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***“Strengthening Institutional Capacity, Extension Services
and Rural Livelihoods in the Central Dry Zone and
Ayeyarwaddy Delta Region of Myanmar”***

(ASEM-2011-043)



***STUDY ON AGRICULTURAL LABOR MIGRATION:
FACTORS AFFECTING THE CROP PROFITABILITY
AND MIGRATION STATUS
IN KYAUKPADAUNG TOWNSHIP***

NANDAR AYE CHAN AND THEINGI MYINT

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ABSTRACT

The study was carried out to examine impact of labor migration on agricultural crop productivity in Kyaukpadaung Township. The specific objectives are to observe the profile of migrants and patterns, income composition, changes of agricultural labor utilization, factors affecting on profitability of current grown intercropping and factors affecting the out migration status of farm households in the study area. Sample size were 59 migrant and 58 non-migrant farm households from Inntaw and Ywartanshay villages by purposive sampling procedure through household survey and field observation in October 2014. Descriptive statistics, cost and return analysis, profit function and logistic regression model were used for data analysis. Based on the research findings, mostly active agricultural youth labor migrated and was working at non-agricultural sector in urban area. International migration was about one third of total and less than internal migration. Internal migration was caused by unfavorable factors of crop production and low farm income as push factor. Urban sector had high income opportunities than agricultural sector which was pull factor. Remittance affected positive relation to crop production and getting more profit and improved household income but not significant. In the study, migrant farm households can more invest in crop production such as input used, hired labor in farming activities etc. Therefore, higher yield and profit were earned by migrant farm households. Profit from current cropping pattern can be obtained by efficient use of land, labor and capital inputs and high crop price which is shown by profit function. Migration status hadn't shown strong relation to crop production profitability but it was positive relation. According to out-migration status logistic function, migration in farm households extensively related to exist of young male member, higher education level and the person who was seeking to work in non-farm activity.

Migrant status depends on high education level of male member, the rest of family members would be low education level, female and aging people who have to participate in farming, therefore, agricultural technologies, practices, machineries and extension education program would be emphasized for low educated female and aging people affordability. Higher income opportunity is the pull factor of migration, for that reason agricultural sector would be improved by small and medium enterprise (SME) development and better value chain process of various crops would be the better opportunity of rural community. Moreover, remittance used in farming activities and investment for farm shows positive impact on agricultural sector, and therefore, formulating agricultural sector development long term plan would be reflected on migration status, farmer's education level, gender issue and farm labor availability in specific region for the country's economic development.



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CHAPTER 1

INTRODUCTION

Migration is the movement of people from one location to another and widely associated with change of permanent place of residence. Rural out-migration and agricultural crop production are key livelihood strategies in many rural areas of agro-based developing countries nonetheless the relationship between migration, agriculture and rural development has become an interesting argument in the study of economic development. In developing countries, the major source of income, food and employment opportunities are still provided from the agriculture sector (World Bank, 2008).

Over the last decade, the landscape of Myanmar has changed remarkably. Migration has played a crucial role as a component of people's livelihood strategies and in shaping the national economy following improvements in market, communications and transport, and access to electricity. The countryside is no longer confined to food production but is now a source of labor for urban areas. Hence migration has become an increasing focus of research and policy development in many developing countries.

In Myanmar, labor migration takes place both internal and cross-border migration. An increasing number of migrants from Myanmar have been crossing the borders with Thailand, China and India. The numbers of those migrating from one place to another within Myanmar itself, either seasonally or longer term also seem to be growing. Estimates by the Ministry of Labor, Employment and Social Security (2012) have suggested that as much as 10 per cent of the labor force is employed overseas. In Myanmar, the development of mining areas in the Shan and Kachin States, the fishing industry in the Taninthayi Division and legalization of the border trade as part of the economic liberalization process had much impact on some of the traditional patterns of migration. In addition, an increasing number of infrastructure development activities by the government, with the support of foreign donors, are providing temporary employment opportunities for construction workers. A large percentage of internal migrants travel seasonally to work on infrastructure construction sites, for example for dams and irrigation canals (Zuijlen, 2002).

Small studies of migration in Myanmar, as part of Qualitative Social and Economic Monitoring (QSEM) revealed that migration is a common coping strategy, with 26-30% of all households having a family member migrating, and overall village population migration



levels ranging from less than 2% in Shan State to over 10% in Mandalay Region. International, non-seasonal migration was highest in States bordering neighboring countries, whilst in the central and delta areas, the migration was predominantly internal and seasonal (LIFT/World Bank, 2014).

Myanmar's total population is 51.41 million and 66.21 percent of the population lives in rural areas. Since agriculture is the major income source and employment in the rural areas, farm labor is a major source of employment opportunity for the rural labor force. However, farming activities are gradually unattractive for them because of unstable crop production, inadequate credit, and adverse climate condition etc. Under such conditions, most of the households commonly practice income diversification strategies, including labor migration. In most cases, the aim is to diversify the families' means for a better livelihood and to find new sources of cash income, social security and resilience to adversity that comes with rapid economic transition, which also alters patterns of the use of and access to natural resources. Therefore, the rural out-migration within and between the countries is one of the most important issues and it receives a particular consideration for alternative economic development.

1.1 Migration in Myanmar

People born in Myanmar have migrated all across the world. However, primarily international migration flows from Myanmar are to other Asian countries including Thailand, Malaysia, Singapore, Bangladesh, Korea and Japan. Migration from Myanmar to countries in the Greater Mekong Subregion (GMS), particularly Thailand, accounts for the largest migration flows within the GMS. Within ASEAN, such large scale international out-migration is matched only by Indonesia and the Philippines. Myanmar is therefore a key country in addressing Asia's regional migration challenges (Hall 2012).

An IOM report published in 2009 suggests that up to 10% of Myanmar's population, estimated at 50 to 55 million people, and is currently overseas. Reasons for migration from Myanmar include relative poverty, lack of jobs, inability to earn enough money to survive as well as political and/or ethnic conflict. According to Nyi (2013), a study based on the data collected in Fertility and Reproductive Health Survey (2001 and 2007), the highest in-migration rate is seen in the States of Yangon, Kayah, Kachin and Shan and highest out-



migration in Kayah, Chin, Kachin, Mon, Tanintharyi and Ayeyarwady. Only four States/Regions have net positive migration, namely Yangon, Kayah, Kachin and Shan. The migration streams in the States/Regions under this study are as follows:

Table 1.1 Migration stream in the selected State/Region

State/ Region	Migration stream	
	Out-migration to	In-migration from
Mon State	Yangon, Kayin, Bago	Kayin
Magway	Yangon, Mandalay, Shan, Bago, Sagaing, Mon	Mandalay
Mandalay	Shan, Yangon, Bago, Kachin, Magway, Sagaing	Sagaing, Magway, Shan, Yangon, Bago, Kachin
Shan State	Mandalay, Yangon, Kachin, Kayah	Mandalay, Magway, Sagaing, Bago, Yangon, Ayeyarwaddy

Source: Nyi, 2013

In Mon State, most internal seasonal migrants were from within Mon State, while migrants from outside are mostly year-round temporary (with or without family) in nature. Migrant numbers from the Dry Zone in Mon State are low compared to neighboring Bago and Delta Region, particularly Ayeyarwady. Migration from the Delta is reported to have increased after cyclone “Nargis” (Maharjan&TheingiMyint, 2015). IOM (2013) also reports that most in-migration to Mon State is intra-State; however, the townships of Mawlamyine and Mudon attract migrants from all over the country and Kyaikmaraw from Bago (East and West). Most of the migrants in the study sites had temporary settlements – Mawlamyine(65%), Mudon (70%) and Kyaikmaraw (73%).

From the aspect of formal sector internal migration in Myanmar, over one-third (38.9%) of formal sector workers had migrated for work from one State/Region to another for work. Nearly half (48.7%) of formal sector workers in the sample had either migrated from one State/Region to another, or had migrated from one part of their native State/region to another for work, with over half of all formal sector workers in Yangon being migrants. Nearly three quarters (71%) of all migrants to the formal sector are from four regions: Ayeyarwaddy, Yangon, Mandalay and Bago. The majority of migrants in formal sector labor in



Yangon are from Ayeawaddy Region, whereas migrants in the Dry Zone tend to be from other States/Regions within the Dry Zone. Ayeawaddy Region and the Dry Zone are net exporters of migrant labor to the formal sector, whilst Yangon is a net importer (Griffiths and KyawZawOo, 2013-2014)

1.2 Migration in Dry Zone

Traditionally, during the long dry season, especially in areas that have little or no access to irrigated water supply, it has been a customary practice for people in the Dry Zone to leave their villages (either individually, in families or in groups) temporarily in search of work. Every year during the dry period that extends for over six months from November to May, seasonal migration occurs. The landless farmers leave in search of employment, as agricultural laborers and construction workers, to Shan State, Yangon and nearby townships. Very often entire families migrate together resulting in severe social disruption. Children are often taken out of the school system to accompany the parents or adults. Migration by itself is an important coping strategy for the Dry Zone poor. However, there is growing evidence that many of the young people migrating from the Dry Zone are ending up working in highly exploitative conditions. Dry Zone male youth have been found to work in the fishing industry and road construction. While some of these young people are working in good conditions, many are working extremely long hours, often in dangerous conditions for very low or no wages (Zuijlen, 2002).

According to the study conducted by IOM and ARCM in Thailand in 2013, 26.7% of Myanmar's migrants in Thailand are from Mon, 19% from Shan, 16.2% from Thanninthayi and 14.5% from Kayin, whereas migrants from the Dry Zone (Mandalay, Magway and Sagaing) were less than 5%. However, there is a recent tendency among young migrants from the Dry Zone to go for cross-border/international migration to Thailand, China, and Malaysia. The preferred destination areas for internal labor migrants from the Dry Zone are: i) Yangon, Nay Pyi Taw and Mandalay for work in industrial zones, tea shops, restaurants, construction and petty trading; ii) Shan State and Southeast to work in tea, sugarcane, rubber plantations, and mines; iii) North Kachin for work in gold and jade mines; iv) central Dry Zone for crude oil (Maharjan & Theingi Myint, 2015).



Migration of women is also common in the Dry Zone. In the total sample 7% of households have at least one female migrant, 18% of households have a male migrant. The proportion of households with labor migrants has slightly decreased compared to last year, from 31% to 27% in the areas covered by both assessments. Most migrants stay within Myanmar, 21% work in Yangon, 71% work in other places within Myanmar and only 8% migrates outside Myanmar, mainly Malaysia. For both female and male migrants, about one quarter is permanent migrants, while three quarters migrate on a non-permanent basis, most commonly between 6 and 12 month (NAPA briefing report, 2011).

1.3 Rationale of the Study

Labor migration is a common livelihood strategy in the dry zone area, Myanmar. In the rural areas of central dry zone, small scale farmers operate in a high risk environment. In recent decades, climatic fluctuations in the dry zone have become more intense, with droughts becoming more frequent and with rainfall patterns changing – arriving later in the early monsoon and leaving earlier in the late monsoon, and at the same time with rainfall becoming more intense (Khin Moe Kyi, 2012). Climate change effects force the rural people to change their works to other income opportunities because these effects cause insufficient return from their traditional agriculture. On the other hand, governmental and non-governmental organizations don't support adequate facilities such as in-kind, cash and extension services to enhance adaptive capacity for agricultural development. So, they become more interested in seasonal or oversea migration.

Generally, farming in Myanmar is labor intensive. As unpredictability of agricultural activity due to climate change, especially youth from households go outside to find other income opportunities which lead to decreased work force in agricultural sector. The loss labor effect due to the out-migration of household members reduces the availability of labor inputs. In the case of actively young male out-migration, female left behind are more responsible to manage on their farm and to support for both the elderly and the young. Therefore, more female, children and elder persons have to work in farming during peak labor period. Labor shortages in the crop production, high labor cost, labor unavailability in time, unskillful female and child labor can create low productivity. Thus, farm households need more agricultural laborer in farm activities to compensate their family labor and face the problem



in accessing hired labor. And also, female farm labors are working more time to replace loss of male family labor. This result not only changes in family structure and livelihoods but also changes in the division of labor in the origin and destination places. In the long term, it also leads to an aging of the labor force. However, remittance money from out-migrants can compensate these effects by allowing more capital investment in agriculture crop production activities that can be profitable in the long run. World Bank (2008) stated that the relationship between migration and agricultural productivity is complex and the absence of household members reduces the agricultural labor supply. In this case, agricultural productivity can therefore fall in the short run but rise in the long run as household with migrants shift to less labor intensive. This can be profitable in crops or livestock production to drive farm mechanization in Dry zone areas.

Therefore, it is needed to find out impact of labor migration on agricultural production, changes of agricultural labor utilization, livelihoods and their incomes.

The paper is an effort to better understanding impacts of migration on agricultural labor problem, crop production and household's income in Dry Zone. The specific objectives are –

1. To describe the profile of migrants and migration patterns in Kyaukpadaung Township
2. To compare income composition of migrant and non-migrant farm households in the study area
3. To examine the changes of agricultural labor utilization in the cropping pattern as the effect of migration
4. To analyze the factors affecting on profitability of intercropping of sesame and pigeon pea in migrant and non-migrant farm households
5. To identify determination of factors contributing to out-migration status of farm households



CHAPTER 2

LITERATURE REVIEW

2.1 The Concept of Migration

Migration is an inherent part of the economic development process. Potential labor migrants in particular consider leaving home in order to earn higher returns to their labor. Standard models of migration predict that migrants move due to wage gaps between rural and urban areas (Harris and Todaro, 1970).

According to Lee (1966), migration is a permanent or semi-permanent change of residence with no restrictions upon the distance involved and the nature of the act involved in the movement. According to Bogue, migration refers to only those changes of residence that involve a complete change and readjustment of community affiliations of individuals (as cited in Adhikary and Ghtmire, 2000)

Migration is generally a household decision and is a highly complex procedure that considers: potential benefits; family, social and economic costs; changes in the division of labor; migration policies and rules; availability of networks; and many other aspects that may facilitate decisions to leave or create barriers (IFAD, 2008).

Also migration is categorized into various types depending on various aspects of migration such as time period (Permanent, Temporary and Seasonal), purpose (labor migration, forced migration), location (internal and international), process involved (legal migration and illegal migration) etc.

2.2 Types of Migration

Ellis (2000) classified labor migration into four types. ‘Seasonal migration’ refers to temporary migration occurring in response to the agricultural calendar or seasons, with individuals normally moving out during the lean period and returning during the peak period. ‘Circular migration’ refers also to temporary migration but occurring in response to the demand for labor and not necessarily associated with agricultural seasons. ‘Permanent migration’ (rural-urban migration) is when household members move to work in urban areas for a long period of time and transfer money back home (remittances). ‘International migration’ involves household members migrating either temporarily or permanently to work in foreign countries.



2.3 Types of Migration and Agricultural Activities

Seasonal migration allows for a better deployment of labor, because those underemployed during the agricultural lean season can find work in towns or other areas, thereby increasing their incomes. In assessing the impact of migration on the reallocation of resources by migrant households in Albania, it has been found that the type of migration (seasonal, circular or permanent) influences the allocation of resources to different agricultural activities, according to labor and capital requirements and physical and human capital endowments (McCarthy et al. 2006). While permanent migration has favored livestock production, temporary/seasonal migration has entailed a reduction in livestock holdings but an increase in fruit cultivation. On the other hand, lasting out-migration can deprive rural areas of critical agricultural labor during farming seasons (Skeldon 2003). Longer-term, international migration, especially migration not occurring between border countries, usually means that migrants are unable to return home to engage in agricultural activities and employment during the farming season. Their absence may generate a labor shortage (Tacoli 2002).

Migration of one or more family members also has important consequences in terms of labor allocation and the division of labor within the household, and those effects are not gender neutral. Departure of family members may lead to labor supply adjustments by remaining family members, such as taking up tasks on a family plot or the care of children and household duties (Ramirez et al. 2005). Migration of people entails a loss of labor force and human capital resources in the place of origin, along with several fixed and opportunity costs for the whole household, in terms of forgone working capital, skills, yield, and income (Rozelle et al. 1999). Few empirical studies have shown that earnings of international migrants have a positive impact on crop productivity and may also serve as a source of capital accumulation in rural households (Lucas, 1987). Mendola (2005) found that international migration has a positive effect on the investment in a superior agricultural technology, whilst temporary and permanent migrations do not encourage such a risky agricultural investment.



2.4 Labor Migration and Rural Livelihoods

Globalization and migration are rapidly transforming traditional spheres of human activity. The work of rural families is no longer confined to farming activities, and livelihoods are increasingly being diversified through rural-to-urban and international migration (IFAD, 2008). Migration has long been one of the livelihood strategies available to rural households. It is often combined with other strategies, thus contributing to livelihood diversification and risk mitigation. Labor migration has affected rural livelihoods and the agricultural sector in various ways. A crucial issue is the linkage between migration and agricultural intensification. Out-migration causes a shortage of labor in the agricultural sector when rural people, especially young workers, go to work in non-farm activities in other areas of the country or even in other countries (Rigg 2007). According to Rigg (2005), many villages in Southeast Asian countries such as Thailand, Indonesia, the Philippines, and Malaysia have become ‘de-agrarianised’ in that most people who live in the village earn their livelihoods through non-agricultural employment in towns.

On the other hand, the remittances from migrant family members can help reduce the capital constraints of poor households. Migration may therefore encourage agricultural intensification if remittances can be used to hire labor or purchase agricultural inputs such as seeds, fertilizers, livestock, and labor-saving equipment (McDowell and de Haan 1997). Rigg (2007) found that households who receive remittances are able to invest more in agricultural production or even engage in new investment activities, especially when migrant family members return home with skills and money. In Albania, rural remittance-receiving households generally shift their on-farm investment from crop to livestock production. Despite reductions in the work force, agricultural income does not seem to decline as a result of migration and total income is rising, partially as a result of the higher investments in livestock. It has also been found that members of households with migrants abroad work significantly fewer hours in agricultural production.

2.5 Remittance Allocation in Farm Households

Remittances play an essential role in ensuring food for many rural poor households and thus constitute an efficient strategy for facing adversities such as low agricultural productivity and the inherent risks and instability of farming activities. Investment of



migrants' income in farm and nonfarm activities and even increased consumption may also create employment opportunities directly and indirectly. Accordingly, it is recommended that policies be designed to increase the social, economic and financial links between migrants and their communities or countries of origin (IFAD, 2008). The major impacts of migration and remittances on agriculture and rural employment depend directly on patterns of expenditure, investments and labor allocation of migrant households, and indirectly on the multiplier effects of remittances and changes in the labor, goods and services markets. While in some cases remittances can provide a way to compensate for labor shortages, in others the quantity sent may not be enough to cover the vacuum left. The labor shortage may also be covered by the influx of cheap labor from other areas (Cotula and Toulmin 2004).

Several of the smallest households in central Mali consider this outflow of young laborers detrimental, as their remittances are often considered a poor substitute for a young man's contribution to filling the family granary (McDowell and de Haan 1997). In some cases, migration and remittances foster household farm investment and agricultural production, while in others, the opposite occurs. Initially, labor availability for farm and non-farm production may decrease when family members migrate, particularly if households are unable to reorganize family labor endowments or lack the necessary means to hire additional labor (Lucas 2006).

2.6 Remittance and Agricultural Productivity

In rural China, remittances partially compensate for lost labor, contributing directly to household incomes and indirectly to crop production (de Brauw et al. 2003). In Ghana, migration from rural areas has negative effects on household farm income initially, although over time remittances tend to fully compensate for lost labor, contribute to household incomes and stimulate both farm and non-farm production (Tsegai, 2004). The ways in which migration and remittances affect agricultural production and income go beyond their direct impact on farm activities (Taylor and Stamoulis, 2001). As early as 1980, Lipton (1980) posited that remittances may have a negative effect on farm productivity, as a result of a number of factors including the loss of the youngest and most productive household members and a possible substitution of labor for leisure by the less efficient household members left behind. In fact, despite this potential, anecdotal evidence suggest that only a small share of



remittances is going towards productive investments in agriculture (King and Vullnetari, 2003).

In contrast, migration and remittances are being invested in commercial agriculture, particularly vegetable cultivation and livestock farming, although the extent of such investment seems rather limited. The lost labor is not replaced by remittances; in fact remittances are seldom invested in land or other capital inputs needed to improve the agricultural sector (Mines and Janvry, 1982). Rozelle et al. (1999) found that, in China, even though overall remittance has a positive impact on maize yields, the loss of labor had negative impacts on maize yields. The negative impact through labor loss is not sufficiently replaced by remittance investment in farming, thereby leading to an overall negative impact on maize yield. In one such study, Gray (2009) reports that migration and remittance positively influence smallholder agriculture in the Southern Ecuadorian Andes. The study reports that ‘outmigration has lost-labor effects but international remittances have investment-promotion effects that result in increased maize production. In other words it is not clear whether remittances sent back by migrants are able to compensate for the opportunity cost of allocating a marginal unit of family time to migration that is the loss of net income from production. Household may not be able to simultaneously devote time to migrant labor and to investment activities in home areas. Moreover, it has been argued that human and physical capital embodied in (‘certain types’ of) migration is likely to complement other family resources in production, strengthening the negative effect from less family labor (i.e. “brain drain” argument. See Faini, R. 2003). Another argument in this direction provided by the literature is the one of moral hazard phenomena in sending households: if migrant work is lucrative enough household members remaining behind may entirely forgo productive activities and live primarily on remittances receipts. For evidence on this see Gubert, F 2000. On the other hand, though, people left behind may invest more so as to motivate the migrant to send more remittances (de Janvry et al., 1997).

2.7 Migration and Young People in Rural Area

Traditional development programs have largely overlooked the importance of improving services and infrastructure in small cities and towns even though there inadequacy is an especially acute driver of migration for young people the world over and is speeding up



the aging of rural populations in both developed and developing countries (Iaquinta 1999). Young people want the entrepreneurial opportunities, types of services, and control over livelihoods currently unavailable in most of smaller cities and towns (Carney 1999). Tuan et.al 2000 found that younger persons who are involved in agricultural activities full-time are more educated than their older counterparts. Furthermore, the younger generation looking for better employment opportunities has already received more education than the older generation. Since education and training are the primary vehicles that can equip individuals with the skills needed to be engaged in non-agricultural employment activities, the younger generation is better prepared to work outside of agriculture. This is captured by the distribution of education of those engaged in non-agricultural activities either part time (full-time, agricultural & non-agricultural activities) or full-time.

Depending on the cultural context and individual circumstances, young sons or daughters will be encouraged to migrate, as might at times fathers or mothers, giving rise to a growing phenomenon of multi-spatial households and enterprises. In South Asia, the Middle East and most of Africa, men constitute the majority of rural-urban migrants. In Taiwan, the Philippines, Indonesia and Thailand parents prefer daughters to migrate because they are more likely to send back a larger part of their earnings as remittances to cover the needs of their parents and siblings (including education). In some regions of Africa it is increasingly acceptable for young rural women to work (and study) in cities, though under close supervision from relatives. The presence of relatives is an important determinant in the choice of destination, but migrants who engage in menial occupations or prostitution often prefer more distant locations (Okali et al. 2001).

Farming may only change slowly, but it will change as many young and better educated people move out of agriculture to seek higher incomes elsewhere- rural areas will be left with proportionally more older people, but gradually there will be consolidation of farms into larger, more viable units (depending on the nature of land market and agricultural marketing infrastructure), with more mechanization and fewer full-time farmers (Davis 2001). A large number of youth are also opting out of farming because of growing insecurity in land ownership. The loss of agricultural land to urbanization has become possible because of the high rate of natural population increase and migration of people to a number of towns. In the Ecuadorian Amazon, young women are more likely than men to move to urban



areas as they are more likely to find employment in domestic service, restaurants and retail (Barbieri and Bilsborrow 2009).

The persistent problem of youth out-migration leaves rural communities with an increasingly declining agriculture labor force (Beale 2000). Although the choice of future careers may be a challenge for young people in general, it is often a dilemma that is both complex and dynamic for rural youth in particular. This is because rural youth are always torn between two competing forces: the desire to remain in their rural or farming communities and maintain ties with family, community, and tradition versus the temptation to leave their rural communities in pursuit of educational and occupational opportunities elsewhere (Johnson, Elder, & Stern 2005).

Rural and farm youth with strong levels of attachment to their families and rural communities may be more willing to choose agriculture careers or inherit a farm business in order to remain close to their family and community than those with lower levels of attachment (Hektner 1995). According to Johnson et al. (2005), rural youths' perception of the local job opportunities affects their career choices and intention to remain or leave their local communities. Further, Johnson et al. posited that rural youths' residential preferences also influence their career choices. For example, rural students who prefer to live close to their parents and those who prefer to live close to nature or natural environments are more likely to choose careers that can be achieved in their rural communities. However, because of the declining employment and few or no postsecondary educational opportunities in most rural communities, rural youth, despite their strong attachments to their communities, have had to move out or get out of their communities in order to move up or get on economically (Jamieson 2000).

Since the late 1990s, a growing number of young adults in rural Cambodia have migrated to urban areas to take up jobs created as the result of the country's opening to a free market economy and its subsequent high economic growth. Moving from one place to another is always risky, especially for young workers most of whom have never left their home village and are equipped with only very limited basic education and few or no skills. Undoubtedly, there are some necessary reasons behind this huge movement of young people from rural to urban areas (CDRI 2007). With greater migration opportunities, villages were beginning to face labor shortages and farmers were losing interest in subsistence farming



altogether. There have also been some new studies such as the one by Jha (2010), which showed that migration leads to reduction in both production and productivity in agriculture. Fadayomi (1998) reveals that internal migration has a negative impact on the quality of rural life because it reduces the number of individuals in rural areas. Migration of young adults from the rural areas places a greater burden on the remaining farmers as they now have to work harder and longer to cover the same area of land thus depriving them of some of their leisure time.

Germenji and Swinnen (2004) report that the major reason for the lower crop output can be attributed to changes in the type of labor involved in farming, with less family labor and more hired labor, leading to a reduction in labor efforts. In contrast, there are other studies that have found that migration leads to an improvement in agricultural production (Taylor and Lopez-Feldman, 2007). While employment opportunities are few in rural areas, labor shortages may arise in the peak season as an increasing number of rural residents are withdrawn to cities for better-paid jobs. Farmers in developing countries are frequently facing financial constraints to productive investments. Non-farm activities in rural areas seem to offer a promising solution to these problems by creating local employment opportunities and generating new sources of income for investment (Démurger et al. 2010). Farm labor provided by active and energetic youth is considered as an essential component of agricultural productivity in rural areas, because agriculture is isolated areas of an open country with low population density solely depends on family labor. Rural farmers due to peasantry nature of the farm business and low income status, mostly depend on family labor, which is mostly provided by the youth (Zimmerer, 2004). Despite the importance of youth migration to the urban centers due to, most especially, lack of social infrastructure in the rural settings, and lack of rural job opportunities during the dry season of the year, and its repercussions resulted to low yield and high cost of farm labor (Ray, 2001).

2.8 Review of Selected Empirical Studies of Logistic Model in Migration Decision

The logistic regression model is employed to analyze the binary data that the Linear Multiple Regression model failed to analyze effectively within the range of rural-urban migration. Unlike Linear Multiple Regression model, the Logistic model forces the estimated probabilities to lie within the range of 0-1 (Bryan, 1994). Thorat et al (2007) stated that



logistic model was estimated by using SPSS software. The independent variables in the model are: age of household-head; education of respondent; family size; net cropped area; before migration non-farm income, before migration off-farm income, income from agriculture, proportion of area under fruit crop to field crop, proportion of area under food grain crops to net cropped area; and relative at destination of migration as a dummy variable.

Thorat et al (2007) observed that variable of age was positively associated with the migration of family member. The coefficient of family size variable indicated that there is positive association between migration of family members and size of family. It has also shown that for both migrant and non-migrant households, agriculture was the main source of income, and their consumption expenditure was more than the production expenditure. It has also been observed that migration has a positive impact on income, expenditure and net savings of migrant sample households. There is a negative relationship between migration of family members and income from agriculture. It was also found that as off-farm income of a household increases, the probability of migration of its family member decreases.

The age coefficient showed a negative sign and the coefficient for age squared was positive, meaning that the probability of being a migrant decreased with age for young adults, as was observed. In the mathematical simulations, especially due to the short run costs of migration, it was proposed that higher income groups might be relatively more capable of migrating in a long distance step. This fact was empirically analyzed by the schooling variable. Notice that all the coefficients were positive, especially for the interstate between non-neighbors migration, as expected, indicating the higher levels of schooling of these migrants when compared to rural non-migrants (Golgher, 2007).

Singh and Varghese (2001) examined that the factors influencing male out-migration were identified using logistic regression model. The factors identified were land/capita, number of members in the family, family income other than remittances, education and caste. It was observed that more the per capita holding with the family, less were the chances of people migrating from that family. The determinants analysis shows that number of members in the family and their education status had a positive impact on migration. Larger families had higher dependency ratio and hence the probability of migration was high as more members had to be taken care for. Income other than remittances had a negative impact on male out-migration in both the states. Male out -migration decreases with every increase in



income other than remittances with the family. Negative sign of the logistic estimate for caste shows that the chances of people from upper caste to migrate were less as compared to those belonging to lower caste.

A logit framework is used to estimate the probability of attaining a higher income relative to average farm income by engaging in various innovative activities. The logit method is preferred to other categorical variable estimation techniques (Maddala 1983), and is a better procedure than probit models (Amemiya 1983) for capturing the magnitude of the effects of independent variables on qualitative dependent variables. In the logit approach, the likelihood of an activity generating a higher income (i.e., higher than average income) is modeled as a function of a set of predetermined variables. Since the dependent variable is binary in nature, a qualitative choice model is used in the analysis (Govindasamy et al. 1998).

Sharma and Bhaduri (2006) postulate that a farmer, characterized by his age, skill level, education, landholding size, irrigation facilities and location of his farmland, seeks to maximize his welfare by making a choice regarding his present agricultural occupation. They used occupational choice model (logit model) to address the question why youth are planning to shift to other nonagricultural activities, and assess the odds of an average rural youth moving out of agriculture. The results showed that education has a positive effect on the farmer's propensity to shift out of agriculture. Younger farmers are more open to opportunities, can take the risks of moving out and experimenting with newer jobs and unfamiliar surroundings. Lower average size of land holdings is one of the most important factors explaining the farmer's higher propensity to migrate for other nonagricultural activities. Farmers are finding it untenable to farm lower holding size land, and the sale of land and migration to urban areas has become rampant (Ghosh, 2003).

Tuan et al. 2000 applied a generalized polytomous logit technique to analyze the patterns of rural labor employment and forecast rural migration. In this framework, they related rural labor migration with demographic characteristics, types of occupation, place of work, geographic characteristics, and various economic development indicators. Garson (2009) pointed out that if the independent variables are continuous and/or categorical and dependent variable is dichotomous, logistic regression can be applied in order to predict the significant of explanatory variables. In recent studies, Maharjan (2010) described that basic household variables such as demographic, human resource, household assets and



characteristics, migration network within the family and friends are the influencing factors of the migration decision. Gray (2009) also pointed out that total dependent numbers in the households, age and education status of household head and gender of productive family labor are key drivers for choice of migration.

Different studies have investigated the determinants or factors that most influence the decision to participate in nonfarm activities and the choice of activity, as well as the extent of rural household participation. For example, Mduma and Wobet (2005) found that education level, availability of land, and access to economic centers and credit were the most important factors in determining the number of households that participated in a particular rural local labor market and the share of labor income of total cash income. Bezu et al. (2010) also looked at the activity choice in rural nonfarm employment. They found education, gender, and land holding to be the most important determinants of activity choice.



CHAPTER 3

RESEARCH METHODOLOGY

3.1 Description of the Study Area

3.1.1 Dry zone area in Myanmar

In Myanmar, dry land area is located at its central region, which occupies 10% of the total area of Myanmar (54,390 sq. km) and contains 57 townships and thirteen districts spread across three Divisions namely Sagaing (Lower), Mandalay and Magway, and is home to sixteen million people (one-third of the total population of Myanmar). Dry zone area is defined by the annual rainfall amount, being less than 40 inches (101.6 cm), and known as the dry zone (L. D Stamp, 1964 cited in Saw MyintTun, 1989-90).

Based on the data from Food Security Assessment in the Dry Zone, Myanmar 2011, labor migration is a common livelihood strategy in the Dry Zone. More than every fifth household has a labor migrant (22%). However, uncertain rainfall, high degree of landlessness/near landlessness, low farm-gate prices and diminished margins, low technologies base resulting in lower productivity of crops, lack of off-farm opportunities act as push factors for people to migrate – seasonally, temporarily or permanently. Better wages in the agriculture sector, work opportunities in off farm sectors, potentials for improving livelihoods act as pull factors for villagers from the Dry Zone to migrate in destination locations, mostly to rural areas in Shan State and Southeast Myanmar and to the urban cities within the zone or outside (Yangon) (Amina Maharjan&TheingiMyint, 2015).

3.1.2 Location, area and population of Kyaukpadaung Township

The study focuses on two selected sample villages in Kyaukpadaung Township by purposively sampling for studying the impact of labor migration on rural household economy. Kyaukpadaung Township is situated between North Latitudes from 20° 32' to 21° 5' and East Longitude from 95° to 95° 32' 46" at 408 meter above sea level. Kyaukpadaung Township is bordered by Meiktila Township on the east, Chauk and NyaungOo Townships on the west, Natmauk and Yenanchaung Township on the south, and Taungthar and Mahlaing Township on the north. Figure 3.1 demonstrates location and map of Kyaukpadaung Township.



There are 339 villages composing 109 village tracts. The total population is 291434 - rural and urban populations are 251,463 and 39,971 respectively in 2014. In Kyaukpadaung, 95,826 hectares of the total land area are under cultivated land. Among them, 9,741 hectares, 85,915 hectares and 205 hectares are lowland, upland and alluvial soil respectively. In 2014, upland (yar) occupied about 48% (232,487 hectares) of the net sown area while low land (Le) was about 6%. Therefore, in the study area, yar (dry land) cropping was the major cropping system. About 30% of land use was classified as reserved and unreserved forest area. Wild land occupied 1% and other land (residential area, river and streams area, etc) was about 15% in the study area (Figure 3.2).

The average annual rainfall is 28.07 inches. The daily average maximum temperature is 40°C and average minimum is 12°C. High temperature fluctuation was occurred in the study area (Township General Administrative Office, 2014). There are two irrigation sources, namely Kyetmout and Pin Dams, mainly for monsoon and summer rice cultivation. The major economic sector is agriculture and trade (Department of Agriculture, 2014).

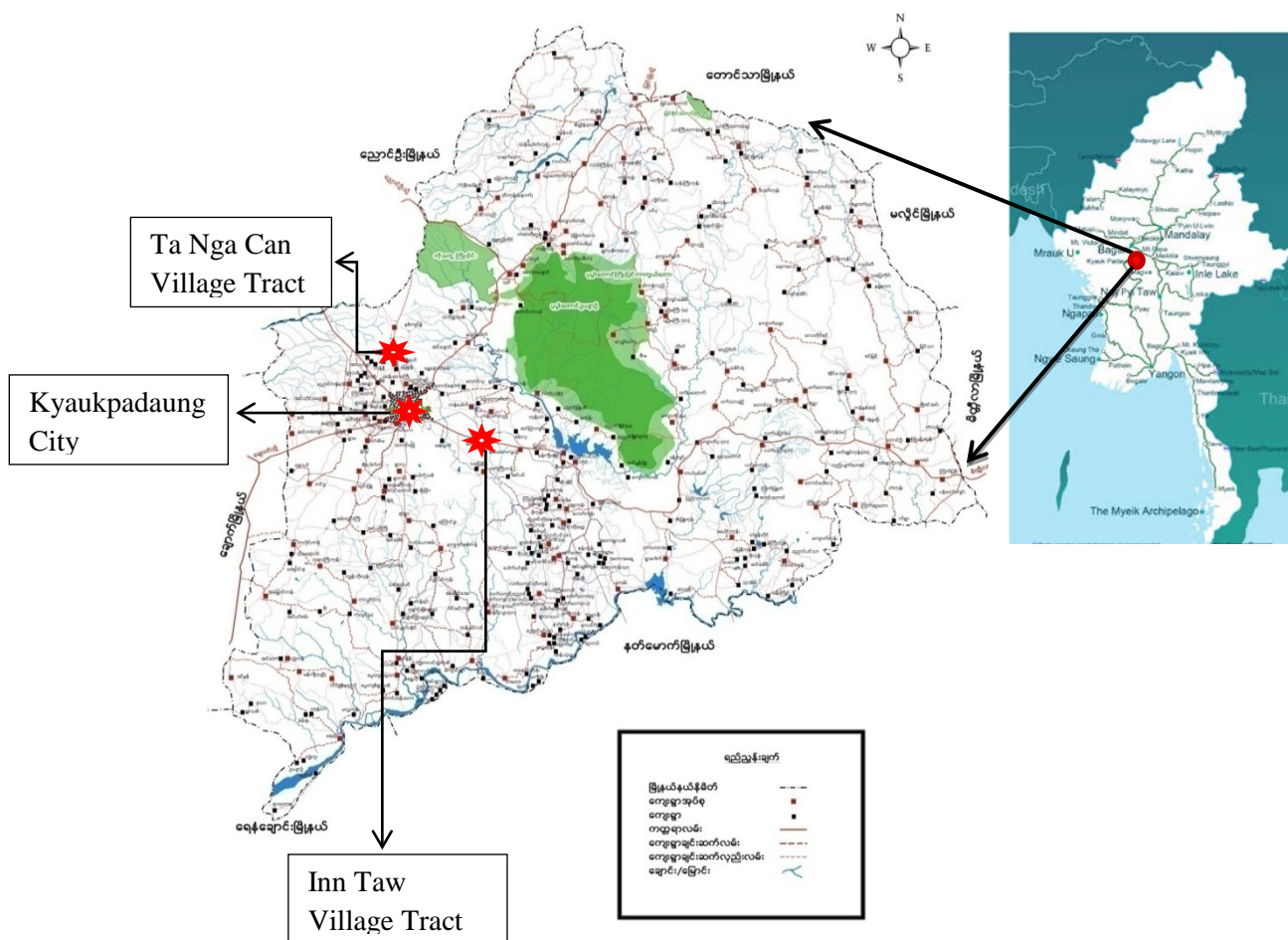


Figure 3.1 Locations and Map of Kyaukpadaung Township.

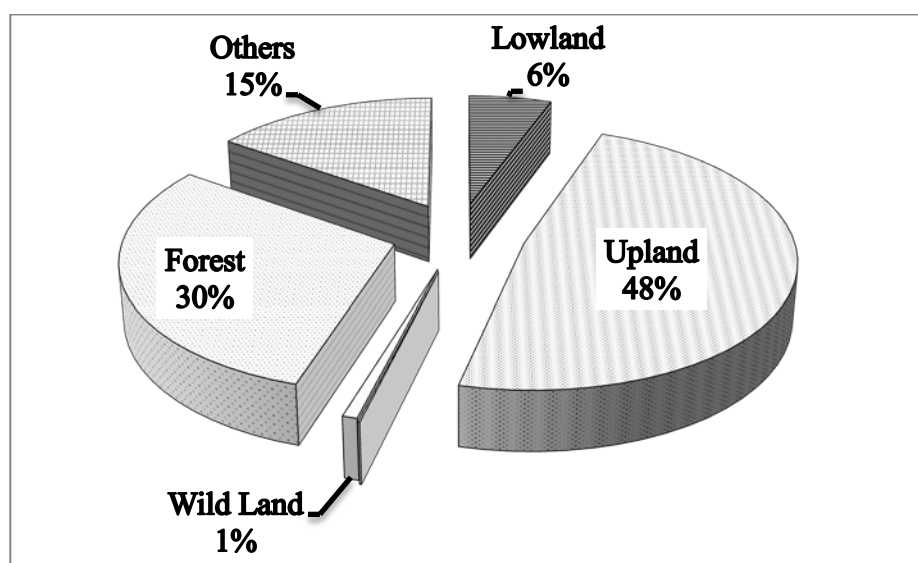


Figure 3.2 Type of Land in Kyaukpadaung Township

Source: Department of Agriculture (2014)

The selected village tracts in the study area are Inn Taw and Tangacan. Inn Taw village is situated 4 miles from Kyaukpadaung and the cultivatable land is about 299 hectares. There are 288 households and has 1280 population in Inn Taw village. Ywar Tan Shay is involved in Tangacan village tract and situated 3 miles from Kyaukpadaung and the cultivatable land is about 60 hectares. There are 226 households and has 1098 population in Ywar Tan Shay village (Department of Agriculture, 2014). The population and production of crops in the study villages were shown in Table 3.1 and 3.2.

Table 3.1 Household and Population of Study Area (2013-14)

Village Tract	Village Name	Population								Total	
		<12 Years		>12 Years		<18 Years		>18 Years		Population	
		M	F	M	F	M	F	M	F	M	F
Inn Taw	Inn Taw	111	101	472	596	211	201	372	496	583	697
Ta Nga Can	Ywar Tan Shay	100	144	368	486	200	190	268	440	468	630



Table 3.2 Production of Crops (2013-14)

Village Tract	Paddy			Sesame			Groundnut		
	Sown Acres	Av. Yield (bsk)	Production (bsk)	Sown Acres	Av. Yield (bsk)	Production (bsk)	Sown Acres	Av. Yield (bsk)	Production (bsk)
Inn Taw	11	44.82	493	284	3.95	1121	60	46.7	2981
Ta Nga Can	-	-	-	2679	3.55	9510	3	40.1	120

3.2 Data Collection Methods and Sampling Procedure

The study based on both primary and secondary data. Relevant secondary information was collected from Department of Agriculture (DoA) and Township General Administrative Office in Kyaukpadaung. Primary information was approximately collected from two villages – Inn Taw and Ywar Tan Shay from each village tract in Kyaukpadaung Township. Sample size was 59 migrant farm households and 58 non-migrant farm households by using the purposive sampling procedure through household survey, field observation, key informant interview, and focus group discussion (Figure 3.3). To estimate the relationship between out-migration and agricultural activities of farm households in the study area, field work was carried out for a household survey during the period of 18th October – 23th October 2014. The total sample population in the selected study villages was presented in Table 3.3.

Emphasis has given for both qualitative and quantitative types of information. The data were collected based on information such as type of migration, patterns of migration, receipt of migrant remittances, type of nonfarm employment activities and income sources (annual crops, livestock, wage employment, non-farm employment), individual characteristics of the household head, members and migrants - household compositions (age, gender, marital status, education and skill level, housing condition, asset-holding, occupation, household labor sources, category of work). Data of land use, cultivation and production of crops, production practices, cropping patterns and labor allocation were also collected. Furthermore, data on accessibility to farm subsidies, credit and social benefits were included. The data was collected on perception of farm households about farming as a major career alternative and their plans for future.

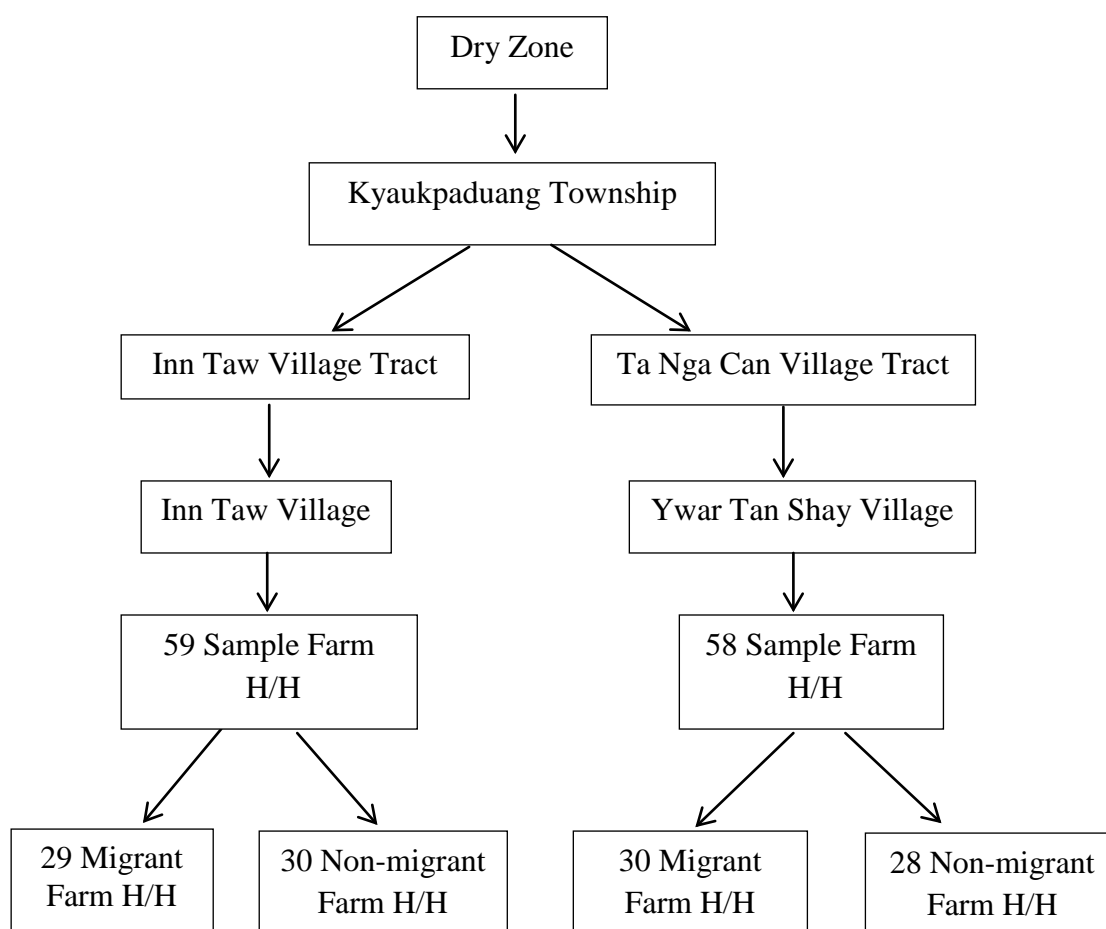


Figure 3.3 Sampling Procedure of the Study Area in Kyaukpadaung Township



Table 3.3 Sample size in the selected study villages

Village name	Total farm HHs	Sample households		Total
		Migrant farm HH	Non-migrant farm HH	
Inn Taw	288	29	30	59
Ywar Tan Shay	226	30	28	58
Total households	514	59	58	117
Total sample HH members		323	259	582
Total actively working members*		251	185	436
Total migrant no.		79		79

* = is not included dependents and unemployed members

3.3 Data Analysis

3.3.1 Descriptive analysis

The collected data (both qualitative and quantitative) was entered into the Microsoft Excel program. Descriptive statistics methods such as frequency, percentage, mean, standard deviation, was applied to show their socio-economic and socio-demographic characteristics, migrant's profile, types of occupation, income composition, reasons of out-migration, remittances utilization, contribution of remittances in crop production sector, constraints of agricultural crop production, crop production activities, agricultural labor utilization and labor management problems etc.

3.3.2 Cost and return analysis

The concept of enterprise budget (Olson 2009) was used to evaluate the profitability of sesame and pigeon pea production. In this analysis, variable costs were taken into account;

- (1) Material input cost,
- (2) Hired labor cost,
- (3) Family labor cost, and
- (4) Interest on cash cost.



The interest was normally charged on cash expense for early in the growing season. The counted interest rate was 0.4 % per month for six months (one growing season).

The first measurement was the difference between the total gross benefits or total returns and total variable cash costs, excluding opportunity costs. This value was referred to as “return above variable cash cost”.

The second measurement was the deduction of the opportunity cost and total variable cash costs from gross benefit. This return was referred to as “return above variable costs” or “gross margin”.

The “return per unit of capital invested” could be calculated by gross benefits per total variable costs. The “return per unit of cash cost” could be calculated by gross benefits per total cash costs.

These measurements could be expressed with equations as:

Measurement (1)

Return above variable cash cost = Total gross benefit – total variable cash cost

Measurement (2)

Return above variable cost = Total gross benefit – total variable cost
(Gross margin)

Measurement (3)

Return per unit of capital invested = $\frac{\text{Total gross benefit}}{\text{Total variable cost}}$

Measurement (4)

Return per unit cash cost = $\frac{\text{Total gross benefit}}{\text{Total cash cost}}$

3.4 Determinants Factors on Intercropping of Sesame and Pigeon Pea Profit

The following model was used to examine the determinant factors of sesame and pigeon pea profit of the selected farm households in Kyaukpadaung Township. To determine the factors affecting sesame and pigeon pea profit at farm level in the study area, linear regression function was used. The dependent variable was profit of sesame and pigeon pea by sampled farmers and independent variables were age, education level, sown area, non-farm income, household size, migration status, material cost, family labor cost, hired labor cost and average price. The regression function was as follow;



$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \beta_8 X_{8i} + \beta_9 X_{9i} + \beta_{10} X_{10i} + \mu_i$$

Where;

Y_i = sesame and pigeon pea profit (MMK/ac)

X_1 = age (yr)

X_2 = education level

X_3 = sown area (ac)

X_4 = non-farm income (MMK/yr)

X_5 = household size (no.)

X_6 = migration status (1=migrant FHH, 0=non-migrant FHH)

X_7 = material cost (MMK/ac)

X_8 = family labor cost (MMK/ac)

X_9 = hired labor cost (MMK/ac)

X_{10} = average price (MMK/bsk)

μ_i = Disturbance term or error term

$\beta_0, \dots, \beta_{10}$ = Estimated coefficients, $i = 1, 2, 3, \dots$ etc.

3.5 Determination of Factors Contributing to Households' Out-Migration Status

In this study, the empirical analysis of the determinants or influencing factors on households' out migration status in the area of Kyaukpadaung Township was carried out by using logit regression model. The list of some selected variables for logit regression model which give a description of the variables, and the expected signs for each of the estimated coefficients. The empirical model is followed by a description of the 10 factors - number of persons with high school level and above, number of persons with two jobs, number of non-farm labor, agricultural land holding size (acres), number of livestock, number of income sources, number of credit sources, number of active males (age 15-45), number of active females (age 15-45), number of young dependent (<age 15) and number of other dependents in HH. In a logit model, the endogenous variable is a dummy or categorical variable with 1 representing migrant farm household and 0 representing non-migrant farm household. Expressing differently and expanding the logit equation, we can state:



$$\mathbf{M} = \mathbf{b}(\mathbf{Z})$$

$$\mathbf{Z} = \mathbf{f}(\mathbf{X}_1, \mathbf{X}_2, \mathbf{X}_3, \dots, \mathbf{X}_k)$$

Where:

\mathbf{M} = Migration status of the household (migrant farm household = 1 and non-migrant farm household = 0)

\mathbf{Z} = vector of explanatory variables

\mathbf{X}_1 = Persons with high school level & above (no.)

\mathbf{X}_2 = Persons with secondary occupation (no.)

\mathbf{X}_3 = Non-farm labor (no.)

\mathbf{X}_4 = Agricultural land holding size (ac)

\mathbf{X}_5 = Livestock (no.)

\mathbf{X}_6 = Income sources (no.)

\mathbf{X}_7 = Credit sources (no.)

\mathbf{X}_8 = Active males no. (age 15-45)

\mathbf{X}_9 = Active females no. (age 15-45)

\mathbf{X}_{10} = Young dependents no. (< age 15)

\mathbf{X}_{11} = Other dependents (no.)

$\mathbf{X}_1, \mathbf{X}_2, \mathbf{X}_3, \dots, \mathbf{X}_k$ = Explanatory variables

k = total number of explanatory variables



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CHAPTER 4

RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Sample Farm Households in Kyaukpadaung

4.1.1 Demographic characteristics of sample farm households in the Inn Taw and Ywar Tan Shay villages?

a. Household heads

The demographic characteristics of sample farm households in the study area are described in Table 4.1. The results of t-tests showed that male and female headed households were not significantly different between migrant and non-migrant household heads. It was found that 80% of migrant farm household heads and 86% of non-migrant farm household heads were male while 20% of migrant farm household heads and 14% of non-migrant farm household heads were female. Therefore, male headed households were traditionally dominant in the study area. The average age of sample household heads was around 57 years in migrant farm households and 52 years in non-migrant farm households. According to the t-test results, these average ages of H/H heads were significantly different at 5% level.

In the study area, the education levels of migrants' household heads were found in monastery (31%), primary (20%) and secondary (19%) respectively. And also, the education levels of non-migrant farm households' heads were found in monastery (19%), primary (24%) and secondary (24%) respectively. There were no differences between educational levels of migrant and non-migrant farm households' heads in the study area.



Table 4.1 Demographic characteristics of migrant and non-migrant household heads

Item	Migrant farm HHH (N = 59)	Non-migrant farm HHH (N = 58)	Total HHH (N = 117)
Female headed HH	12 (20.3%)	8 (13.8%)	20 (17.1%)
Male headed HH	47 (79.7%)	50 (86.2%)	97 (82.9%)
Total	59 (100%)	58 (100%)	117 (100%)
t-test	t=0.936, sig= 0.315 ^{ns} , df= 115		
Average age (Year)	57	52	
t-test	t=2.585, sig= 0.011**, df= 115		
Educational level			
Illiterate	5 (8.5%)	3 (5.2%)	8 (6.8%)
Monastery	18 (30.5%)	11 (19.0%)	29 (24.8%)
Primary	12 (20.3%)	14 (24.1%)	26 (22.2%)
Secondary	11(18.6%)	14 (24.1%)	25(21.4%)
High school	10 (16.9%)	15 (25.9%)	25 (21.4%)
Graduated level	3 (5.1%)	1(1.7%)	4 (3.4%)
t-test	t=-1.274, sig=0.205 ^{ns} , df= 115		

Note: ** Significant at 5% probability and ns = non-significant

b. Household members

The demographic characteristics of sample farm household members in the study area are shown in Table 4.2. The total number of household members was 264 in migrant farm households and 201 in non-migrant farm households. The population of female in migrant farm households (55%) and non-migrant farm households (66%) were higher than male population in migrant farm households (45%) and non-migrant farm households (34%). The results of t-tests showed that the gender status were highly significantly different between migrant and non-migrant household members at 1% level. Between ages of 15-45, it was observed that middle-aged members in migrant farm households were higher than non-migrant farm households (172 > 113 members).



According to the education levels, primary (25%), secondary (22%), high school (22%) and graduate (16%) were found in migrant farm households whereas primary (40%), secondary (18%), high school (16%) and graduate (4%) were found in non-migrant farm households. The educational level was significant at 5% level between migrant and non-migrant farm households' members. Therefore, it was observed that the educational level of migrant farm households' members were higher than non-migrant farm households' members in the study area.

Table 4.2 Demographic characteristics of migrant and non-migrant household members

Item	Migrant farm HHM (N = 264)	Non-migrant farm HHM (N = 201)	Total HHM (N = 465)
Female	145 (54.92%)	132 (65.67%)	277 (59.69%)
Male	119 (45.08%)	69 (34.33%)	188 (40.30%)
Total	264 (100%)	201 (100%)	465 (100%)
t-test	t=3.802, sig= 0.000***, df= 115		
Age (Year)			
>15	42 (15.91%)	50 (24.88%)	
15-24	68 (25.76%)	46 (22.89%)	
25-45	104 (39.39%)	67 (33.33%)	
46-55	18 (6.82%)	12 (5.97%)	
55+	32 (12.12%)	26 (12.94%)	
Educational level			
Illiterate	18 (6.8%)	23 (11.4%)	41 (8.8%)
Monastery	23 (8.4%)	21 (10.4%)	44 (9.3%)
Primary	65 (24.7%)	81 (40.3%)	146 (31.5%)
Secondary	58 (22.1%)	37 (18.4%)	95 (20.5%)
High school	57 (21.7%)	32 (15.9%)	89 (19.2%)
Graduated level	43 (16.3%)	7 (3.5%)	50 (10.8%)
t-test	T= 0.484, sig= 0.000**, df= 115		

Note: *** and ** significant at 1% and 5% probability levels respectively and ns = non-significant



4.1.2 Family size and dependency ratio of sample farm households in the study area

The family size and dependency ratio were compared between migrant and non-migrant farm households (Table 4.3). The average family size of migrant farm households was 6 ranging from 2 to 10 and the average family size of non-migrant farm households was 5 ranging from 2 to 7. According to the t-test results, the average family size was highly significantly different at 1% level among migrant and non-migrant farm households. In Myanmar traditional custom, dependent members who are lower than 14 years and above 65 years are considered as school-age-children and elder people respectively. When analyzing household members by age category, there were 42 and 50 household members under 15 years in migrant and non-migrant farm households. The working-aged household members have to take care for both dependent groups although they are partially concerned in household livelihood activities. The average dependency ratios of migrant and non-migrant farm households were 21% and 29% respectively. Therefore, number of dependents in non-migrant farm households was higher than migrant farm households.

Table 4.3 Family size and dependency ratio of migrant and non-migrant farm households

Items	Migrant farm HH (N = 59)	Non-migrant farm HH (N = 58)	Total
Family size			
Mean	6	5	5
Minimum	2	2	2
Maximum	10	7	10
t-test	t=3.80, sig= 0.000***, df= 115		
Dependency ratio			
0-19%	27 (45.8%)	19 (32.8%)	46 (39.3%)
20-39%	17 (28.8%)	18 (31.0%)	35 (29.9%)
40-59%	11 (18.6%)	12 (20.7%)	23 (19.7%)
60% & above	4 (6.8%)	9 (15.5%)	13 (11.1%)
Average ratio	21.1%	28.7%	24.9%
t-test	t= -1.943, sig= 0.055**, df= 115		

Note: *** and ** significant at 1% and 5% probability levels respectively



4.1.4 Primary occupations of farm household heads and members

Primary occupations of migrant and non-migrant farm household heads are illustrated in Figure 4.1. In the study area, 83% of the migrant and 87% of non-migrant farm household heads worked in farming activities as their major occupation. According to the primary occupations of farm household members (Figure 4.2), non-migrant farm household members (39%) were more involved in agriculture than migrant farm household members (33%). However, the percentage of migrant farm household members working in industrial and construction sites was higher than those of non-migrant farm household members as it was found that 21% and 10% respectively. Dependent and unemployed household members (39%) in non-migrant households were higher than those of migrant household members (27%). There were different types of job taken by a few of non-migrant and migrant household members such as government services, company, motor cycle carrier, handicraft/cottage and casual labor.

Regarding with the type of occupation undertaken by actively working members of migrant and non-migrant farm households, 70% of non-migrant farm household members in agricultural sector were higher than migrant farm household members (54%). Accordingly, 46% of migrant farm household members working in other sectors were higher than non-migrant farm household members (30%). Therefore, migrant farm household members seemed to be preferred to work in other sectors than agricultural sector (Table 4.4).

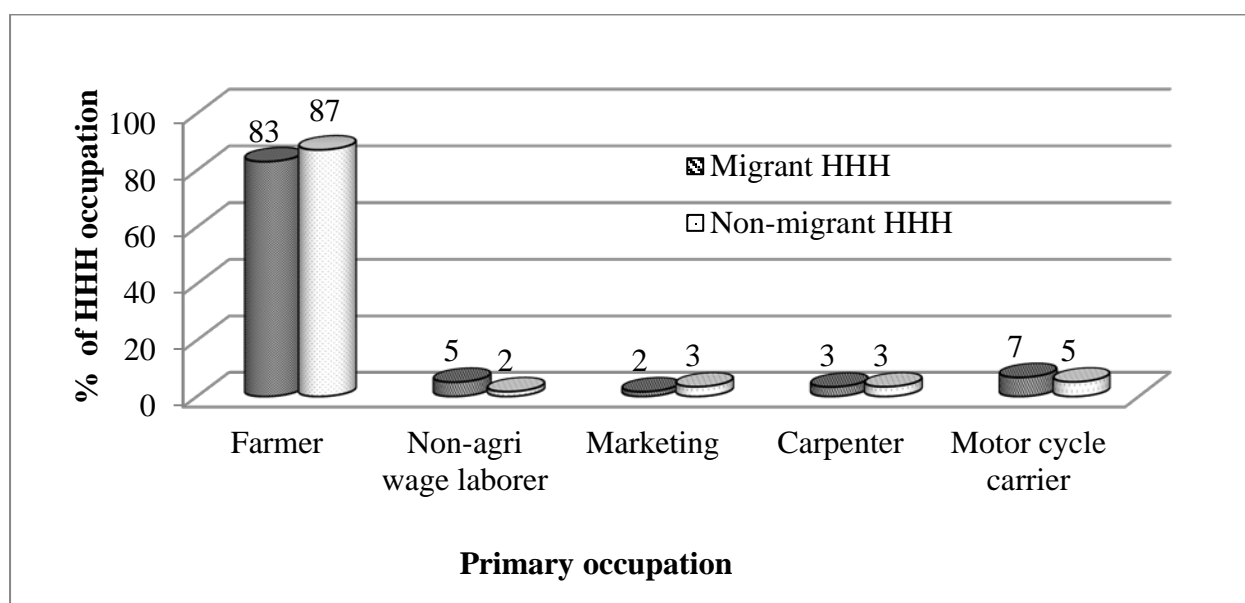


Figure 4.1 Primary occupations of farm household heads

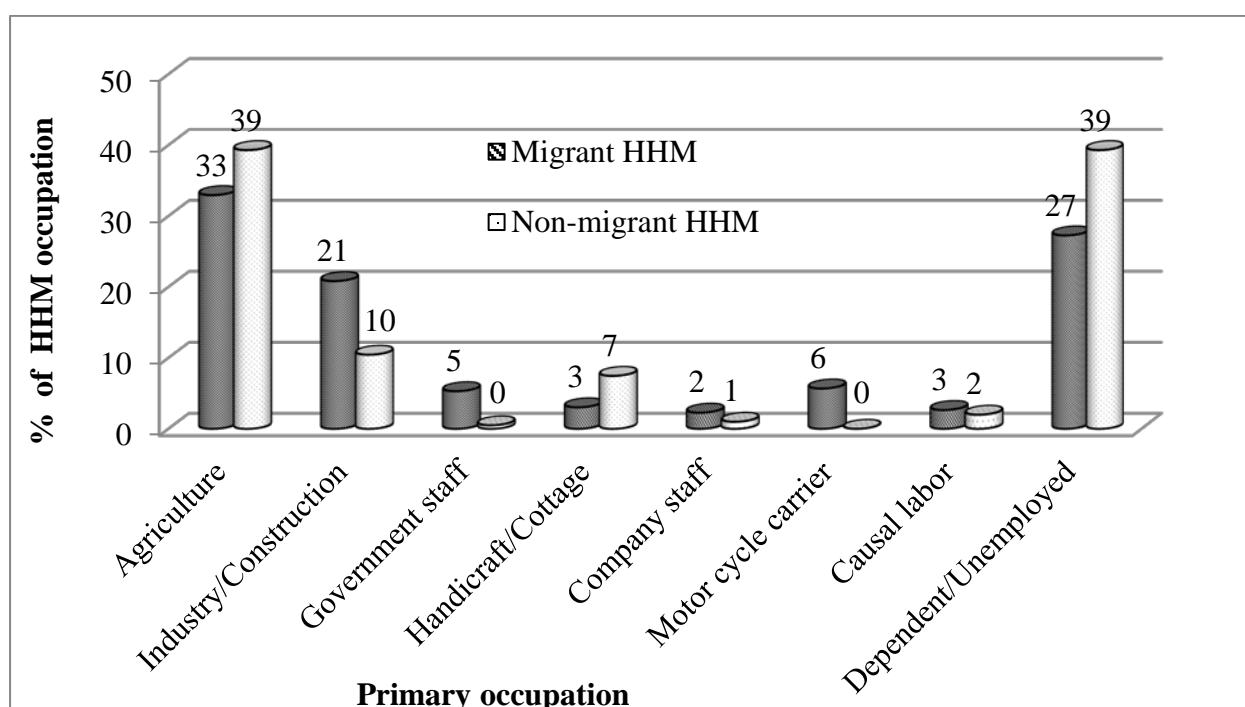


Figure 4.2 Primary occupations of farm household members



Table 4.4 Occupation of actively working members* of migrant and non-migrant farm households

Occupation	Migrant farm HH (N = 251)	Non-migrant farm HH (N = 185)	Total
Agricultural sector	136 (54.2%)	129 (69.7%)	265 (60.8%)
Other sectors	115 (45.8%)	56 (30.3%)	171 (39.2%)
Total	251 (100%)	185 (100%)	436 (100%)

Note: * = is not included dependents and unemployed members

4.2 Profile of Migrants and Migration Patterns

4.2.1 Socio-economic characteristics of migrants in the sample migrant farm households

When analyzed rate of migration (which measures the proportion of migrants as a percentage of the entire sampled population), the total number of migrants were 79 out of 323 populations in the 59 sample migrant farm households. Therefore migration rate was 25% in the study area. Among them, 90% were male and 10% were female. The average age of migrants was 24 years old and ranging from 12 to 52 years. The average age when they started migration was 22 years. The oldest age at the initial migration was 36 years and the youngest was 11 years. In this case, most of these migrants were young people and only a few migrants were older household heads. The average education year of migrants was 10 years. The maximum education year was 14 years and the minimum was 5 years. In the study area, the minimum migrated duration was 6 months and maximum was 30 years with an average of 4 years (Table 4.5).

Regarding the relationship of migrants in their households, most of the migrants (77%) were son, daughter (10%), son-in-law (9%), household head (3%) and relatives (1%). According to the gender issue, most of the migrants were male in the study area (Table 4.6).



Table 4.5 Socio-economic characteristics of migrants in the sample farm households

Item	Male (N=71)	Female (N=8)	Total (N=79)
Gender (No.)	71 (89.9%)	8 (10.1%)	79 (100%)
Age (Years)	Mean	Minimum	Maximum
	24	12	52
Age of migrants when migrated (Years)	22	11	36
Education (Years)	10	5	14
Years of migration	4.3	0.5	30
Migration rate	25% (1/4 of 323 total population in migrant FHHs)		

Table 4.6 Relationship of migrants with household heads

Relationship of migrants	Migrants (N=79)	
	No.	Percent
Son	61	77.2
Daughter	8	10.1
Son-in-law	7	8.9
Household head	2	2.5
Relative	1	1.3
Total	79	100

4.2.2 Ratio of migrants and migrant farm household members

Regarding with the ratio of household size and migrant number, the average ratio was 26% which means there was one migrant when the family size was four. It was found that 30 migrant farm households had the highest ratio ranging from 20% to 39%. There were 18 farm households which had the lowest ratio ranging from 0% to 19%. The average ratio 26% was mostly found in this study area (Figure 3).

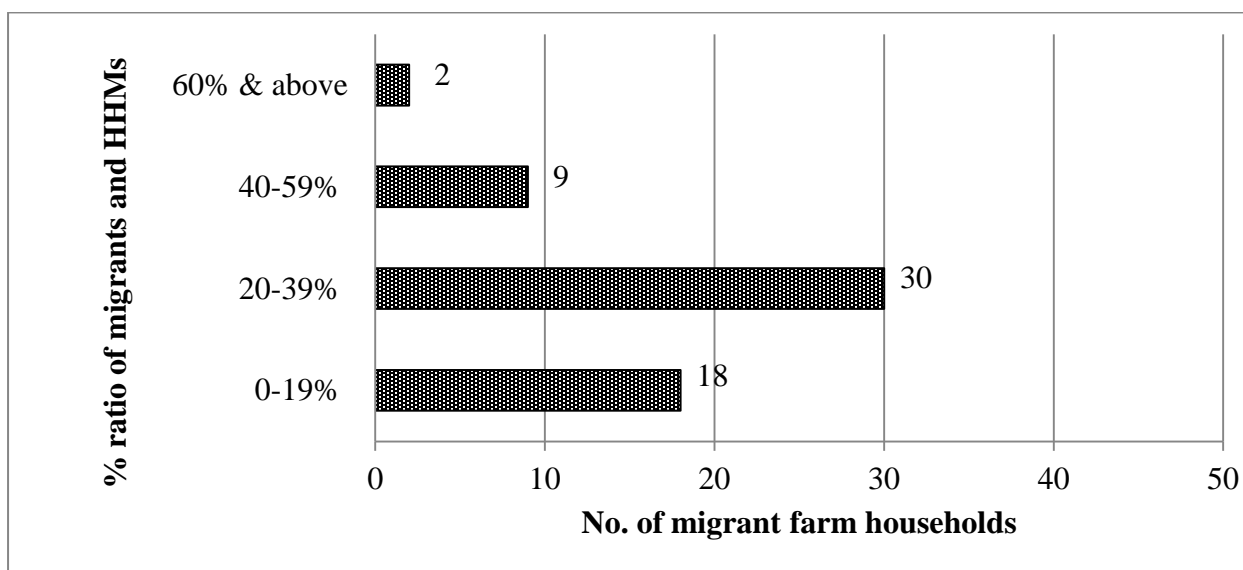


Figure 4.3 Ratio of migrants and migrant farm household members

4.2.3 Types of occupation of migrants (before and after migration)

Table 4.7 showed the types of occupation of migrants before and after migration. In case of occupation of migrants before migration, the highest percentage (23%) worked in farm activities as family labor whereas 22% of migrants worked in the car workshop. Another 22% of migrants were still attending school before migration. Regarding with agricultural work, farmers agricultural wage labor and livestock raising were found as 8%, 5% and 1% respectively. After migration, 37% of migrants worked as industrial workers. Furthermore, some migrants worked as bus drivers and assistant (19%), causal labor (19%) and government employees (11%).

It was observed that most of the migrants worked in their farming as a family labor before migration. Then, they migrated to work in the non-agricultural sectors and they worked as industrial workers, bus driver and bus conductor etc. and they didn't involve in the agricultural sector at the present condition. To be clear, the occupation of sample migrants regarding with the agricultural sector, 37% of migrants worked in the agricultural sector and 63% of migrants worked in other sectors before migration. After migration, the migrants didn't work back in the agricultural sector any more. All migrants were working in the non-agricultural sectors at the present condition.



Table 4.7 Types of occupation of migrants (before and after migration)

No.	Types of occupation	Before (%)	Types of occupation	Current (%)
		N=79		N=79
1	Family labor	22.8	Worker in industry	36.7
2	Student	21.5	Causal labor	19.0
3	Car workshop	21.5	Bus driver & conductor	18.9
4	Farmer	7.6	Government staff	11.4
5	Agricultural wage labor	5.1	Private company staff	6.3
6	Worker in industry	3.8	Student	3.8
7	Private company staff	2.5	Grocery	2.5
8	Dependent/ Unemployed	5.1	Dependent/ Unemployed	1.3
9	Government staff	2.5	Total	100
10	Livestock raising	1.3		
11	Bus driver & conductor	1.3		
12	Causal labor	5.1		
	Total	100		

4.2.4 Pull and push factors of out-migration

Based on the reasons of out-migration, it was divided into push and pull factors. The main push factor for migration was insufficient farm income (11%) probably due to crop damaged (3%) by irregular rainfall and weed problem, and consequently they got low wages (8%) from agriculture. Some migrants reported that they were surplus labors (7%) in their households because of small farm land holding (4%) and few job opportunities (4%) in their village. Therefore, they were unemployed and looked for job opportunities near urban area, Kyaukpadaung or migrating to other places and neighboring countries to work as causal labors. Another factors influencing decision for out-migration were family food insecurity (4%) and family social problem (4%). Some rural households were in debt to pay back loan borrowed from money lenders to invest in agricultural production (7%).



Nowadays, the areas of rural and urban are becoming more combined because people move from village to city and vice versa. By doing short-term work or in construction work during their off-season, rural households got better income. Thus, agricultural laborers also changed their jobs into other sectors because they got higher income and job opportunities in urban area and overseas. For these reasons, it was observed that the main pull factors for the migrant location were high salary income and better job opportunities (31%) in the new destination places and for education purpose (6%) (Table 4.8 and 4.9).

Table 4.8 Reasons of out-migration in the study area

Reasons	Percent (N=79)
To seek better job/ salary	31
Insufficient farm income	11
To be better living standard	9
Low wages from agriculture	8
Surplus labors in HH	7
For education purpose	6
To invest for agriculture	6
Inadequate farm land	4
Few job opportunities in village	4
Family food insecurity	4
Family social problem	4
Crop damaged due to climate	3
To build a house	2
Repayment for debt	1
Total	100



Table 4.9 Pull and push factors of migration

Push factors	Pull factors
Insufficient farm income	Better job in urban
Low wages	Higher wage rate and income
Surplus labors in HH	
For education purpose	
Inadequate farm land	
Few job opportunities	
Family food insecurity	
Family social problem	
Crop damaged due to climate	
Deep in debt	

4.2.5 Time interval of returning home by migrants

The returned time interval of migrants was found as annual basic (18%) and most of them involved in agriculture while they were in village. Some migrants (41%) involved in out-migration as seasonal basis (3 or 6 months interval) and these migrants returned to their home depending on labor needs of the family farm during the peak season. About 28% of migrants were in permanent migration and have not returned home till the time of field survey. Other 9% of migrants responded that the return time interval was irregular (longer than one year) and few of them were engaged in agriculture when they returned home. Very few percentages reported monthly return intervals (Figure 4.4).

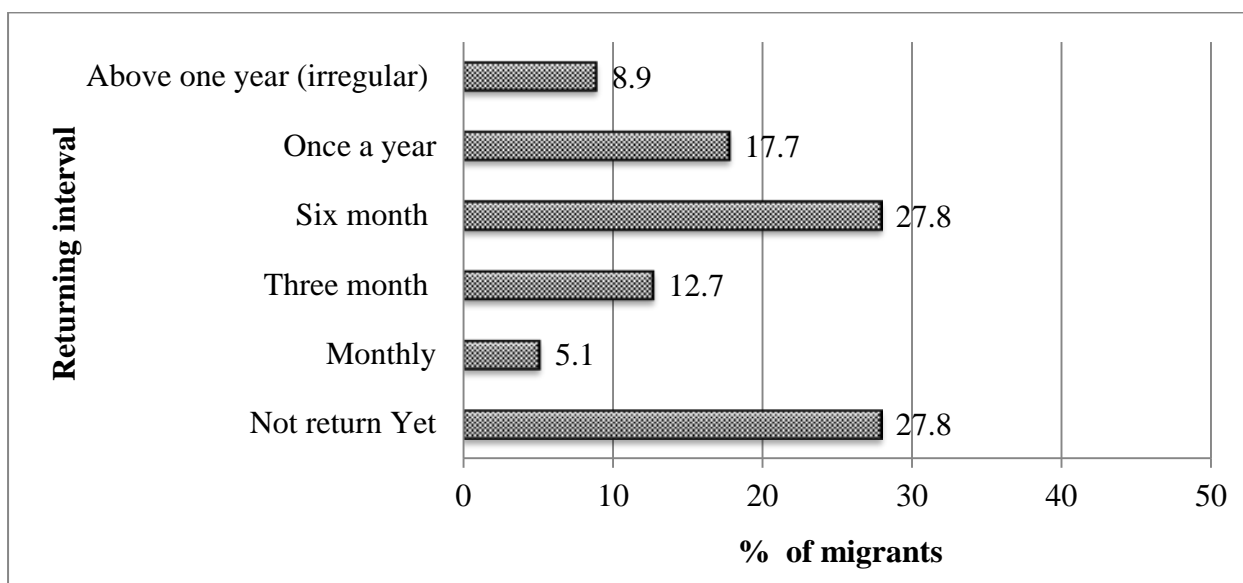


Figure 4.4 Returning home intervals by migrants

4.2.6 Types of migration and pattern in the migrant farm households

In the study area, two types of migration were examined- rural to urban or internal migration (66%) and abroad or international migration (34%). The destination places for internal migration were Yangon, Magway, Lashio and Muse townships. As international migration, most of migrants went to Malaysia and Thailand.

According to the return time interval and their migration period, there were 3 patterns of migration were found in this study. They are - (1) permanent migration, (2) temporary migration, and (3) seasonal migration.

- (1) Permanent migration – Migration is considered to be permanent when migrants/households have left their native place for good and settled in the destination place indefinitely (with or without registering to the authorities). These migrant/households do not intend to return to their original place of residence.
- (2) Temporary migration – Migration is considered to be temporary, when an individual or household (fully or partly) settles in the destination location throughout the year, but still has the intention to return to the original place of residence.
- (3) Seasonal migration – Migration is considered to be seasonal, when he/she takes place only in a certain time of the year or when the migrant returns to his/her place of origin at least once a year.



In this study, it was observed that 18% of migration was permanent, 54% was temporary and 28% seasonal (Table 4.10). Most of the migrant farm households reported that their family members involved in out-migration was temporary in nature.

Table 4.10 Types of migration and pattern in the migrant farm households

Item	Migrant (N=79)
Types of migration	
- Rural to urban (internal migration)	52 (66%)
- Abroad (international migration)	27 (34%)
Pattern	
(1) Permanent	14 (18%)
(2) Temporary	43 (54%)
(3) Seasonal	22 (28%)

Note: (1) permanent migration = left their native place for good,
 (2) temporary migration = return to the original place of residence sometimes
 (3) seasonal migration = take place only in a certain time of the year

4.2.7 Sources of migration information for migrant farm households

Among 79 migrants in the study area, 40% of the internal migrants got the information on migration from friends. About one fourth (27%) of internal migrants worked other places by their own decision. Only 5% of internal migrants got information through their family members working in new destination place. For international migration, 42% of migrants decided to go abroad through job hunting agents and companies. Some migrants (12%) decided to migrate abroad and looked for a job through returned migrants and current migrated people abroad (Figure 4.5).

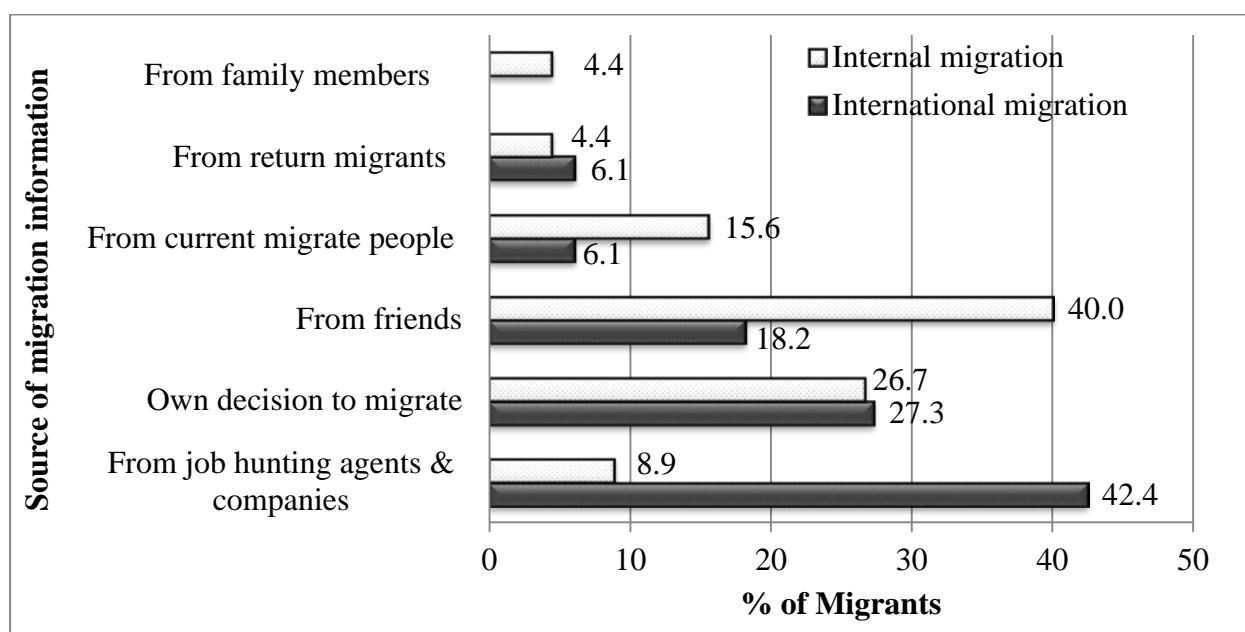


Figure 4.5 Sources of migration information for migrant farm households

4.2.8 Financial sources for initial migration cost of migrants

In case of initial migration cost which included travel cost and fee for agent, 33% of migrant workers had to pay the costs of migrating with their parents' money or own saving. Most migrants (37%) reported that initial migration cost was covered by borrowing money from friends, relatives and others. Some migrants (8%) sold their properties in which 4% of migrants sold land for migration cost in this study area. However, 23% of migrant workers had no specific migration costs because their migrated area was within local area (Figure 4.6).

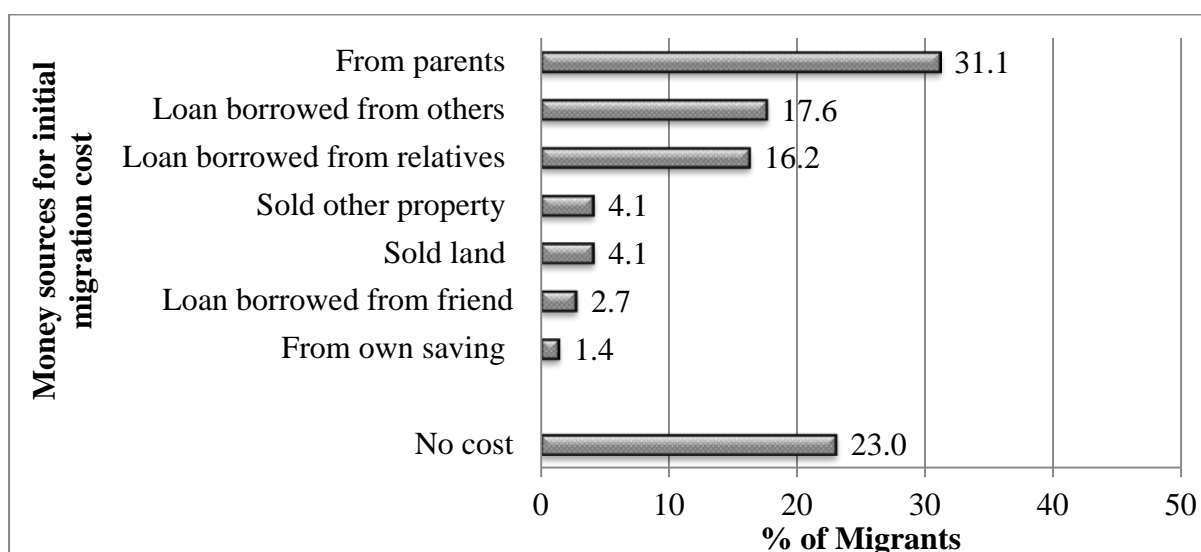


Figure 4.6 Money sources for initial migration cost of migrants

4.3 Comparison of Income Compositions between Migrant and Non-migrant Farm Households

4.3.1 Income sources of migrant and non-migrant farm households

Income sources of migrant and non-migrant farm households are described in Table 4.11. According to the average annual crop income, migrant farm households got 811,610 MMK/year while non-migrant farm households earned 727,138 MMK/year. Migrant farm households got higher crop income than non-migrant farm households in the study area but there was no significantly difference in crop income between migrant and non-migrant farm households by t-test. Average annual remittance income received by migrant farm households was observed as 1,345,424 MMK and it was significant income source for them. Accordingly, the total annual household income of migrant farm households (3,107,424 MMK) was higher than 2,252,717 MMK of non-migrant farm households. By using t-test, total annual household income of migrant farm households was significantly higher than that of non-migrant farm households at 5% level.



Table 4.11 Income sources of migrant and non-migrant farm households

Sources of income	Migrant farm HH (N = 59) MMK /Year	Non-migrant farm HH (N = 58) MMK /Year
Crop	811,610	727,138
t-test	t=0.806, sig=0.422 ^{ns} , df= 115	
Animal husbandry	90,339	123,586
t-test	t= -0.691, sig=0.491 ^{ns} , df= 115	
Remittance	1,345,424	0
t-test	t=8.971, sig=0.000***, df= 115	
Off-farm income	346,034	704,683
t-test	t= -2.247, sig=0.027**, df= 115	
Non-farm activities	514,017	697,310
t-test	t= -0.880, sig=0.380 ^{ns} , df= 115	
Total annual income	3,107,424	2,252,717
t-test	t= 2.692, sig=0.008**, df= 115	

Note: ***, and ** significant at 1%, and 5% probability levels respectively, ns = non-significant

4.3.2 Percentage share of total crop income of sample farm households

The income compositions in migrant and non-migrant farm households were described in Figure 4.7. In the study area, it was observed that migrant farm households earned their family income mainly from two main sources, i.e., remittance and farm income while non-migrant farm households earned family income mainly from three sources, i.e., farm income, off-farm and non-farm income. In both migrant and non-migrant farm households, farm income obtained from sale of crops such as sesame, pigeon pea, groundnut, green gram and cowpea. Some farm households earned the household income from non-farm activities which are working in industry and construction sites, working in government and private services, handicraft and cottage.



According to the observed income composition of migrant farm households, annual income from remittance was the largest amount and it took 43% of the total incomes. Annual income from crop production was 26% of the total income. Other sources of income were 17% from non-farm activities, 11% from off-farm activities and 3% from livestock rearing. Therefore, the migrants' income was the highest in the total households' income. In income composition of non-migrant farm households, it was found that annual income from crop production (32%), off-farm income (31%) and non-farm income (31%) were the highest in the total households' income.

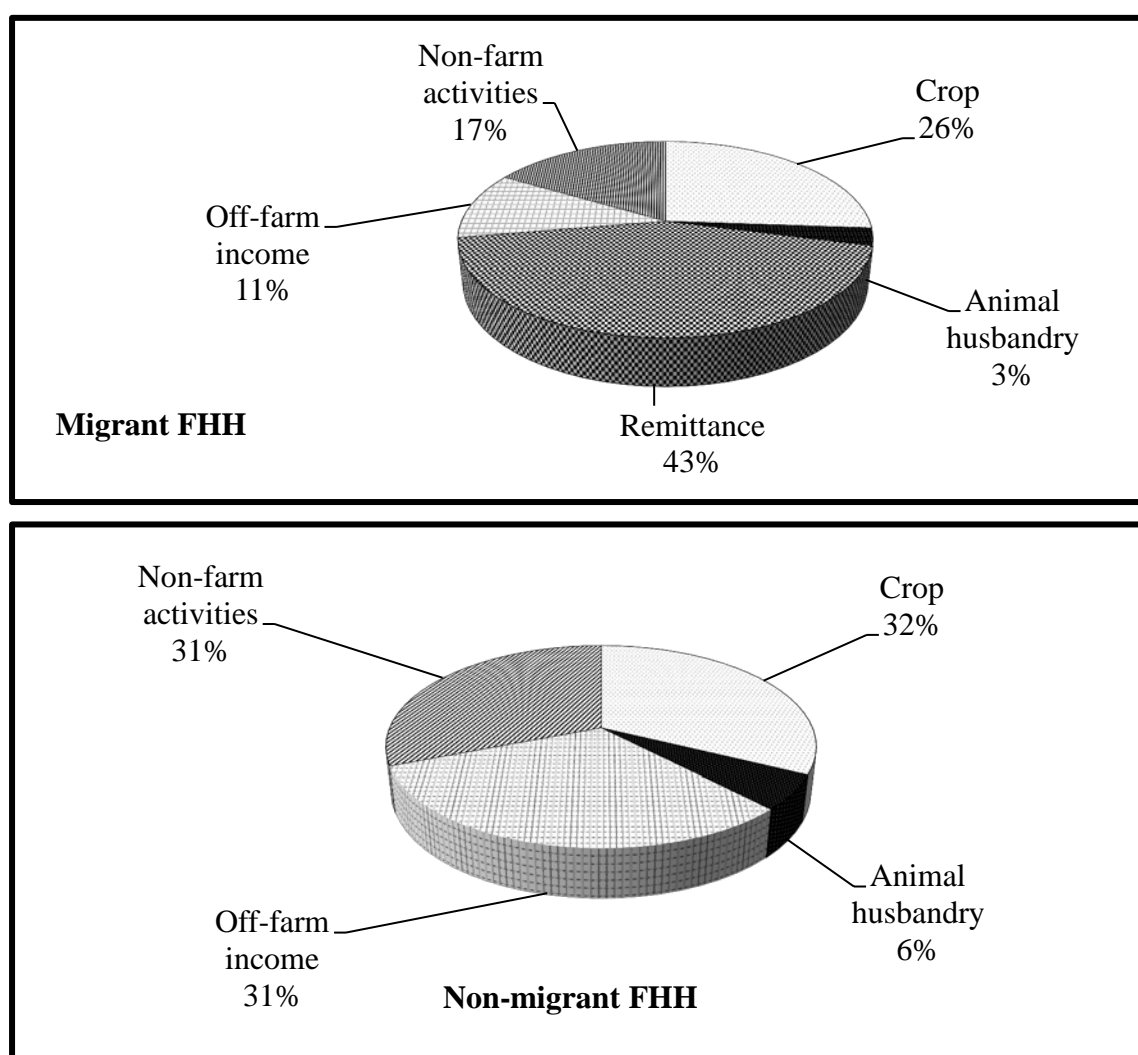


Figure 4.7 Income compositions of migrant and non-migrant households



4.3.3 Remittance received by sample migrant farm households

Among 59 sample migrant farm households, about 90% have received remittances from migrant family members whereas 10% haven't received remittances (Figure 4.8). The remittance received by migrant farm households was varied with different time interval in this study area. Among them, 46% of migrants sent back money monthly to their family. Various remittance receiving intervals were once a year (22%), once per 2 months (12%) and 6 months interval (10%) respectively (Figure 4.9).

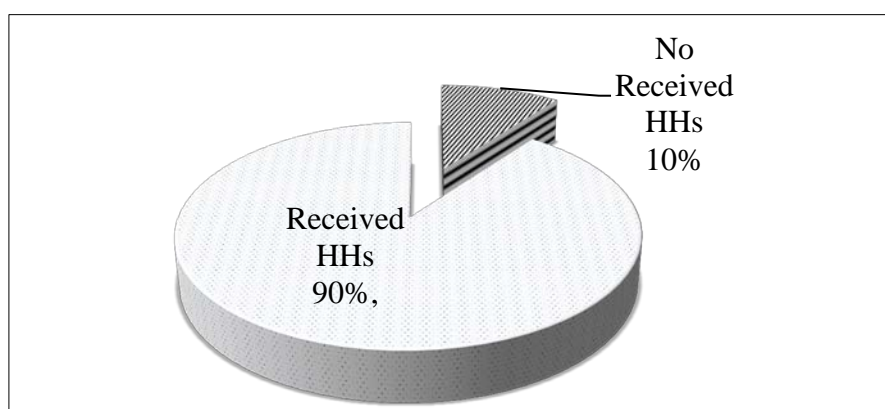


Figure 4.8 Remittance receiving status of migrant farm households in the study area

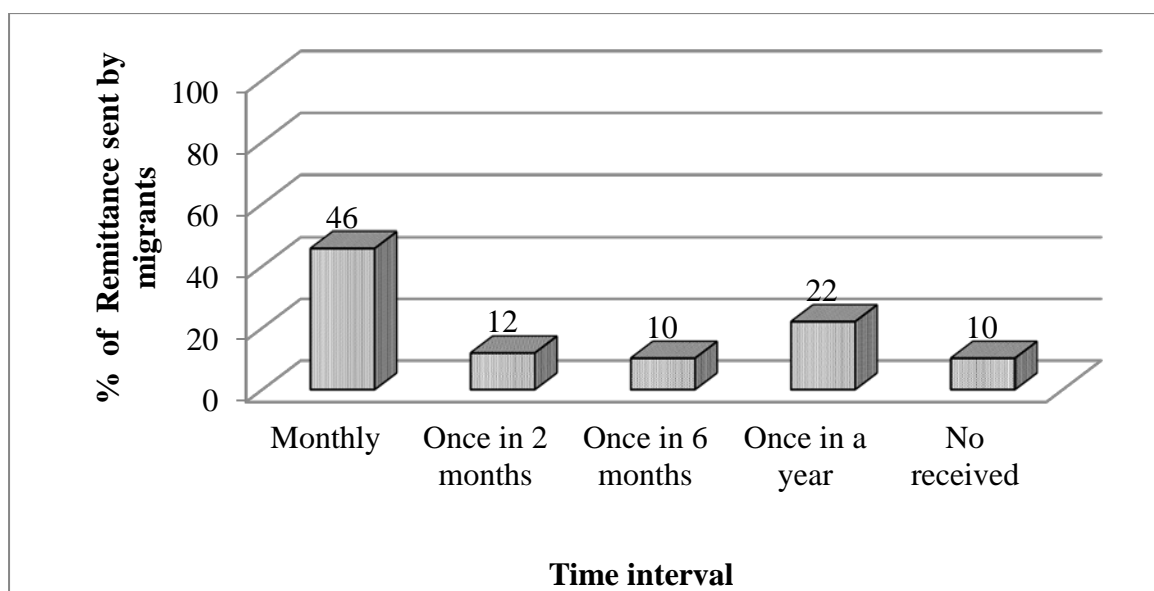


Figure 4.9 Time interval of sending remittance by migrants



4.3.4 Remittance utilized by sample migrant farm households

The utilization of remittance by the receiving households was analyzed in order to identify the allocation of remittance money in their households' needs. About one third of the migrant farm households (33%) utilized remittance money to invest in crop and livestock production for inputs (11%), for new farmland (7%) and for hired labor wage (13%). And then, 32% of migrant farm households allocated remittance money for basic needs (food, clothing and shelter) of household subsistence. Another 14% of migrant farm households spent for social affairs, 7% for debt repayments, 6% for education and 5% for health care. A few percent of migrant farm households (3%) allocated remittance as saving (Figure 4.9). Therefore, it was found that migrant farm households mainly allocated remittance money for agricultural inputs and basic needs.

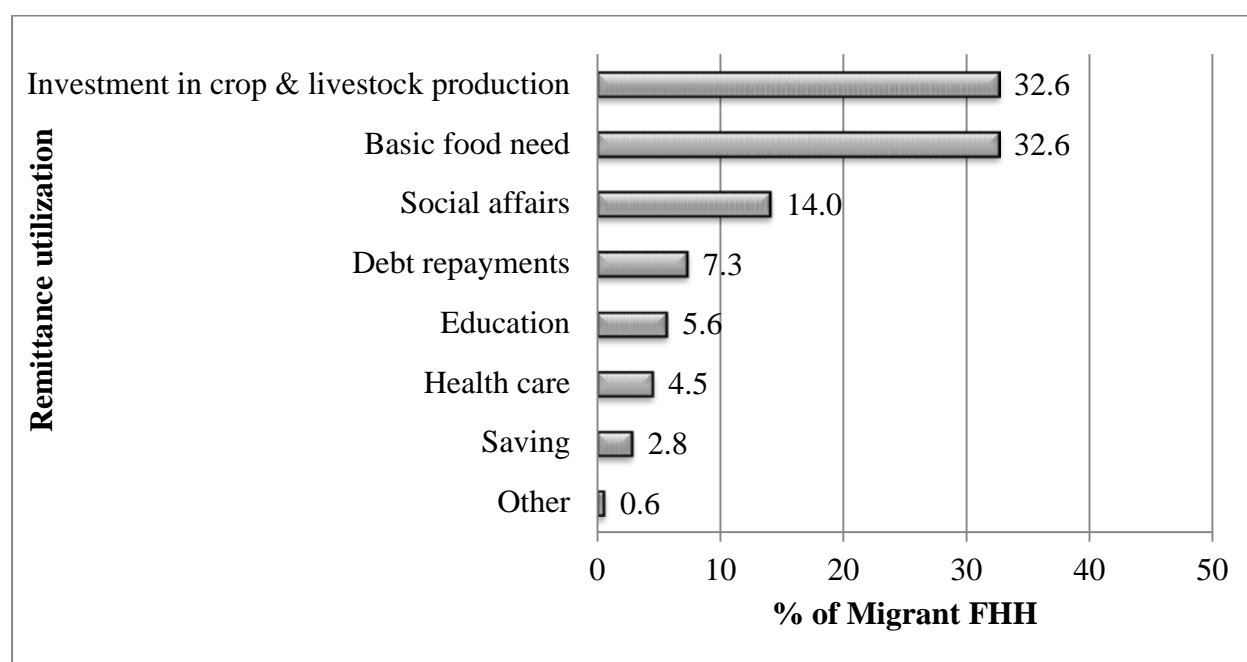


Figure 4.9 Remittance utilization of migrant farm households



4.4 Agricultural Labor Utilization and Cost & Return Analysis

4.4.1 Land holding size of sample farm households

The land holding of sample farm households in Kyaukpadaung Township was examined in Table 4.12. The average farm size of migrant farm households was 5.6 acres. The maximum farm size was 22 acres and the minimum was 0.5 acres respectively. In non-migrant farm households, the average farm size was 5.1 acres and ranging from 1 to 15 acres. It can be said that most of the farmers were small holder farmers in this study area. The land holding size was not significantly different between migrant and non-migrant farm households

Table 4.12 Land holding size of sample farm households

Items	Migrant farm HH (N = 59)	Non-migrant farm HH (N = 58)
Land holding size (acre)		
Maximum	22	15
Minimum	0.5	1
Mean	5.6	5.1
t-test	t=0.742, sig=0.460 ^{ns} , df= 115	

4.4.2 Upland cropping patterns of sample farm households

In the study area, there were 6 cropping patterns observed in upland farming. These cropping patterns were shown in Table 4.13. Among these six patterns, intercropping of sesame and pigeon pea was one of the dominant cropping systems and it was grown by 79.6% of migrant farm households and 74.1% of non-migrant farm households. 13.6% of migrant farm households and 20.7% of non-migrant farm households grew rain-fed sesame followed by groundnut. Rain-fed sesame followed by groundnut and green gram cropping pattern, rain-fed sesame followed by cowpea, only groundnut and only rain-fed sesame were grown by few of both households.



Table 4.13 Upland cropping patterns of sample farm households

(Number and percentage of farmers)

No.	Upland cropping patterns	Sample farm households		Total farm households (N=117)
		Migrant FHH	Non-migrant FHH	
1.	Sesame + Pigeon pea	47 (79.6%)	43 (74.1%)	90 (77%)
2.	Sesame - Groundnut	8 (13.6%)	12 (20.7%)	21 (17%)
3.	Sesame - Groundnut - Green gram	1 (1.7 %)	1 (1.7%)	2 (1%)
4.	Sesame - Cowpea	1 (1.7%)	0 (0%)	1 (1%)
5.	Groundnut only	1 (1.7%)	2 (3.4%)	3 (3%)
6.	Sesame only	1 (1.7%)	0 (0%)	1 (1%)
Total		59 (100%)	58 (100%)	117 (100%)

4.4.3 Labor utilization by sources and gender in sesame and pigeon pea intercropping in the study area

Labor utilization according to gender by sample farm households in Kyaukpadaung is explained in Table 4.14. There are two sources of labor such as family labor and hired labor in the study area. According to the results, the average female family labor was 9.2 man days per acre in migrant farm households and 8 man days per acre in non-migrant farm households. In contrast, male family labor used was found to be around 7 man days per acre in both migrant and non-migrant farm households. In total, the average family labor used per acre was 16.3 man days in migrant households and 15.2 man days was in non-migrant households. In family labor utilization, it was found that migrant farm households involved in crop production a little more than non-migrant farm households; however, there were no statistically significant differences in the family labor involvement.

In case of hired labor used, the magnitudes of male and female hired labor and also total hired labor used per acre were found to be higher in migrant households than non-migrant households in the study area. The average female hired labor was used 73.1 man days per acre as compared with non-migrant households (56.8 man days per acre) and there was statistically significant difference at 10% level. Similarly, average male hired labor used



was found to be 16.2 and 13.3 man days in migrant and non-migrant farm households but no significant difference was observed. The total hired labor used per acre (89.3 man days) of migrant farm households was higher than 70.1 man days of non-migrant farm households and it was observed that there was significantly different at 10% level. In overall, the significant differences were found in hired female and total labor used (Table 4.14). It may be because migrant households had few number of working aged family farm labor because of migration and also used more hired labor especially female labor in crop production. It may be considered that male out-migration reduced the availability of male hired labor and migrant farm households used more female hired labor in crop production. On the other hand, remittances can compensate the loss of family labor by hiring labor in kind of cash.

Table 4.14 Labor utilization by sources of labor and gender in sesame and pigeon pea intercropping in the study area

Labor utilization (Manday/ac)	Migrant farm HH (N=47)	Non-migrant farm HH (N=43)
Family female labor	9.2	8.0
T-test	t=0.584, sig=0.560 ^{ns} , df=88	
Family male labor	7.1	7.2
T-test	t=0.146, sig=0.884 ^{ns} , df=88	
Total family labor	16.3	15.2
T-test	t=0.490, sig=0.626 ^{ns} , df=88	
Hired female	73.1	56.8
T-test	t=1.763, sig=0.081*, df=88	
Hired male	16.2	13.3
T-test	t=1.270, sig=0.208 ^{ns} , df=88	
Total hired labor	89.3	70.1
T-test	t=1.860, sig=0.077*, df=88	

Note:* Significant at 10% probability levels and other variables are not significant by t-test



4.4.4 Labor utilization by tasks in sesame and pigeon pea intercropping

Farmers in the study area cleaned the residual crop of previous cropping season before land preparation. Land preparation generally started by ploughing their lands with a range of 6 to 10 days before cultivating under rain-fed condition. There were a few sample farmers using machine for land preparation in the sesame and pigeon intercrop production of the rain-fed area. The machine for crop production is still poor in the study area. FYM application was done by harrowing their plots two to three times with a four or five-tooth harrow pulled by a pair of bullock. The land preparation was needed till the soil became into a smooth and fine structure that is adequate for small seeds to germinate.

According to the farming practice in sesame and pigeon pea intercropping, labor utilization was relatively varied between two groups of households. The migrant farm households used more labor in many tasks such as sowing ($3.8 \text{ md/ac} > 3 \text{ md/ac}$), organic fertilizer application ($3.4 > 2.8 \text{ md/ac}$), chemical fertilizer application ($1.7 > 1.3 \text{ md/ac}$), manual weeding ($44.5 > 32.4 \text{ md/ac}$). Harvesting ($23.7 > 19.9 \text{ md/ac}$) and threshing ($13.6 > 10.1 \text{ md/ac}$). Non-migrant farm households used slightly more labor only in land preparation ($4.8 > 4.5 \text{ md/ac}$) and pesticide application ($1.5 > 1.4 \text{ md/ac}$). According to the t-test results, the difference of average manual weeding was significant at 5% level among migrant and non-migrant farm households which means migrant farm households used more labor than non-migrant farm households in the manual weeding process,

Depending on the life period of sesame variety, when the sesame plant or whole field of sesame is attaining a golden color, it is time for harvesting. There are three processes after harvesting, i.e. stacking (piling of the harvested sesame stalks), and upright stacking of sesame plants for drying, threshing and winnowing. All processes are done manually. In the study area, hired labors were used for harvesting, stacking and drying of sesame crop, threshing and winnowing. In threshing process, the t-test showed that there was significant different between migrant and non-migrant farm households at 10% level (Table 4.15).

The labor use for manual weeding possessed the largest proportion of total labor followed by harvesting and threshing, land preparation, sowing, pesticide application and fertilizer application in all sample households. Considering the gender issue, female labor employed more than male labor in both family and hired labor in sesame and pigeon pea



intercropping. Because female labors mostly worked in sowing, weeding, harvesting, threshing and most of the male family labors worked in fertilizer and pesticide application, seed bed preparation and land preparation.

In sesame and pigeon pea intercrop cultivation process, proper time for manual weeding, harvesting and threshing are important to get high quality yields. The quality yields were different among sampled farm households especially in post-harvest process. In the study area, migrant farm households used more labor in manual weeding, harvesting and threshing than non-migrant farm households. Therefore, migrant farm households could follow post-harvest process effectively especially in threshing and cleaning activities than non-migrant farm households.

Table 4.15 Labor utilization by tasks in sesame and pigeon pea intercropping

Labor utilization (Man day/ac)	Migrant farm HH(N=47)	Non-migrant farm HH (N=43)
Land preparation	4.5	4.8
T-test	t= -0.373, sig=0.710 ^{ns} , df=88	
Sowing	3.8	3.0
T-test	t=1.300, sig=0.197 ^{ns} , df=88	
Organic fertilizer application	3.4	2.8
T-test	t=1.179, sig=0.242 ^{ns} , df=88	
Chemical fertilizer application	1.7	1.3
T-test	t=1.165, sig=0.247 ^{ns} , df=88	
Pesticide application	1.4	1.5
T-test	t= -0.253, sig=0.801 ^{ns} , df=88	
Manual weeding	44.5	32.4
T-test	t=2.064, sig=0.042 ^{**} , df=88	
Harvesting	23.7	19.9
T-test	t=0.975, sig=0.332 ^{ns} , df=88	
Threshing	13.6	10.1
T-test	t=1.771, sig=0.080 [*] , df=88	

Note: ** and * significant at 5% and 10% probability levels respectively



4.4.5 Enterprise budget of sesame and pigeon pea production

The enterprise budget for sesame production among migrant and non-migrant farm households groups was presented in Table 4.16. It can be seen that the total variable cost (207,512 MMK/ac), total material cost (89,489 MMK/ac) and total hired labor cost (88,248 MMK/ac) of migrant farm households were higher than total variable cost (195,442 MMK/ac), total material cost (79,674 MMK/ac) and total hired labor cost (79,741 MMK/ac) of non-migrant farm households. However, total family labor cost (28,853 MMK/ac) was higher in non-migrant farm households than (21,777 MMK/ac) in migrant farm households.

Migrant farm households obtained higher yield of sesame (3.27 basket/ac) and pigeon (6.1 basket/ac) than non-migrant farm households (2.81 and 5.24 basket/ac). And also, prices of sesame (41,149 MMK/basket) and pigeon pea (19,872 MMK/basket) for migrant farm households were higher than sesame price (36,423 MMK/basket) and pigeon pea price (19,581 MMK/basket) of non-migrant farm households because they expended higher total variable cost and could produce quality yield to get higher price.

Hence, migrant farm households received more profit (48,284 MMK/ac) than non-migrant farm households (9,624 MMK/ac) by growing sesame and pigeon crop intercropping in the study area. The reason for receiving larger profit than non-migrant farm households was that the migrant farm households got higher yield than the other one. Although there was not much different in output price and total variable costs among migrant and non-migrant groups, the gross benefit received by migrant (255,799 MMK/ac) and non-migrant farm households (205,066 MMK/ac) was different. Return above variable cost (RAVC) for migrant and non-migrant farm households were 48,287 MMK/ac and 9,624 MMK/ac respectively. Hence, the benefit-cost ratios were 1.23 and 1.05 for migrant and non-migrant farm households, respectively. The enterprise budget for sesame and pigeon pea production was indicated in Table 4.16.



Table 4.16 Enterprise budget of sesame and pigeon pea production

Item		Unit	Migrant farm HH (N=47)	Non-migrant farm HH (N=43)
Sesame	Yield	Bsk/ac	3.27	2.81
	Price	MMK/bsk	41,149	36,423
Pigeon pea	Yield	Bsk/ac	6.10	5.24
	Price	MMK/bsk	19,872	19,581
Total gross benefit		MMK/ac	255,799	205,066
Total variable cost		MMK/ac	207,512	195,442
Net benefit		MMK/ac	48,287	9,624
Benefit Cost Ratio (BCR)			1.23	1.05

4.4.6 Some measurements of enterprise budgets of migrant and non-migrant farm households in the study area

Some measurement of enterprise budget based on migrant and non-migrant farm households was explained in Table 4.17. The return from labor investment was 1,609 MMK/ac in migrant farm households and 1,482 MMK/ac in non-migrant farm households. The return from the family labor and hired labor investment were (4,670 MMK/ac and 1,596 MMK/ac) in migrant farm households and (2,630 MMK/ac and 1,334 MMK/ac) in non-migrant farm households. In peak labor season at weeding, the return from labor investment in migrant farm households was 1,931 MMK/ac and non-migrant farm households was 1,242 MMK/ac. In the study area, it was found that migrant farm households attained the higher return from labor investment in hired labor, family labor and labor used at weeding compared to non-migrant farm households. The detail calculation of enterprise budget of migration status was shown in Appendix.



Table 4.17 Some measurements of enterprise budgets and mean comparison of sesame and pigeon pea production per acre by migration status

Item	Unit	Migrant farm HH	Non-migrant farm HH
Return per unit of labor	MMK/ac	1,609	1,482
Return per unit of family labor	MMK/ac	4,670	2,630
Return per unit of hired labor	MMK/ac	1,596	1,334
Return per peak of labor at weeding	MMK/ac	1,931	1,242

4.4.7 Factor share analysis

The factor shares in payments and percentages of the sample households were presented in Table 4.18. The factor shares of material input, labor input and interest for migrant farm households were 32.2%, 44.7% and 3.1% respectively. Therefore gross margin factor share was 20.0% and farm income factor share was 28.8% for migrant farm households. Factor share for material inputs, labor inputs and interest for non-migrant farm households were 38.3%, 53.0% and 3.5%. Consequently, gross margin factor share and farm income factor share for non-migrant farm households was 5.3% and 19.4%. Among two different farm households groups, migrant farm households received higher factor shares for farm income than that of non-migrant farm households. And also, migrant farm households received higher factor shares for gross margin than those of non-migrant farm households. However, factor share of family labor input for migrant farm households (8.8%) was lower than that of non-migrant farm households (14.1%) in the study area.



Table 4.18 Factor shares of sesame and pigeon pea production between migrant and non-migrant farm households

Variables	Factor share (%)	
	Migrant farm HH (N=47)	Non-migrant farm HH (N=43)
Total revenue	100.0	100.0
Material cost	32.2	38.3
Labor cost	44.7	53.0
Family labor	8.8	14.1
Hired labor	35.9	38.9
Interest cost	3.1	3.5
Total inputs	80.0	94.7
Gross margin	20.0	5.3
Farmer's farm income	28.8	19.4

Note: Farmer's farm income = Gross margin + Family labor cost

4.4.8 Production constraints in the farming at current condition

In Kyaukpadaung Township, there were many constraints in crop production at current condition (Figure 4.10). In the study area, most of the migrant and non-migrant farm households reported that irregular rainfall (24%) and labor shortage problems (about 22%) were the serious problems in crop production. The problem of low crop yield (about 16%), weed problems (14%) and insects/pest problems (about 13%) were observed in both migrant and non-migrant farm households.

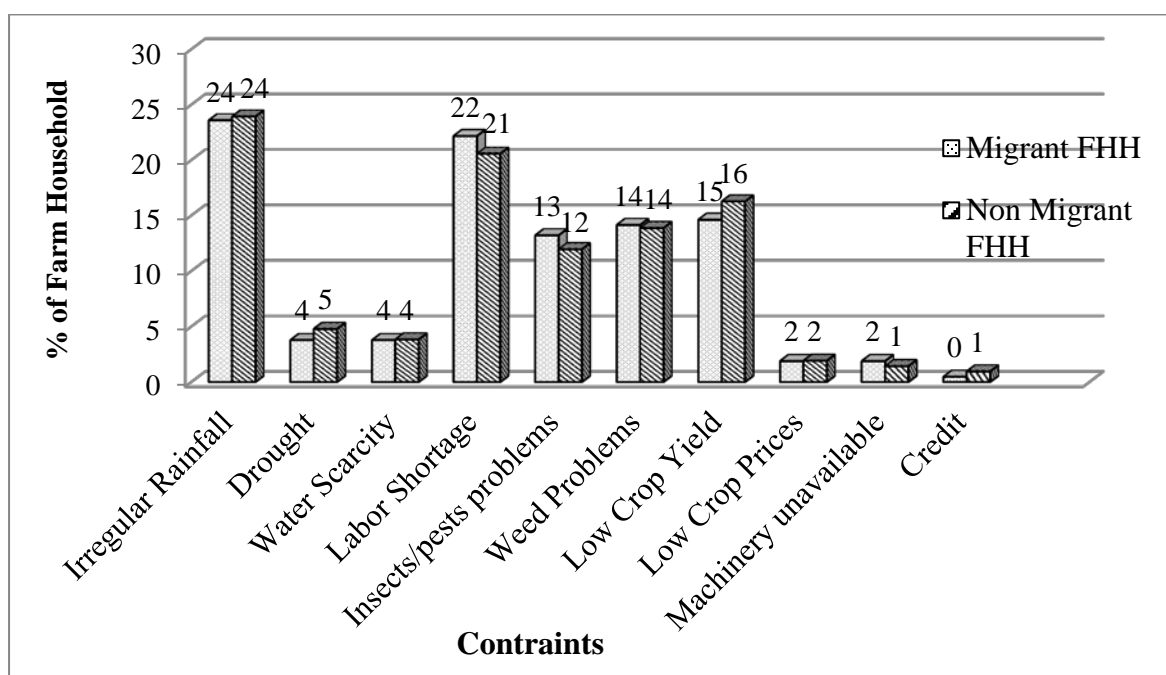


Figure 4.10 Production constraints in migrant and non-migrant farm households

4.5 Impact of Migration on Agricultural Labor Problem

4.5.1 Problems in accessing hired Labor

Generally, farming in Myanmar is small scale and labor intensive. Migrant farm households needed more agricultural laborer in farm activities to compensate their migrant family labor. Problems in accessing hired labor for migrant and non-migrant farm households were presented in Figure 4.10. Among 59 sample migrant farm households, 86% of households faced the problem in accessing hired labor while only 14% households didn't have this problem. Among 58 sample non-migrant farm households, 74% of households faced the problem in accessing hired labor while only 26% households didn't have this problem. In this case, problem in accessing hired labor was serious in migrant farm households than that of non-migrant farm households.

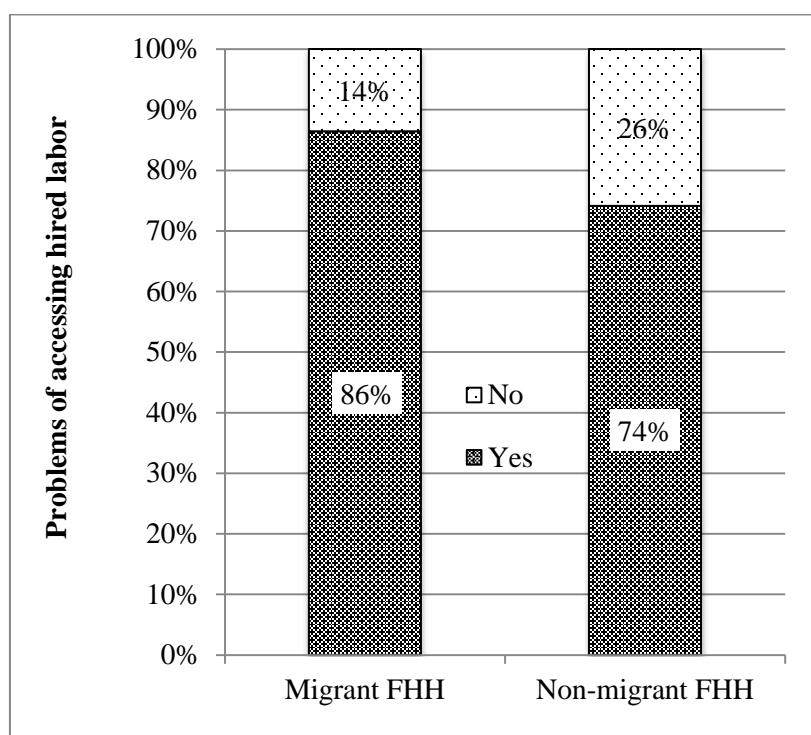


Figure 4.11 Problems in hired Labor

4.5.2 Labor management problems

The labor management problems in migrant farm households were difficulty to get hired labor in time (54%), high wage in accessing hired labor (17%) and hired labors were not affective as family labor (5%). Labor migration creates labor shortage in the crop production which, in turn, high wages and decrease crop yields, particularly during the peak season are happened (Amina Maharjan&TheingiMyint, 2015). Therefore, these labor shortage problems affect crop cultivation and yield (14%) and also livestock farming (1%) (Figure 4.11).

In non-migrant farm households, labor problems were difficulty to get hired labor in time (50%), high wage in accessing hired labor (11%) and hired labors were not affective as family labor (5%). These labor shortage problems affect crop cultivation and yield (12%) and also livestock farming (1%) respectively. In this study, it was found that there were no significantly differences between migrant and non-migrant farm households in labor management problems.

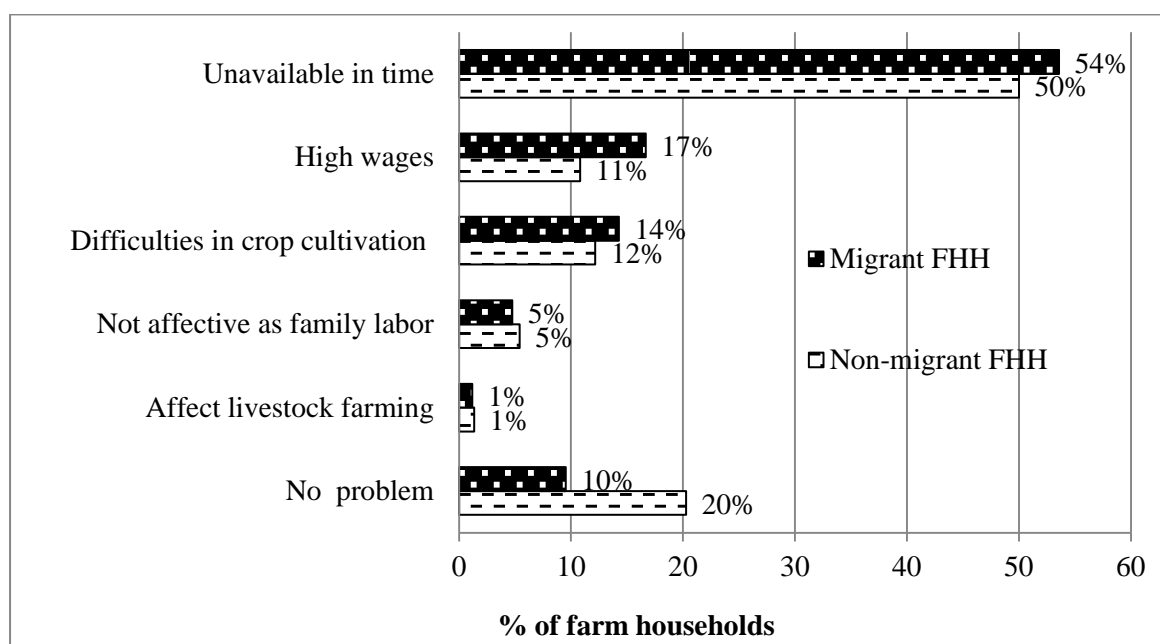


Figure 4.12 Labor management problems

4.5.3 Problem solving strategies for agricultural labor scarcity

Labor problem solving measures such as hiring labor from other distance villages, paying high wage to get labor in time, involvement of children, women and elder persons as family labor and taking advantage of close social dealing to get labor were used by 32%, 14%, 12% and 8% of migrant farm households (Figure 11). Non-migrant farm households (21%) solved that the problem by hiring labor from other distance village. Some solutions were paying high wage to hire in time (16%), involvement of more family members worked in farm during peak season (7%) and taking advantage of close social dealing to get hired labor from within village and other villages (2%).

In this case, it was found that 30% of non-migrant farm households didn't solve labor requirement problem whereas migrant farm households (17%) ignored it. Therefore, migrant farm households did more effort to solve the labor requirement problem than non-migrant farm households. There were no reducing cultivated farmland and using mutual labor exchange system to solve this problem in non-migrant farm households. Mostly, migrant farm households solved the problem by hiring labor from other distance village, involving



more family labor and taking advantage of close social dealing than those of non-migrant farm households.

As labor migration impacted on labor availability, it also impacted on wages. In Kyaupadaung Township, the labor shortage has increased the wages in agriculture work after migration condition. The wages comparison, the hired labor daily wage increased from about 500 MMK to 2000 MMK for male and about 300 MMK to 1500 MMK for female during off-season. The daily wage increased from about 800 MMK to 3000 MMK for male and about 600 MMK to 1500 MMK (or) 2000 MMK for female during peak season in the study area.

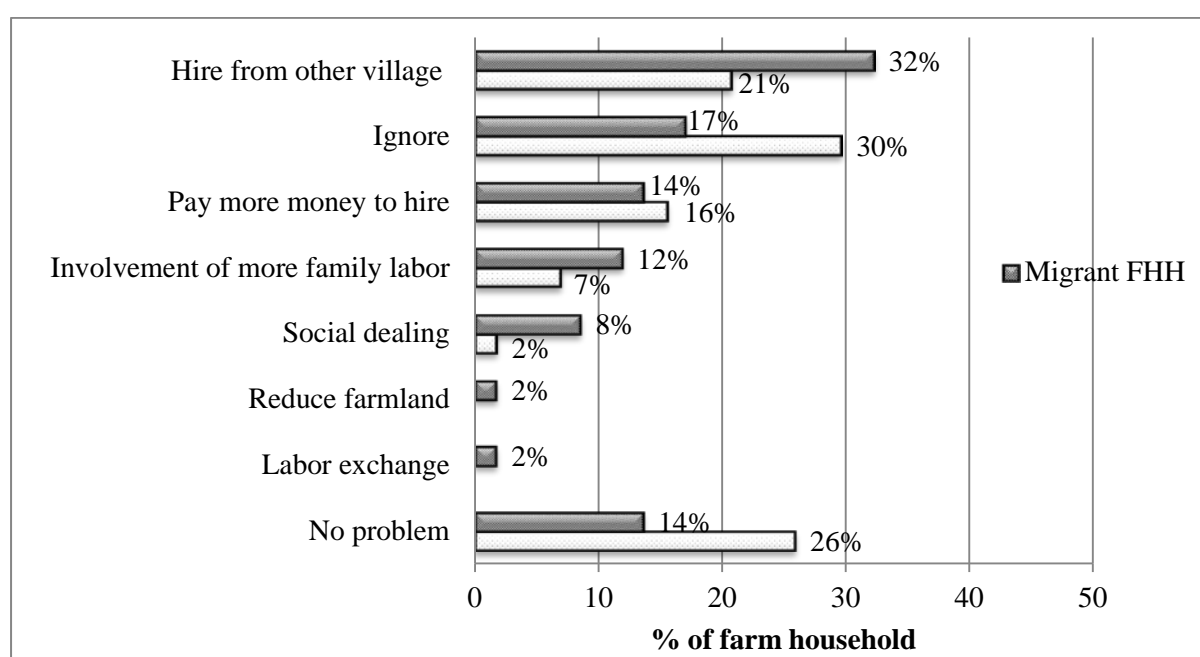


Figure 4.13 Problem solving strategies for agricultural labor scarcity

4.6 The Empirical Results of Factors Affecting Profitability of Sesame and Pigeon Pea Intercropping in the Study Area

This section indicated the estimate results of factors affecting the sesame and pigeon pea profit of the selected farm households in the study area. To determine the factors affecting the sesame and pigeon pea profit, linear regression function was employed. The specific profit functions of sesame and pigeon pea farmers were estimated by using 10 independent variables; age (years), educational level (as a dummy variable), sown acre (acre), non-farm



income (MMK/year), household size (no.), migration status (as a dummy variable), material cost (MMK/ac), family labor cost (MMK/ac), hired labor cost (MMK/ac) and average price (MMK/basket). The mean value of dependent and independent variables of sesame and pigeon pea profit function were shown in Table 4.19.

According to regression estimates of the sesame and pigeon pea intercrop profit, the profit was positively related with migration status but not significant. Based on the results, there was a strong relationship between the profit and the four explanatory variables: sown area, material cost, hired labor cost and price. The profit of the sample farm households was positively and significantly influenced by price at 5 percent level. According to the regression estimates, if 1 MMK increases in price, the profit will be increased 8.82 MMK. The result showed that the farmers who got the highest price can receive more profit because price greatly affected on profit. Sown area of the sample farm households negatively and significantly influenced on profit at 5 percent level. It means that if 1 acre increases in sown area on the farm, the profit will be decreased 15155.23 MMK. And also, the total material cost of the sample farm household negatively and significantly influenced on profit at 1 percent level. It means that if 1 MMK increases in total material cost, the profit will be decreased 0.91 MMK. The result showed that the farmers who used high cost of material inputs in sesame and pigeon pea production can receive low profit. The hired labor cost of the sample farm household negatively and significantly influenced on profit at 1 percent level. It means that if 1 MMK increases in hired labor cost on the farm, the profit will be decreased 0.87 MMK. The adjusted R squared points out that the model is significant and it can explain variation in groundnut profit by 45 percent (Table 4.34).



Table 4.19 Statistics of dependent and independent variables for sesame and pigeon pea intercropping profit function (N=90)

Variables	Unit	Mean	Minimum	Maximum
Sesame + Pigeon profit	MMK/ac	27,899	14,875	503,822
Age	Year	53	26	77
Education level of HHH	No.	9	Use as dummy variable by coding the education level	
Illiterate	No.	20		
Monastery	No.	16		
Primary	No.	17		
Secondary	No.	28		
High school & above	No.			
Sown area	Acre	3	1	10
Non-farm income	MMK/year	1,864,188	0	4,280,000
Household size	No.	5	2	10
Migration status	Dummy (1 means migrant HH, otherwise 0)			
Material cost	MMK/ac	80,578	0	200,000
Family labor cost	MMK/ac	22,149	0	94,800
Hired labor cost	MMK/ac	102,745	23,500	285,162
Average price	MMK/basket	29,312	20,000	39,500





Table 4.20 Profit function of sesame and pigeon pea intercropping (N=90)

Variables	Unstd. Coef.		Standard.	t	Sig.
	B	Std. Error	Coef. Beta		
(Constant)	-136087.92 ^{ns}	161172.519		-.844	.401
Age	1529.25 ^{ns}	1153.350	.126	1.326	.189
Education level	12364.36 ^{ns}	9254.946	.123	1.336	.185
Sown area	-15155.23**	7064.326	-.190	-2.145	.035
Non-farm income	.01 ^{ns}	.009	.091	1.002	.319
Household size	-2129.83 ^{ns}	9242.118	-.021	-.230	.818
Migration status	14593.12 ^{ns}	28843.262	.050	.506	.614
Material cost	-.91***	.225	-.358	-4.053	.000
Family labor cost	-1.12 ^{ns}	.676	-.151	-1.636	.106
Hired labor cost	-.87***	.261	-.298	-3.338	.001
Average price	8.82**	4.221	.197	2.089	.040
R ²			0.691		
Adjusted R ²			0.477		

Note: Dependent variable: Sesame + pigeon pea profit

Note: *** and ** significant at 1%, and 5% probability levels respectively and ns = non-significant



4.5 The Empirical Results of Influencing Factors Contributing to Households' Out Migration Status

In this study, the empirical analysis of the determinants or influencing factors on households' out migration status was carried out by using logit regression model. In a logit model, the endogenous variable is a dummy or categorical variable with 1 representing migrant farm household and 0 representing non-migrant farm household. In the present study, not only some quantitative variables but also some qualitative or dichotomous variables were considered.

The estimation was done to determine the factors, which influence on migration status by logit model. There were 11 independent variables in the empirical logit model: number of persons with high school level and above, number of persons with two jobs, number of non-farm labor, agricultural land holding size acres), number of livestock, number of income sources, number of credit sources, number of active males (age 15-45), number of active females (age 15-45), number of young dependent (<age 15) and number of other dependents in HH were shown in Table 4.21.

The estimated coefficients and the correspondents Z ratios which resulted from the logit model are given in Table 4.22. Chi-Square value (162.523) and p-value (0.000) suggested that the estimated model was significant at 1% level.

Analysis of the survey data revealed that 4 number out of the 11 variables included in the model were significant (at 1 % to 5 %) in explaining the variation in migration status of household in the study area. These variables were persons with high school and above, persons with two jobs, number of non-farm labor, active males (age 15-45) and intercept. The other factors, agricultural land holding size, livestock, income sources, credit sources, active females, young dependents and other dependents were not significant.

In this study, the explanatory variable person with high school and above was positively related to the migration status and statistically significant at 5 % level. It indicates that the person with higher educational level was higher in the probability of migration than lower educational level.

In terms of the person with two jobs, it is significant at the 5% level and having positive impact on the probability of migration. It suggests that the increase the person with two jobs, the higher the probability of migration.



Looking at the number of non-farm labor, the coefficient value (0.66) was positive impact on the probability of migration and significant at 5% level. This implies that non-farm labors are likely to migrate to work in other sectors.

According to the logit regression results, number of land holding size, number of credit source and number of income sources were positively related to the probability of migration but not significant. This means that the probability of migration was not affected by number of land holding size, number of credit source and number of income sources.

Moreover the probability of migration was positively and significantly related with active males who were between 15-45 ages at 5% level. This means that active males in the sample households were more interested to migrate to other places and the older the age the lesser interested to migrate.

In this analysis, the number of active females (age 15-45), the number of young dependents and other dependents were negatively related with the probability of migration but not significant. Reason was that female, young children and older persons were lesser interested to migrate to other places and they were willing to work in farm activities. However, these were not significantly affected on probability of migration.



Table 4.21 Statistics of dependent and independent variables for households' out migration status logistic function (N=117)

Variables	Unit	Mean	Minimum	Maximum
Migration status	Code 1 for migrant household and 0 for non-migrant household			
Persons with high school level & above	No.	1.2	0	4
Persons with two jobs	No.	0.25	0	1
Non-farm labor	No.	1.2	0	4
Agricultural land holding size	No.	5.3	0	22
Livestock	No.	1.7	0	10
Income sources	No.	2.8	1	6
Credit sources	No.	1.2	0	3
Active males (age 15-45)	No.	0.8	0	3
Active females (age 15-45)	No.	1	0	3
Young dependents (< age 15)	No.	0.8	0	3
Other dependents in HH	No.	1.3	0	5



Table 4.22 Logistic function of households' out migration status (N=117)

Variables	Coefficient	Z -value	P- value
Persons with high school & above	0.729**	2.151	0.032
Persons with two jobs	0.864**	1.933	0.053
Number of non-farm labor	0.660**	2.711	0.007
Agricultural land holding size	0.107 ^{ns}	1.119	0.263
Livestock	0.133 ^{ns}	0.849	0.396
Income sources	0.127 ^{ns}	0.419	0.675
Credit sources	0.485 ^{ns}	1.195	0.232
Active males (age 15-45)	0.864**	2.051	0.040
Active females (age 15-45)	-0.511 ^{ns}	-1.161	0.246
Young dependents (< age 15)	-0.313 ^{ns}	-0.597	0.551
Other dependents in HH	-0.204 ^{ns}	-0.573	0.567
Intercept	-5.459***	-4.087	0.000
χ^2	162.523		
P-value	0.000***		

Note: ***, ** and * significant at 1%, 5% and 10% probability levels respectively and ns = non-significant



CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

This chapter centres on the conclusions of the assessment and their implications from the impact of migration on the agricultural sector in Kyaukpadaung Township, Dry Zone Area. This study was done carefully within the limited timeframe based on both qualitative and quantitative data collected for the study. Based on the findings of the study, conclusion and policy recommendation can be drawn to highlight the important points especially for the effects of migration in the study area.

5.1 Summary of Findings

5.1.1 Comparison of socioeconomic characteristics, income and crop production in migrant and non- migrant farm households

According to the demographic and socioeconomic characteristic results, there were statistically significant differences between migrant farm households and non-migrant farm households. The total number of household members and their education level were higher in migrant households than non-migrant farm households. The major occupation of household heads was farming and most of the household members worked in agriculture in both migrant and non-migrant farm households. However, 21% of migrant household members worked in construction sites were higher than non-migrant farm households (10%). Regarding with the occupation sector, 45.8% of migrant farm households and non-migrant farm households (30.3%) worked in other sectors. The total number of migrants was 25% out of 323 populations in the 59 sample migrant farm households. Among them, 89% migrant were male and 11% migrant were female.

Regarding with the ratio of migrant number and household size, the average ratio was 26%. In the study area, international non-seasonal migration (34%) to abroad and internal seasonal migration (66%) to urban areas was found. Currently, both types of migrants worked in the non-agricultural sectors. The push factors of rural out-migration were mostly associated with declining job opportunities in agriculture, weed problem and bad weather condition. Low employment opportunities of non-farm sectors in original areas were also



significant factors. The pull factors were out-migrating to other places which had better economic or employment opportunities, high income and better living standard.

Migrants got higher wage (157,918 MMK/month) at present occupation than before migration (13,508 MMK/month). The main income of migrant farm households was remittance income (43% of total household income) and they relied on that kind of income for their survival (37%) and agriculture (33%). Based on income composition, it was found that remittance was significantly high and it was about half of total households' income in migrant farm households. Non-farm and off-farm income were the highest number in non-migrant farm households. Total annual income of migrant farm household was higher than non-migrant farm household.

In the study area, the common cropping pattern was intercropping of sesame and pigeon pea followed by groundnut crop production. Due to migration, the original areas faced the labor shortage problem in their farming especially during peak season- weeding and harvesting. In crop production, 86% of migrant farm households and 74% of non-migrant farm households faced the problem in accessing hired labor because they didn't get hired labors in time. Therefore, migrant farm households (32%) solved this problem by hiring labor from other villages. However, 30% of non-migrant farm households ignored and didn't solve this problem. In intercropping of sesame and pigeon pea crop production, hired female labors were mostly used in migrant farm households especially during weeding. The major constraints for both migrant and non-migrant farm households were irregular rainfall, labor shortage and low crop yield and price.

In crop production, migrant farm households obtained higher yield and price of sesame and pigeon than non-migrant farm households because they expended higher total variable cost and could produce quality yield to get higher price. According to enterprise budget for intercropping of sesame and pigeon pea, benefit cost ratio of migrant and non-migrant farm households were 1.25 and 1.06 respectively. Return per unit of labor in migrant farm households was 1,609 MMK/ac than non-migrant farm households (1,482 MMK/ac). And also, return per peak of labor at weeding was higher in migrant farm households than non-migrant farm households. Gross margin of migrant households was significantly higher



than non-migrant households because they go higher price than non-migrant households. But total variable cost and net benefit were not significant.

According to factor share analysis, migrant farm households received higher factor shares for farm income than that of non-migrant farm households. And also, migrant farm households received higher factor shares for gross margin than those of non-migrant farm households. However, factor share of family labor input for migrant farm households (8.8%) was lower than that of non-migrant farm households (14.1%) in the study area. Share of labor cost and material cost were high in both migrant and non-migrant farm households.

5.1.2 Factors affecting profitability of sesame and pigeon pea intercropping

According to regression estimates of the sesame and pigeon pea intercrop profit; there was a strong relationship between the profit and the four explanatory variables: sown area, material cost, hired labor cost and price. Sesame and pigeon pea profit was negatively and significantly influenced by sown acre, material cost, hired labor cost and positively influenced by price. It was also found that migrant farm households led to increase profit but did not show significant effects.

5.1.3 Influencing factors contributing to households' out migration status

According to households' out migration decision analysis, 4 number out of the 11 variables included in the model were significant (at 1 % to 5 %) in explaining the variation in migration status of household in the study area. These variables were persons with high school and above, persons with two jobs, number of non-farm labor, active males (age 15-45) and intercept. Migration status was positively and significantly influenced by active male household members who were between 15-45 years old, higher education level, household members with two jobs and household members who worked in non-farm activities. This finding was also consistent with descriptive results in this study.

5.2 Conclusions

It was concluded that the educational level of migrant farm households' members were higher than non-migrant farm households' members in the study area. Number of dependents in non-migrant farm households was higher than migrant farm households. Migrant farm household members seemed to be preferred to work in other sectors than



agricultural sector. Most of the migrants worked in their farming as a family labor before migration. After migration, the migrants didn't work back in the agricultural sector any more. All migrants were working in the non-agricultural sectors at the present condition.

Mostly active agricultural youth labor migrated and working at non-agricultural sector in urban area. International migration also existed but less than internal migration. Internal migration was caused by unfavorable factors of crop production-insufficient farm income. Urban sector have high income opportunities than agricultural sector. Earning of migration was transferred to households as remittance about half of income which was used for crop production investment and subsistence households expenditure. Agricultural income was lower than other sector and migrant households' income was higher than non-migrant households which were based on remittance and higher crop income. Migrant households can more invest in crop production such as input used, hired labor in farming activities etc.

In the study area, male out-migration reduced the availability of male hired labor and migrant farm households used more female hired labor in crop production. Migrant farm households used more labor in manual weeding, harvesting and threshing than non-migrant farm households. Therefore, migrant farm households could follow post-harvest process effectively especially in threshing and cleaning activities than non-migrant farm households. Therefore, higher yield, higher profit was earned by migrant households.

However, remittance affected positive relation to crop production and getting more profit but it is not significant. Profit from current cropping pattern can be obtained by efficient used of land, labor and capital inputs and high crop price which is shown by profit function. Migration status hadn't shown strong relation to crop production profitability but it was positive relation. Migration in farm households related to young male member, higher education, seeking to work non-farm activity. Therefore, young man with higher education usually looks for better opportunity in other places and also in non-agricultural sector to manage their problems of household as migration is one of the livelihood strategies.



5.3 Policy Implication

The results of this study confirmed many of the findings in the existing literature and offered some potentially new insights and suggested several lessons for the study of migration in general. Based on the findings of this study some recommendations are suggested as follow. In the study area, as migrant status depends on education level of male member, the rest of family member would be low education level, female and aging people who have to participate in farming. Therefore, agricultural technologies, practices, machineries and extension education program would be emphasized for low educated female and aging people affordability. Role of the female would be more important in farming activities as migrant male prefer to work with non-farm activities with higher wage rate, therefore, gender issue become more considerable point for policy makers in agricultural sector.

Mostly active agricultural youth labor migrated and working at non-agricultural sector in urban area. Therefore, rural youth vocational training in agricultural sector would be pay more attention for getting skill labor in farming activities. Climatic fluctuations in the study area have become more intense, with droughts becoming more frequent and with rainfall patterns changing. The main push factor for migration was insufficient farm income probably due to crop damaged by irregular rainfall, bad weather condition and weed problem. Therefore, technologies for improving profitability of cropping system would be cost effective and efficient methods to Dry zone area where is resource poor region working by small scale farmers.

Farm households need more agricultural laborer in farm activities to compensate their family labor and face the problem in accessing hired labor. Therefore, farm labors migrate from village to village for solving labor scarcity problem that used as one of technology dissemination approaches by extension education program based on rural-rural seasonal migration. Higher income opportunity is the pull factor of migration, for that reason agricultural sector would be improved by small and medium enterprise (SME) development and better value chain process of various crops would be the better opportunity of rural community.

Moreover, remittance used in farming activities and investment for farm shows positive impact on agricultural sector, and therefore, formulating agricultural sector development long term plan would be reflected on migration status, farmer's education level, gender issue and farm labor availability in specific region for the country's economic development.



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APPENDIX

Appendix 1 Enterprise budget of sesame and pigeon pea for migrant farm

				househ olds(N =47)
Item	Unit	Level	Eff.Price (Kyats)	Total Value (Kyats)
Gross benefit				
Yield of sesame	Bsk/ac	3.27	41,148.94	134,518.61
Total gross benefit	Kyats/ac			134,518.61
Gross benefit				
Yield of pigeon pea	Bsk/ac	6.10	19,872.34	121,280.71
Total gross benefit	Kyats/ac			121,280.71
Gross benefit of sesame and pigeon pea				255,799
Variable cost				
(a) Total material cost				82468.09
(b) Family labor cost				
Land preparation	Amd/ac	1.91	4404.3	8412.14
Planting	Md/ac	1.70	992.6	1687.34
Organic fertilizer application	Md/ac	1.23	1156.38	1422.35
Chemical fertilizer application	Md/ac	1.13	1251.06	1413.70
Spraying pesticide	Md/ac	0.34	1712.77	582.34
Weeding	Md/ac	2.91	845.74	2461.10
Harvesting	Md/ac	2.87	903.19	2592.16
Bundling	Md/ac	0.98	902.13	884.09
Thrashing	Md/ac	2.72	1121.28	3049.87
Total family labor cost	Kyats/ac	15.8		22505.08
(c) Hired labor cost				
Land preparation	Amd/ac	2.7	4404.3	11715.33
Planting	Md/ac	2.2	992.6	2153.83
Organic fertilizer application	Md/ac	2.2	1156.38	2532.47
Chemical fertilizer application	Md/ac	0.6	1251.06	688.08
Spraying pesticide	Md/ac	1.1	1712.77	1866.92
Weeding	Md/ac	44.3	845.74	37483.20
Harvesting	Md/ac	20.8	903.19	18795.41
Bundling	Md/ac	5.5	902.13	4988.77
Thrashing	Md/ac	10.3	1121.28	11526.72
Total hired labor cost	Kyats/ac	89.6		91750.74
(d) Interest on cash cost				
Hired labor cost			0.045	4128.8
Material input cost			0.045	3711.1
Total Interest on cash cost				7839.8
Total variable cost (a+b+c+d)				204564
Total variable cash cost (a+c+d)				182059
Return above cash cost				
(Gross return-Total variable cash cost)				73741
Return above variable cost				
(Gross return-Total variable cost)				51236
Return per unit of cash cost				
(Gross return/Total variable cash cost)				1.41
Return per unit of capital				
(Gross return/Total variable cost) (BCR)				1.25



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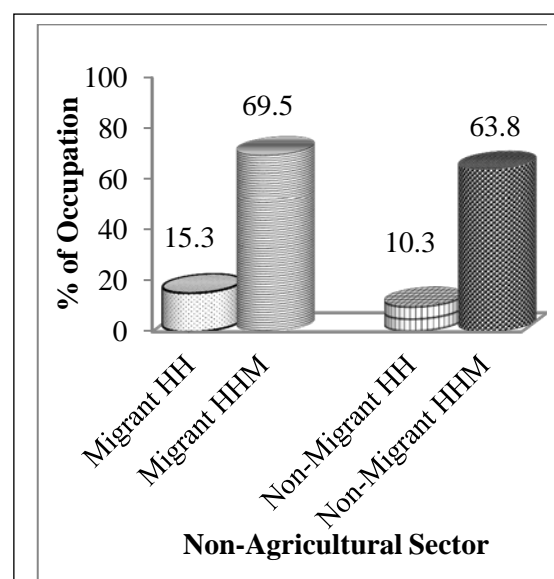
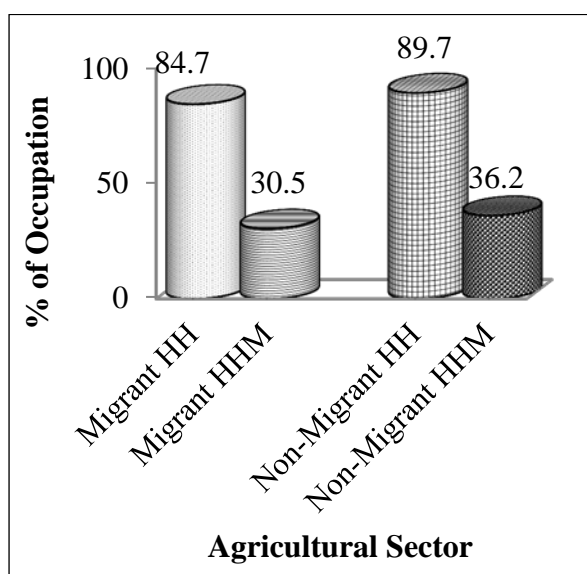
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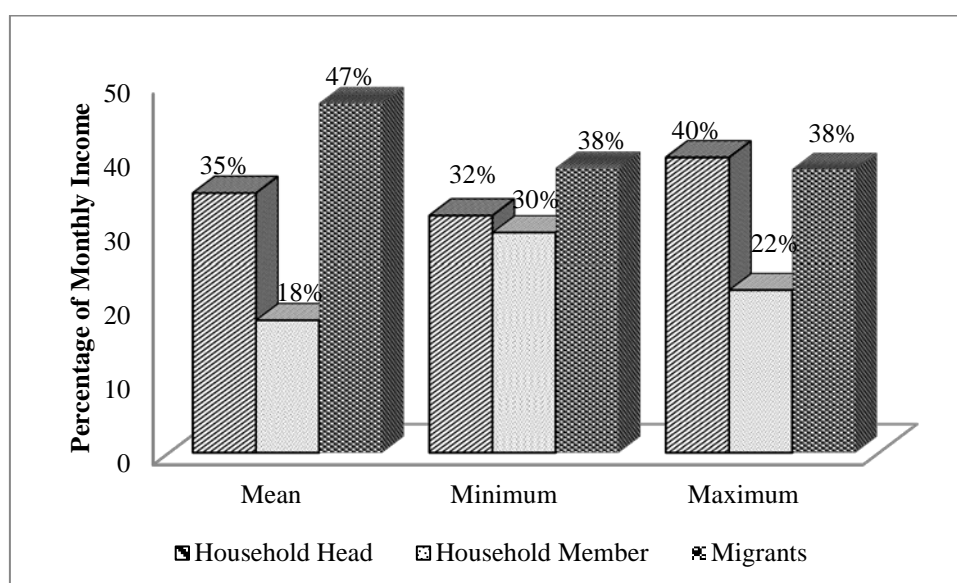


Appendix 2 Enterprise budget of sesame and pigeon pea for non-migrant farm households (N=43)

Item	Unit	Level	Eff.Price (Kyats)	Total Value (Kyats)
Gross benefit				
Yield of sesame	Bsk/ac	2.81	36423.26	102,377.20
Total gross benefit	Kyats/ac			102,377.20
Gross benefit				
Yield of pigeon pea	Bsk/ac	5.24	19581.40	102,688.48
Total gross benefit	Kyats/ac			102,688.48
Gross benefit of sesame and pigeon pea				205,065.68
Variable cost				
(a) Total material cost				78511.63
(b) Family labor cost				
Land preparation	Amd/ac	2.70	5674.4	15320.93
Planting	Md/ac	1.33	877.9	1167.62
Organic fertilizer application	Md/ac	1.33	1119.77	1489.29
Chemical fertilizer application	Md/ac	0.81	1211.63	981.42
Spraying pesticide	Md/ac	0.40	1779.07	711.63
Weeding	Md/ac	2.23	906.98	2022.57
Harvesting	Md/ac	2.73	1137.21	3104.58
Bundling	Md/ac	1.12	919.77	1030.14
Thrashing	Md/ac	2.44	1239.70	3024.87
Total family labor cost	Kyats/ac	15.1		28853.06
(c) Hired labor cost				
Land preparation	Amd/ac	2.1	5674.4	12143.26
Planting	Md/ac	1.7	877.9	1466.11
Organic fertilizer application	Md/ac	1.5	1119.77	1668.46
Chemical fertilizer application	Md/ac	0.5	1211.63	617.93
Spraying pesticide	Md/ac	1.1	1779.07	1939.19
Weeding	Md/ac	30.1	906.98	27336.38
Harvesting	Md/ac	17.2	1137.21	19548.64
Bundling	Md/ac	6.0	919.77	5537.02
Thrashing	Md/ac	7.7	1239.70	9483.71
Total hired labor cost	Kyats/ac	67.9		79740.68
(d) Interest on cash cost				
Hired labor cost		79740.68	0.045	3588.3
Material input cost		78511.63	0.045	3533.0
Total Interest on cash cost				7121.4
Total variable cost (a+b+c+d)				194227
Total variable cash cost (a+c+d)				165374
Return above cash cost (Gross return-Total variable cash cost)				39692
Return above variable cost (Gross return-Total variable cost)				10839
Return per unit of cash cost (Gross return/Total variable cash cost)				1.24
Return per unit of capital (Gross return/Total variable cost) (BCR)				1.06



Appendix 3 Opinion of future plan by household heads and members in the study area



Appendix 4 Percentage of monthly income earned by household heads, household members and migrants



Photos are books which have been published by YAU_ACIAR_ Strengthening Institutional Capacity, Extension Services and Rural Livelihoods in the Central Dry Zone and Ayeyarwaddy Delta Region of Myanmar (ASEM-2011-043)

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