2	3.4	2.5

Table 54: Average duration of loan by type of provider (months)

Loan provider	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	Alltownships
Landholding households					
Government	7.0	6.5	7.1	6.5	6.7
NGO	11.7	9.2	10.0	9.0	10.6
Private	9.3	4.5	5.4	4.8	6.5
CSO	6.1	6.0	6.0	6.0	6.0
Landless households					
Government	–	–	–	–	–
NGO	8.3	11.6	8.4	11.8	10.0
Private	5.0	–	7.6	12.5	8.4
CSO	7.3	6.0	6.4	3.2	5.7

Average loan amounts vary significantly across townships and loan providers (see Table 55). On average, landless households borrow significantly less across all provider types. Comparing the different provider types, CSOs and NGOs lend less on average compared to private and government providers.

Government loans are mostly intended for landholding households that grow lowland rice. On average, landholding households in Chaung-U and Pwintbyu have larger government loans than households in Myingyan and Kyaukpadaung. Households in Pwintbyu and Chaung-U have much greater access to lowland irrigated areas, allowing farming of rice over two seasons.

Table 55: Average loan amount by provider (kyat)

Credit sources	Kyaukpadaung	Chaung-U	Myingyan	Pwintbyu	All townships
Landholding households					
Government	152,833	368,632	191,579	542,500	350,513
NGO	189,744	350,000	22,500	300,000	228,362
Private	457,692	336,667	206,667	1,063,333	599,535
CSO	108,750	118,000	113,385	125,000	114,779
Landless households					
Government	–	–	–	–	–
NGO	153,226	118,462	37,500	66,667	153,226
Private	123,750	–	120,000	161,538	123,750
CSO	122,222	135,714	109,615	92,000	122,222

Note: US\$1 is equivalent to approximately 1,100 kyat.

Table 56: Loan amount by township (kyat)

Township	<500,000 (kyat)		500,001– 1,000,000 (kyat)		1,000,001– 2,000,000 (kyat)		2,000,001– 3,000,000 (kyat)		3,000,001– 9,000,000 (kyat)	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landholding households										
Kyaukpadaung	82	91.1	6	6.7	1	1.1	1	1.1	0	0
Chaung-U	76	73.1	23	22.1	4	3.4	0	0	1	1
Myingyan	94	97.9	2	2.1	0	0	0	0	0	0
Pwintbyu	53	50.0	45	42.5	6	5.7	1	0.9	1	0.9
Landless households										
Kyaukpadaung	43	97.7	1	2.3	0	0	0	0	0	0
Chaung-U	36	85.7	6	14.3	0	0	0	0	0	0
Myingyan	40	97.6	1	2.4	0	0	0	0	0	0
Pwintbyu	27	93.1	2	6.9	0	0	0	0	0	0

Table 56 breaks down average loan amounts by township. Of landless and landholding households that took out loans, the majority were for less than 500,000 kyat (less than approximately US\$450). Landholding households in Chaung-U and Pwintbyu had a greater number of households taking larger loans, consistent with earlier discussions around irrigation access, rice farming and government loans.

Reasons for taking loans

Respondents were asked the main reason or purpose for taking loans (see Table 57). For landholding households, 73.9% across the sample responded that the loan was to support aspects of crop production (see Table 57). This is consistent with the main purpose for government loans, which is to support agriculture.

In contrast, two-thirds of landless households (66.5%) took a loan for household consumption. Landless households also took loans to cover the costs of rearing livestock in Kyaukpadaung (23%), Chuang-U (about 10%) and Myingyan (about 10%).

Table 57: Main purpose for taking loan

Reason for loan	Kyaukpadaung		Chuang-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landholding households										
Crop production	74	54.4	122	81.3	96	73.3	112	86.2	404	73.9
Livestock production	10	7.4	6	4.0	4	3.1	0	0	20	3.7
Buy machinery	2	1.5	1	0.7	1	0.8	2	1.5	6	1.1
Household consumption	20	14.7	9	6.0	21	16.0	6	4.6	56	10.2
Education	7	5.1	2	1.3	5	3.8	1	0.8	15	2.7
Health	2	1.5	4	2.7	1	0.8	0	0	7	1.3
Others	12	8.8	0	0	2	1.5	3	2.3	17	3.1
Two reasons	9	6.6	6	4.0	1	0.8	6	4.6	22	4.0
Total	136	100	150	100	131	100	130	100	547	100
Landless households										
Household consumption	23	44.2	50	80.6	26	56.5	28	82.4	127	65.5
Livestock production	12	23.1	8	12.9	5	10.9	0	0	25	12.9
Education	2	3.8	0	0	2	4.3	0	0	4	2.1
Health	2	3.8	1	1.6	4	8.7	2	5.9	9	4.6
Buy machinery	1	1.9	1	1.6	1	2.2	0	0	3	1.5
Others	12	23.1	2	3.2	8	17.4	4	11.8	26	13.4
Total	52	100	62	100	46	100	34	100	194	100

Note: based on the number of responses for each purpose

Extension and information provision

Access to information and support services is central to supporting households to make decisions relating to changing agricultural practices. Group membership may support households to access information and provide increased power or social capital in farming and marketing decisions. This section focuses on the extent to which households are participating in these kinds of opportunities.

Training

Table 58 shows the number of households that had received training in the previous 12 months. Among landholding households, about 40% had attended some kind of training, though this was significantly less common in Kyaukpadaung (15%) due to government training focusing on rice, which has low production numbers in the township. Few landholding households had received training in livestock or fisheries.

In comparison, only 14% of landless households in the sample had attended some kind of training in the previous 12 months. The highest was Myingyan (29%) due to a CSO program providing training in microfinance.

Table 58: Number of households that received training in the previous 12 months

	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landholding households										
Agriculture	16	12.5	50	42.7	57	48.3	72	58.5	195	40.1
Livestock	4	3.1	0	0	1	0.8	1	0.8	6	1.2
Fisheries	0	0	6	5.1	0	0	0	0	6	1.2
Landless households										
Agriculture	–	–	–	–	–	–	–	–	–	–
Livestock	–	–	–	–	–	–	–	–	–	–
Fisheries	–	–	–	–	–	–	–	–	–	–
Other	5	8.2	8	11.9	20	29	5	8.2	38	13.9

Table 59 presents the main training provider for landholding households, led by the Department of Agriculture (DoA) (65%).

‘Private’ mostly refers to agrochemical companies, which provide training related to selling their products. Inputs are provided to farmers and costs are recovered at harvest. Training provided by NGOs varies, depending on the location of the project village.

Table 59: Main training providers for landholding households (number of households)

Provider	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Government	15	71.4	47	94	52	85.2	26	31.7	140	65.4
NGO	4	19.0	2	4	5	8.2	8	9.8	19	8.9
Private	2	9.5	1	2	4	6.6	48	58.5	55	25.7

Group membership

Village organisations can provide members with a network to access resources and information, and increase market negotiating power. In rural communities in Myanmar, the formation of village organisations has been very weak and has been a sensitive area in the past. As a result,

membership in village organisations is low, with only 13% of the overall sample being members of a village organisation (see Table 60).

Of the survey respondents who were members, 36% are members of government groups such as village administrative groups or firefighting services. Farmer groups have the second-highest percentage of members. Membership in NGOs is often for the management of microfinance activities, maternal healthcare programs and women's associations. Cooperatives cover microfinance activities, while most private groups are formed by agrochemical companies (see Table 61). According to FGDs, most members of these private-sector groups are male.

Table 60: Membership of village organisations (number of households)

	Kyaukpadaung		Chuang-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Member	14	11	12	10	26	22	13	11	65	13
Not member	114	89	106	90	94	78	109	89	423	87
Total	128	100	118	100	120	100	122	100	488	100

Table 61: Membership of village groups, by type of group (number of households)

	Kyaukpadaung		Chuang U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Government	8	57.1	4	33.3	8	30.8	4	30.8	24	36.9
NGO	3	21.4	2	16.7	2	7.7	4	30.8	11	16.9
Private	1	7.1	0	0	0	0	2	15.4	3	4.6
Cooperative	1	7.1	2	16.7	2	7.7	2	15.4	7	10.8
Farmers	1	7.1	4	33.3	14	53.8	1	7.7	20	30.8
Total	14	100	12	100	26	100	13	100	65	100

Information

The survey asked respondents whether they had sought information about crop production or other issues in the previous 12 months. Overall, 61.6% of landholding households had sought information while very few landless households had (see Table 62).

Landholding households asked for information from government institutions such as DoA and the Department of Agricultural Research, and from agrochemical companies. They were mostly looking for information to deal with problems in crop production, such as on pest and disease management.

Table 62: Households seeking agricultural information, by source

	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Government	29	22.7	64	54.7	45	39.1	28	22.8	166	34.4
Other	55	43.0	19	16.2	16	13.6	73	59.3	163	33.5

Table 63 shows the technology or media households use to access technical information for agricultural production. Listening to the radio is the most common source among our surveyed samples, though there are significant differences between landholding and landless households. Almost half of landholding households listen to the radio for information, compared to only 9.1% of landless households (despite 40% of landless households owning a radio, see Table 22). Radio provides important information for landholding households on the weather and crop prices, which are important for household decisions. This may indicate a lack of relevant production information for landless households (e.g. livestock) aired in these formats.

More landholding households in Pwintbyu and Chaung-U access information about crop production via television, compared to households in other townships. This is due to better crop production in these townships because of access to irrigation.

Table 63: Main technology for receiving agricultural information (number of households)

	Kyaukpadaung		Chaung-U		Myingyan		Pwintbyu		All townships	
	No.	%	No.	%	No.	%	No.	%	No.	%
Landholding households										
Radio	60	46.9	79	67.5	42	35.6	55	44.7	236	48.6
TV	13	10.2	43	36.8	26	22	60	48.8	142	29.2
Internet	0	0	0	0	0	0	3	2.4	3	0.6
Journal	8	6.3	1	0.9	0	0	10	8.1	19	3.9
Others	5	3.9	2	1.7	0	0	5	4.1	12	2.5
Landless households										
Radio	4	6.6	7	10.4	3	3.9	11	15.9	25	9.1
TV	2	3.3	5	7.5	1	1.3	5	7.2	13	4.7
Internet	0	0	0	0	0	0	0	0	0	0
Journal	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	1	1.4	1	0.4

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