The Formation of Rural's Labor Migration in Rural-Coastal of Aceh, Indonesia: Do Land-Factor or Other Household Characteristics Matters

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Abstract

As in other Indonesian provinces, Aceh is also experiencing demographic changes due to migration patterns. However, the migration rate in Aceh is not much significant in number compared to other provinces in Indonesia. As shown in the findings of this study. In the post-conflict and post-tsunami period, migration patterns in Aceh more influenced by economic factors. Moreover, the agricultural sector that dominates the structure of the regional GDP of Aceh unfortunately tends to decline every year in percentage and not so promising for rural household income and prompted the agricultural labour force to move to the non-agricultural sector and induces rural-urban migration. The study aims to assess the effects of land factors (agriculture) on individual migration decisions in households in four coastal villages in Bireuen district of Aceh. The research approach is the theory of economic migration. The method of analysis used in this study is statistically-descriptive and multiple linear regression analysis, to assess whether land ownership has a significant impact on the labour's migration behaviour. In the findings of study, we found the relationship of land factor to migration pattern are both induce the "cost of opportunity" and the "hinder factor". While land ownership does not significantly affect the likelihood of migration, other factors do. These include age, household size, composition of the household labour force, and poverty levels. This study are expected to cover the gaps in the literature on the migration and rural development studies in both Aceh and Indonesia.

Keywords: *Land-Factor, Household Characteristics, Economic Migration, Rural Migration Patterns, Rural-Coastal, Aceh.*

A. INTRODUCTION

According to Statistics Indonesia, the number of people living in villages in Indonesia in 2000 was 58%, compared to those living in urban areas. But in 2020 the rural population is only 36% of Indonesia's population (BPS, 2021). One of the main factors in the demographic change of villages in Indonesia is caused by migration or population movement from rural-urban (internal migration) and rural-to abroad (international). This migration phenomenon can be caused by factors such as employment, education, access to better social services, and other socio-cultural reasons (Sukamdani and Mujahid, 2015).

As in other Indonesian provinces, the province of Aceh is also experiencing demographic changes due to migration patterns. However, the migration rate in Aceh is not much significant in number compared to other provinces in Indonesia. As also shown in the findings of this study. The largest migration in Aceh occurred in the late 1990s, mostly due to socio-political factors, although economic factors are still relevant

(Czaika and Kis-Katos, 2009; Sukamdani and Mujahid, 2015). However, in the post-conflict period, migration patterns in Aceh appear to be declining and more influenced by economic factors (Sukamdani and Mujahid, 2015). The migration that took place between the 2000s and nowadays is mainly due to the lack of job availability in Aceh and the undeveloped economic center in Aceh that can provide the labour market for the Aceh labour force. While the agrarian change in rural Aceh does not occur as a linear transition from a subsistence model to a highly economically valued agriculture model as it does in other regions (McCharty, et al: 2023), the labor market-rural agrarian change is not linked. In fact, the agricultural economic zone in Aceh remains a subsistence economic zone, with land that tends to continue to shrink due to the change in land function to a non-agricultural economic area. Ironically, the economic structure of Aceh depends heavily on the agricultural sector. Although the growth of Aceh's Regional GDP in the agricultural sector tends to rise slowly, this increase is more due to the rise in the percentage of sub-sector plantation (new farm culture of palm coconut oil), compared to traditional subsectors of food crops, holticulture crops and fishing. Those last three subsectors are traditional labor markets that absorb labour.

In fact, the proportion of the labour force in the agricultural sector in Aceh between 2000 and 2022 is likely to be constant or not significantly changed, from 836 thousand to 878 thousand. However, if we compare that number with the total labour force of 2.3 million in 2020, then there has been a 20% decrease from 2000 to 2020 (BPS Indonesia, 2021). These changes indicate that growth in the Aceh labour force is not comparable to the growth of the labour force in the agricultural sector. Currently, the agricultural sector in Aceh is dominated by the elderly labour force (36-65 years old), while the younger labour force (15-35 years old) prefers to leave the village and work in urban areas (BPS Aceh, 2023).

Migration that occur in rural areas, both internal-international and circular-permanent, are mostly influenced by the availability of jobs and agricultural land. (Moeis et al, 2020). In this context, changes in agricultural land structure and patterns of land ownership can be said to be factors driving migration behavior (Wang, 2013; Xiao and Zhao, 2018). Since the rural area is very identical to the agricultural activity area, agricultural land becomes central to agricultural activities (Liu & Meng, 2019). That's why in economic migration theory, land factors cannot be ignored in migration decisions. On the one hand, land can be an opportunity cost for landowners' households to migrate (Wang, 2013; Xiao and Zhao, 2018) by distributing labour to non-agricultural sectors to maximize household income. On the other hand, land can also hinder migratory behavior within certain households (Vanwey, 2005). This is due to, for example, the necessity of labor input due to the size of land to be managed and ways to increase productivity and income obtained from land entrepreneurs. As for households that do not own land, the opportunity for labor in the household to migrate is as high as the opportunity not to migrate.

In the households level, the process of decisons making for migration is not easy, because migration activities often require costs, job security, and a sense of

security to live and work at the destination (De Jong & Gardner, 1981). There are also variations in household decisions about how to allocate and redistribute labour within households before the decision on migration or no-migration takes place, or on decisions about what kind of migration patterns (circular or permanent) are allowed according to the context of the dynamics of labour within the household (Joarder & Hasanuzzaman, 2008). In this context, land factors as an approach to understanding migration patterns have become highly relevant to the study. Thus, in general, the aim of study is to assess what characteristics of households that have a tendency to migrate or not migrate and to be more specific, this study asses the effect of land factors in the migration decisions of within households studied.

This study is expected to contribute to three-fold. Firstly, the results of this study are expected to cover the gaps in the literature on the influence of land factors on migration in both Aceh and Indonesia, thus enriching the migration and population studies. Secondly, the selection of research locations in rural-coastal areas aims to provide a richer explanation that rural areas in Indonesia can be distinguished by characteristics and topography of villages, such as: high-land village, low-land village, urban-village and rural-coastal village. In this respect, the study aims to enrich knowledge about the dynamics of coastal rural economies and the patterns of migration that they trigger. Thirdly, this research is expected to be a reference for policymakers in terms of public policy issues, population, and employment, as well as on rural economic development policies in Indonesia.

The report will be divided into several sections: the first part is an introduction that explains the urgency and relevance of the research. After the introduction, the theoretical framework used as a tool for this research will be discussed. The third part will discuss an overview of the area of study and the research methods used both in the data collection and data analysis phase. The fourth part, the results and discussions of research to answer research questions and discuss further the relationship between land-factor and migration that exists at the research site. The final part is the conclusion of this study.

B. METHOD

The research was conducted in four coastal villages in the Bireuen District of Aceh Province, Indonesia, during July and August 2023. The villages were pre-selected based on their rural-coastal location. The criteria used for selection were: The village selected for the study must be located in a coastal area or be part of a coastal community with livelihoods that reflect this. The main livelihoods of the people in the village should be farming, fishing, and shrimp farming, and the village should have agricultural land primarily for paddy-rice fields and fishery cultivation land (shrimp/ fish farms). The four selected villages were divided into two types: those with both paddy-rice fields and shrimp/ fish farms, and those with only shrimp/ fish farms. Distinguishing between these two typologies is important in the coastal rural landscape. The criteria for selecting villages are also determined through field observations to ensure they meet the research design criteria. Four villages have been

selected from two sub-districts in Bireuen, namely Samalanga and Simpang Mamplam. Each sub-district has one village representing the typology of villages that have paddy-rice fields and shrimp/ fish farms, and one representing the typology of villages that have only shrimp/ fish ponds. It is important to distinguish between these two typologies as the living conditions and livelihoods of communities may vary depending on their topographic and socio-economic backgrounds.

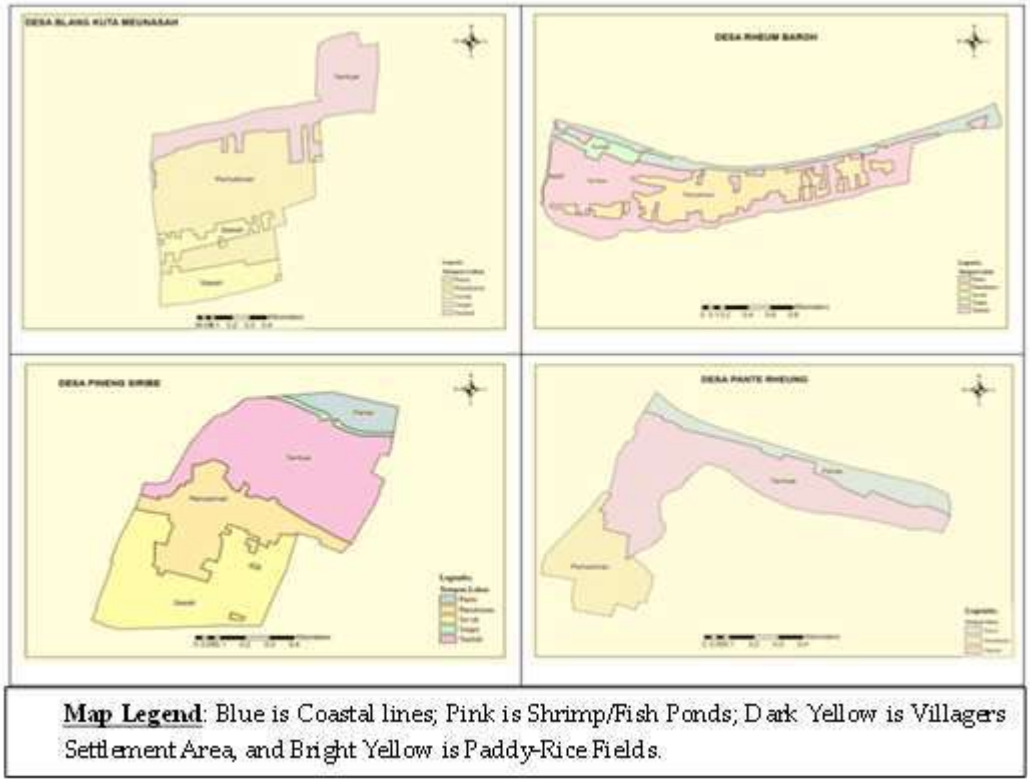


Figure 1. Four Villages Map

Source: Authors

The four villages selected are as follows: (a) Village Blang Kuta II Meunasah. The village is located in the sub-district of Simpang Mamplam with a total of 333 households in 2019. The topographical characteristics of the village are villages that have *sawah*, *kebun* (small-plantation area), and *tambak*. Although this village does not have a coastline, but the distance from the village is less than 1 Km. (b) Rheum Baroh Village (Simpang Mamplam). The village is directly bordered by Blang Kuta Meunasah II. In 2019, the number of households in the village was 258. This village has a topography of a coastal village that has a *tambak* land but no *sawah* land. (c) Pineng Siribee village, located in Samalanga sub-district. This village has a topography of sawah land and tambak land. The number of households in the village in 2019 was 230. (d) The village of Pante Rheng has a topography of coastal villages that do not have *sawah* land land but have tambak land. The village is located in the sub-district of Samalanga with the number of households in 2019 amounted to 302. The demographic and land profiles of each village are presented in Table 1 and Figure 2 below:

Tabel 1. Descriptions of Area Study and Population Sampling

Area Studi and Sampling	Blangkuta Meunasah	Rheum Baroh	Pineng Siribe	Pante Rheung	Total
Total village area (*)	103,80	205,01	83,10	52,07	443,98
Settlements	54,16	61,87	18,29	13,07	147,40
Sawah	18,64	0,00	26,56	0,00	45,20
Tambak	30,99	106,59	32,65	30,07	200,30
River	0,00	10,30	1,02	0,00	11,33
Coastal lines	0,00	26,25	4,58	8,92	39,75
Population (**)	1302	1161	913	1311	4687
No. Households (**)	333	258	230	302	1123

(*)The area of the village is the area that exists in 2023 and is calculated using the ArGIS method by the author; (**)Data Population and Household Number based on data from the Central Statistical Agency of Bireun District in 2019.

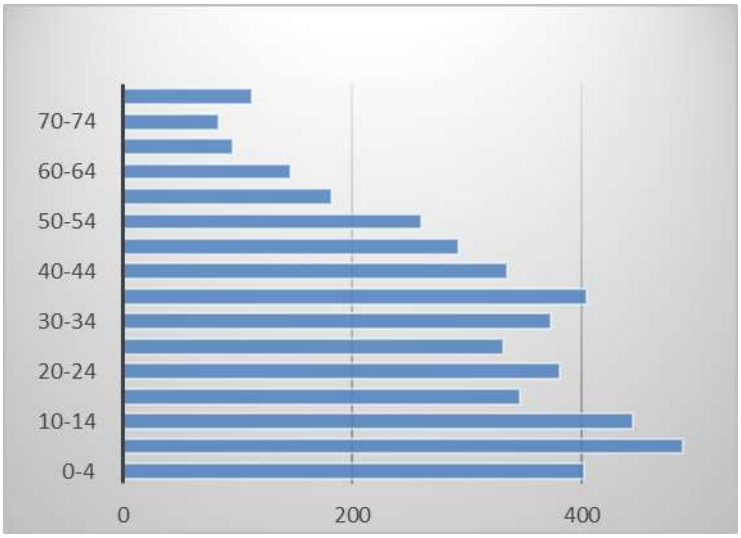


Figure 2. Population Pyramid of Four Villages Study

Source: Author calculation based on Data Dukcapil Kemendagri RI (2023)

The study employs a quantitative research approach to examine the correlation between land factors and migration patterns at the household level. Data collection was conducted from July to August 2023 using structured questionnaires in surveys and interviews with household respondents. This household survey questionnaire covers household profiles, including demographics, education, and labour; ownership and management of farm assets; household economies, including farm income, non-farm income, and expenditure; social assistance and remittances; as well as migration experiences. The total number of households in the four villages was 1,123, while the sample population was 92. The sampling was determined using the Slovin formula with a 10% error limit. Households are sampled proportionally according to the distribution of household sizes in each village. Within each village, the sampling distribution is further divided proportionately based on the distribution of household sizes in each sub-village. Respondent households are then randomly

selected from each sub-village. The minimum distance between respondent locations is 200 metres. There were 226 labors in 92 households.

The method of analysis is divided into two parts: the descriptive-quantitative and the inference model - the multiple linear regression test.

1. Statistical-descriptive analysis informs the key characteristics of households and labour and to contextualize the process of formation of migration patterns in the four research villages.
2. A multiple linear regression analysis will test the significance of the labor and household characteristic across migration patterns, where all independent variables are considered simultaneously (n=226). Multiple linear regression test is used to evaluate relationships and predict relationships between variables (Martin and Bridgmon, 2012). The surveyed household's labour force is the dependent variable, while age, education, number of household members, household income, household expenditure, and access/ownership of agricultural land are the independent variables that affect the village labour's migration decision-making across migration patterns. To facilitate the analysis, the individual labour sampling was sorted according to migration patterns. There were 119 no-migration labourers, 56 circular labourers, and 51 permanent migration labourers.

The formula used is Y = a + bX + cZ which is then translated into the formula as follows:

$$Treatment\ 1:\ Y_1 = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \varepsilon_i$$

$$Treatment\ 2:\ Y_2 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon_i$$

$$Treatment\ 3:\ Y_3 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon_i$$

Whereas:

Y1 = Circular Migration;	X1 = labor age
Y2 = Permanent Migration;	X2 = labor education;
Y3 = No-migration.	X3 = the size of household;
β_0 = konstanta	X4 = household income per year;
ε_i= koefisien regresi	X5 = householde expense per year;
	X6 = land ownership (paddy-rice fields, fish/shrimp ponds).

C. RESULTS AND DISCUSSION

Due to the similarities in topography, social culture, and farming activities, we have decided to combine all household and labour force data from each village into one dataset for analysis purposes. The results are presented descriptively. The following subsection aims to inform about household and labour force characteristics and contextualise the migration patterns observed in the four study villages. A multiple linear regression analysis will test the significance of the labor and household characteristic across migration patterns.

Households and laborforce characteristics in four study villages

Our descriptive findings show that the head of household is mostly employed in the informal sector, which is typical of rural livelihood settings, compared to the formal sector. The informal sector is dominated by the informal non-agricultural sector, as opposed to the informal agricultural sector. Out of the 92 households surveyed, 53% do not rely on land for their livelihood. The majority of farmers work in paddy-rice fields rather than in land-fishing farming. The most common occupations in the formal sector are public servants (PNS) and contract officers in government offices. The informal non-farm sector is dominated by local merchants, either as store owners or workers in someone else's store. The characteristics of households also include the number of members and workers. In the surveyed village, the average number of household members ranges from ≤ 4 to 5 ≥ 7, with very few households having more than 8 members. On average, each family has 4.7 members, and the majority of households (63%) have only ≤ 2 workers. The results suggest that there is a significant gender disparity in household labour production, with men contributing more than women, regardless of whether they hold the position of household head or are simply members of the household. The gender of household heads is predominantly male (79%), which is closely related to the age composition of household heads and the number of household members, i.e. households are headed by individuals of productive age and come from families where the age at marriage is less than 20 years.

In the 92 households that we surveyed, we found a total of 226 individuals in the labor force. Of these, 65% were of productive working age. The majority of the labour force had completed high school and worked in the informal sector, while those working in the formal sector were predominantly university graduates. The workforce in the informal non-farm sector was more diverse in terms of education and age. The informal agricultural sector was dominated by the elderly and those with lower levels of education. In the surveyed villages, the agricultural sector employs 14% of the total labour force. The sector comprises of peasants, landlords, rent-land tenants, peasant workers, shrimp farmers, fishermen, and a small number of gardeners.

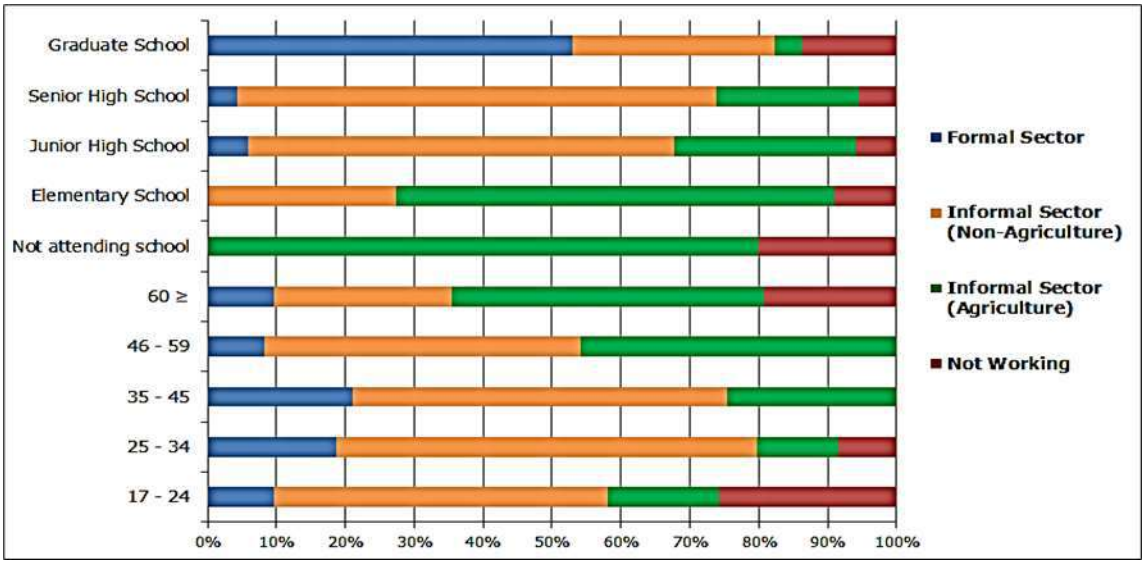


Figure 3. The percentage of labor's occupation sector by age and education

As a traditional livelihood, labour in the agricultural sector has decreased, as shown in the introduction section of this report. This decline can be attributed to several factors, including land use change, inefficiencies in labour input due to disparities in land size, population growth, and other factors. This trend is also evident in our case study. For instance, according to BPS Bireuen (2019), the total size of paddy rice farmland in our study villages was 87 ha in 2009. However, based on our ARGiS calculation in 2023, this figure had decreased to only 45 ha. Although land-farming is decreasing, the total population has increased by 25% from 2009 to 2023, according to BPS Bireuen (2009, 2023). This situation has not only resulted in limited job opportunities for the labors in the village due to the decrease in agricultural activities, but has also led to a shortage of jobs in the village. As a result, some of the labors in the village are looking for alternative employment outside of their village, which we will discuss later as *the formation of a migration pattern*. In the village under study, there are three patterns of migration: Those who stay (no-migration), those who find jobs in surrounding villages (circular migration), and those who move to cities such as Banda Aceh, Medan, Pekanbaru, Jakarta, or work abroad in Malaysia (permanent migration).

The study examines the migration pattern observed in four villages. To establish this pattern, respondents were surveyed about the labor activities in their households. Specifically, they were asked who worked in the household, when they worked, and where they worked between 2009 and 2023. It should be noted that not all family members in a household were considered laborers, as some were still in school. These individuals were categorized as non-labor or as those who would become laborers in the future (*labor creation*). In 2009, out of the 226 surveyed individuals, 93 were non-labor. See Figure 4 for the results of the migration trajectory.

The number of labors in the villages and those who migrate from villages has increased over the years in accordance with the process of labour creation. However, the permanent pattern shows a significant increase compared to the other two patterns and is expected to double in value by 2023. The circular pattern demonstrates

a fluctuating trend, but has a tendency to move towards a flat line in the future. It is because, we found that there was little variation in the labour market situation across a radius of up to 10 km in four villages. In fact, we found that some respondents, who had worked outside their village for several years, returned to the pattern of no-migration. It can be inferred that circular migration is unlikely to undergo significant changes in the future and may even contribute to a pattern of no migration. Seventy-three percent of those involved in circular migration work in the informal sector, encompassing both agricultural and non-agricultural activities. Figure 3 displays a pattern of no migration, followed by a significant increase in movement. This is primarily influenced by the fact that 53 out of 92 heads of household are not moving, along with the addition of young people who are entering the labor market and waiting to be placed in jobs. From the analysis of the three patterns, it is clear that the older people are more likely to remain in the village, while the younger people are more likely to move out of their villages rather than remain at their village to create jobs.

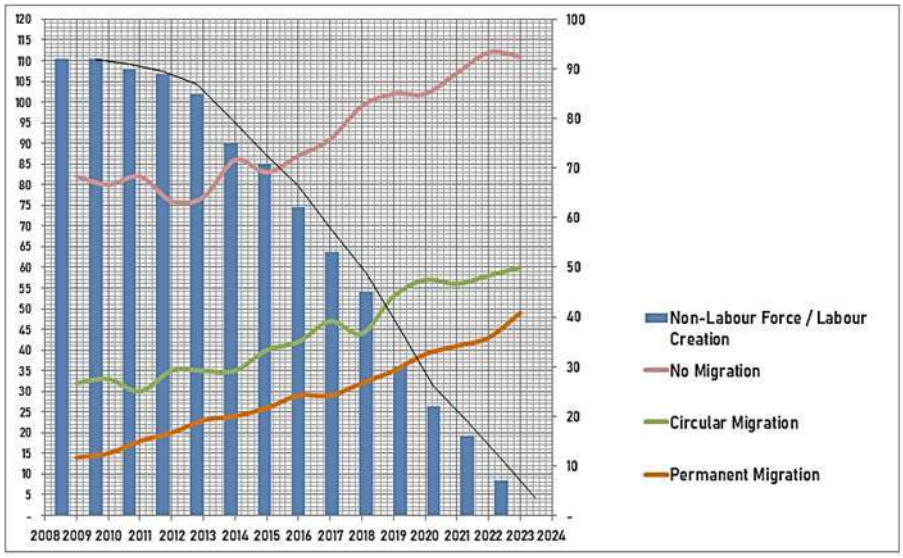


Figure 4. The trajectory migration of village's labor

The formation of village's labor migration patterns

In migration studies, the central question is 'who stays and who moves' in order to understand migration issues (De Jong & Gardner, 1981). This subsection therefore describes how village labour migration patterns emerge in the context of household studies. The migration patterns considered are no-migration, circular migration, and permanent migration. Table 3 presents the results of household and labor characteristics across migration patterns.

Among the 226 village workers, 53% show no migration behaviour. The average age of the labourers who live and work in the village is over 50. They mostly come from households size with ≤ 4 and 5 ≥ 7 member. In households with three or more members, there are only a small number of people who work in the village. Those who do have a job in the village have lower education levels. However,

younger workers with higher education tend to work outside the village. The findings show that 119 out of 226 people work in the village. Households with fewer than four workers are also the most likely to live in the village (no-migration). The percentage of those who own farmland and do not own farmland is equal in the no-migration pattern.

The circular migration pattern is primarily composed of individuals working in the non-informal sector, including local traders, manual construction laborers, and both permanent and contractual civilian servants for government agencies. This pattern is also found in households with a number of household members ≤ 4 and a labour force of 3 ≥ 4. There is no difference between households that own land and those that do not. The percentage remains similar, but the difference lies in the income of their families. Households with incomes ranging from 25-75 million rupiah tend to exhibit circular migration patterns, which are distributed across age categories and education levels.

Permanent migration patterns, as well as those who work in cities outside their districts, provinces, or abroad, are dominated by the young labour force aged 17-34. However, they represent only 17% of the 226 surveyed workers. The majority of them work in the informal non-farm sector, which is similar to the circular migration pattern. This indicates that the quality and skill level of the workforce in the village is still low. Permanent migration patterns mostly involve individuals with a senior high school education level seeking employment opportunities. The average remittance sent to their family in the village is Rp 1.2 million per month for those who have experienced permanent migration. Furthermore, those who migrate permanently come from at households that have members of a household of 5 ≥ 7 and the size of laborforce in a householder of ≥ 5. This is an indication that larger households with more labour force members are more likely to have permanent migrants

Do land factors affect rural out-migration behavior or do other household characteristics matter?

Table 2 shows the results of the Pearson test, indicating weak relationships between the independent variables and both no-migration and circular migration patterns, but a moderate relationship with permanent migration. None of the independent variables demonstrated a strong or very strong relationship with any of the three migration patterns. The correlation coefficients suggest a very weak relationship between the independent and dependent variables.

Table 2. Pearson Correlation test for all labor in the household (n=226)

Pearson Correlation Test			
Dependent Variable			
Labor	No-Migration	Circular Migration	Permanent Migration
Independent Variable	I	II	III
Age	-.102	.041	-.016
Education	-.099	.037	.019
The size of household	.298	.145	.430

Household incomes	-.120	-.147	-.142
Household expenses	.067	.024	-.188
Farm Land assets	.051	-.153	.377
N	119	56	51

Source: Authors

The results of the coefficient test for the treatment model are presented in Table 3. The regression analysis indicates that four independent variables partially affect no-migration patterns. The age variable has a negative correlation with no-migration and is significant at the 10% level. There is a negative correlation between education level and no-migration patterns, indicating that those with higher education are more likely to migrate. However, the variable of household size shows a positive correlation with no-migration patterns. This implies that an increase in the number of household members results in more individuals working within the village. Similarly, land ownership is favourably associated with no-migration patterns. The results show that households owning more land tend to work more in the village and are less likely to migrate. All independent variables significantly impact no-migration behaviour at the 1% level of significance.

Table 3. Coefficients Test for all labors in the households (n=226)

Independent Variable	**Dependent variable**		
	No-Migration	Circular Migration	Permanent Migration
Age	-.008*	.004	.002
	(.064)	(.505)	(.893)
Education	-.116**	.071	-.047
	(.044)	(.401)	(.653)
The size of Household	.370***	.122	.701***
	(.001)	(.331)	(.000)
Household income	-0.000004436	-3.75E-06	4.09E-06
	(.137)	(.156)	(.532)
Household expenses	0.000002955	2.31E-06	-1.85E-05**
	(.547)	(.685)	(.033)
Land Assets	.086**	-.053	.166**
	(.027)	(.259)	(.029)
Constanta	1812	1,215	.949
	(.000)	(.037)	(.208)
R square	.180	.098	.388
F-Test	4100***	.890	4651***
	(.001)	(.510)	(.001)
N.(Obs)	119	56	51

Note: *** is p<0.01; ** is p<0.05; * is p<0.1.

Sources: Authors

Table 3 presents the results of circular migration patterns that are not influenced by the independent variables. However, two variables have an impact on the patterns of permanent migration. Firstly, an increase in the number of household

members leads to an increase in permanent migration, indicating a positive correlation between the two. Secondly, household expenditure is negatively correlated with permanent migration, with a coefficient of 5%. Households with higher expenditure tend to have lower permanent migration rates than those with lower expenditure. Furthermore, land ownership shows a positive correlation with permanent migration at a 5% level of significance. Owning more assets within a household may increase the likelihood of being permanent migrants. All independent variables have a significant effect on permanent migration at the 1% level of significance. However, the R-squared value is only 38.8%, indicating that other independent variables also have a significant impact of 61.7%.

D. CONCLUSIONS

Land as system of production in rural agrarian setting has a complexities dimension on migration issue. On the one hand, land can induce people to migrate (*cost of opportunity*), on the other hand land factor also can hinder migration behavior. In the findings of study, we found the relationship of land factor to migration pattern are both induce the 'cost of opportunity' and the 'hinder factor.' The result of regression test support our result of descriptive analysis. While land ownership does not significantly affect the likelihood of migration. It follows that other factors can also affect the migration patterns of the labour village, such as age, household size, composition of the household labour force, and poverty levels. For instance, no-migration patterns are often observed in households with ≤ 4 and 5 ≥ 7 members. Circular migration patterns involve households with ≤ 4 member and laborforce 3 ≥ 4. Permanent migration, on the other hand, observed at households size with 5 ≥ 7 members and household laborforce ≥ 5. This suggests that households with more members in the labour force are more likely to engage in permanent migration. However, older labor in the villages are hindered from moving out due to their reliance on land as a livelihood system. Figure 3 indicates that younger labourers are more likely to migrate out of the village than older ones. Finally, the research findings indicate that there is a low number of permanent migrants who move from the villages to other cities or abroad (Malaysia).

The result of the study support the statistical result of low rate of out-migration in rural Aceh. While McCharty et,al (2023) in their study in lowlands agriculture in Aceh conclude that migration as household diversification strategy is limited. We found a slight similar conclusion in rural-coastal setting of Aceh. While most of labor force and poor people live in rural Aceh are heavily depend on agricultural subsistence system and tend to not moving out the village, the discussion of migration dynamic should encourage the importance of agriculture land development in rural area setting. As McCharty et,al noted: "in the context of no clear agrarian transition in rural Aceh, the upward trajectories development does not meet expectation of many analysts, instead of 'progressing sideways' scenario. It means while the pluriactive jobs in rural side do occurs, but they experience is on stagnation, indebtness, survival and progress (McCharty, et al, 2023; 135). Thus, the importance of agriculture land

development in rural area setting is not only focus on how to improve land productivity but also on how agriculture land can serve as a labor market that absorb more labor in the village, especially to youth labor. In line with the argument, we suggested to policy makers to approach the labor market matter in the agricultural village setting using the village funds mechanism.

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