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Household Income Structure

Among Paddy Farmers in the Granary Areas of Malaysia

Rika Terano[1+] and Zainalabidin Mohamed [2]

Department of Agribusiness and Information Systems, Faculty of Agriculture,
University of Putra Malaysia, 43400 UPM Serdang Selangor, Malaysia

Abstract. Economic disparity between rural and urban areas is one of the persistent issues that have been discussed among politicians, academics and especially among paddy farmers. Traditionally, paddy farmers have been mired in poverty and their livelihood largely relied on on-farm and off-farm incomes. However the industrialization revolution has encouraged the manufacturing sector to set up factories in the rural paddy granary areas especially on the West Coast of Peninsular Malaysia. Thus these farmers have the opportunity to become employed as part-time factory workers. Since most of the development has been concentrated on the West Coast, the East Coast has been left behind from industrial development. Hence the opportunity for East Coast farmers to seek part-time jobs to earn an off-farm income as a factory worker is not readily available. Therefore it is imperative to investigate the impact of off-farm income disparity between paddy farmers on the West Coast and East Coast with regards to their household livelihood and the situation of the rural economy. The study focuses on the actual income distribution, structure and differences between on-farm and off-farm incomes at the household level. A structured questionnaire was designed to capture the information needed and surveys were conducted among five rice granary areas on the West and East Coasts. The results show that the average farm household income was RM1,824 in Kelantan, followed by RM2,947 in Kedah, RM2,969 in Terengganu, RM4,792 in Penang and RM4,895 in Selangor. Income inequality in Kelantan was the highest at 0.49 as measured by the Gini Coefficient. Out of the five granary areas, Kelantan's farmers have suffered from having the least amount of opportunities for generating on-farm and off-farm income which has led to a widening of income inequality amongst these farmers. .

Keywords: income disparity, paddy farmers, on-farm income, off-farm income, Gini Coefficient

1. Introduction

Among Southeast Asian countries, Malaysia has achieved the most dramatic economic growth since the late 1980s. This is largely due to investments by foreign multi-national companies in the manufacturing sector. Demand for labour in industrial zones increased steadily, and Malaysians started seeking employment as factory workers. While the increase in job opportunities provided cash income to employed workers in some industrialized states, agriculture remained the dominant sector in other states. Due to the difference in employment opportunities between more and less urbanized states, regional economic disparity has become an acute issue. The Malaysian government recognized this social problem as a key issue, reporting that this gap is very wide amounting to a 0.441 Gini coefficient in the Ninth Plan period (2006-2010).

In order to achieve the "Wawasan 2020 (Vision 2020)" goal, in which Malaysia aims to become a developed nation, the government has put an emphasis on rural development for reducing regional income disparity in urban-rural areas. Paddy has been one of the strategic sectors for food security in Malaysia and the Malaysian government has implemented a protective policy i.e. a subsidy scheme for paddy farmers. Numerous technological changes have raised the yield and productivity of paddy since the 1970s especially in selected granaries located in eight areas of Peninsular Malaysia. The majority of the Malaysian paddy farmers are smallholders who work on small uneconomic plots (Acharya, 2000).

As the country developed, the role and contribution of agriculture to the Gross Domestic Product (GDP) in general has declined and been taken over by the manufacturing sector. As Yokoyama (1990) noted in his

study, the Malaysian economy developed by relying on the manufacturing sector, which contributed more than 50 % of Malaysia's total exports in 1989 which is still the case today. While in the 1960s the manufacturing sector was still dependent on the domestic market, by the 1970s the export of Malaysian manufactured products had experienced an annual double digit growth rate. The growth of the manufacturing sector entailed structural changes in the entire Malaysian economy. The share of the manufacturing sector to the GDP increased from 12.2% in 1970 to 26.1% in 2009, while the share of the agricultural sector declined from 32.1% to 7.5% in the same period.

Industrialization through the manufacturing sector brought job opportunities in industrial zones and cash earnings as a salary which meant many Malaysians' livelihoods became rapidly diversified. Ooi (2004) traced the transitional phase of the Malaysian economy to industrialization from the 1970s to the 2000s, and clarified the impact on the working style, whereby the employment structure became more diversified in the sense that more women were being employed in the manufacturing sector so most households were receiving a double income. Although industrial development has created job opportunities for rural communities, development has been concentrated mainly on the West Coast rather than the East Coast. Due to more convenient infrastructure and a geographical advantage, increased job opportunities were mainly felt on the West Coast. In order to determine the actual changes in the household's structure on the West Coast, Fujimoto (1995) focused on socio-economic changes, especially in the rural sector on the West Coast of Peninsular Malaysia, in terms of employment structure including on and off farm activities. He clarified that economic development had changed economic activities at the household level. Off-farm income has become a vital income source for sustaining farm households in the paddy growing communities on the West coast areas.

This study focuses on the main paddy granary areas, where paddy farmers live as typical farmer holding a small scale of land. The objective of the study is to investigate income structure in terms of on-farm and off-farm income in five paddy granary areas on the West and East coast. A survey was conducted in the five areas from 2010 to 2011 using a structured questionnaire. The specific objectives of this paper are as follows: (1) to clarify income distribution of household income in the main paddy granaries, (2) to measure the income inequality of paddy farmers' households, and (3) to examine the determinant factors influencing household income in the paddy granaries located in both coastal areas.

The following methods were used in this study. First, income distribution at the farm household level in five areas was measured for the household income, which was divided into on-farm and off-farm incomes. Second, we focused on computing income disparity among farm households by using the Gini-coefficient in both coastal areas. This enabled the researcher to understand the reality of the income gap and of the specific groups which brought about a wider gap in household income. Third, determinants of household income in the five areas were clarified by using linear regression analysis.

2. Material and Method

The survey was conducted in 2010 in paddy granaries in Peninsular Malaysia. These areas are: 1) the Muda Agricultural Development Authority (MADA); 2) Kemubu Agricultural Development Authority (KADA); 3) Barat Laut Selangor Integrated Agriculture Development Area (IADA Barat Laut Selangor); 4) Penang Integrated Agriculture Development Area (IADA Penang): and 5) North Terengganu Integrated Agriculture Development (KETARA). Random sampling was used to select paddy farming household heads under the same farming and irrigation systems. In total, 201 farmers were selected as respondents to answer the questionnaire. Based on the context of industrialization in Malaysia, the former three areas are on the West Coast and are located in commuting distance from industry zones like Penang or sub-urban areas of cities. The latter two areas are on the East Coast and are located far from the main cities (Table 1 shows the distribution of the sample from each region)

3. Results and Discussion

Table 1 shows the characteristics of the paddy farmers and their households. While most of the farmers from IADA Pinang were part time farmers, only a limited number of the farmers from IADA Selangor worked as part time farmers. Even though both are located on the West coast, the location of IADA Pinang is

much closer to the industrial part of state. Furthermore, though the average farm size in IADA Pinang is smaller than the other areas, there are also more farm owner than the other areas. Additionally, the main pattern of tenant status in KADA was 'landlord' which is covered by Ladang Merdeka Manan. Most of the households belonged to part-time farm households in the areas, and almost half of the household heads were employed in rice farming and a secondly job.

Table 1. Outline of the studied villages and their characteristics

Items	MADA	IADA Pulau Pinang	IADA Barat Laut Selangor	KADA	IADA KETARA
Number of households studied	40	42	42	37	41
Average familly size (persons)	4.8	5.6	5.1	5.0	5.5
Job of head of household					
Full-time (paddy only)	13	17	17	3	12
Part-time	27	25	25	0	29
Characteristics of household					
Full-time farm household	10	3	14	-	5
Part-time farm household	30	39	28	3	36
No.of farmers by tenurial status					
Landlord	0	9	0	50	0
Landlord-owner farmer	0	1	0	1	0
Owner farmers	4	21	11	0	9
Owner-tenant farmers	17	16	8	1	13
Tenant farmers	19	5	23	3	19
Average farm size (acre)	8.2	2.7	6.3	0.8	6.9

Source:Oen survey 2010 and 2011.

Note:farm land size does not include the land of landlord in Penang state.

3.1. Income distribution

Total household income includes all existing incomes such as on-farm and off-farm incomes, remittances from non-residential children, pensions and paddy subsidies received by the farm households. The average total household income is highest in Selangor and on-farm income in Kedah and Penang were the second and third highest followed by Selangor. While average households income were RM4,792 in Penang and RM4,895 in Selangor, the rest of the areas had lower incomes than the overall average income. This amounted to RM2,947 in Kedah, RM1,824 in Kelantan and RM2,969 in Terengganu. In Terengganu, on the other hand, rubber tapping is common and popular among farmers and their wives for supplementing their household income (see Table 2)

Farm households income	Penang (N=42)			Kedah (N=40)			Selangor (N=42)		
	Frequency	Average (ringgit)	SD	Frequency	Average (ringgit)	SD	Frequency	Average (ringgit)	SD
less than 1,000	2	605	261	5	611	133	2	728	305
1,000-1,999	3	1,584	172	10	1,408	283	9	1,394	239
2,000-2,999	6	2,410	307	9	2,506	326	7	2,687	280
3,000-3,999	6	3,470	319	5	3,432	199	7	3,455	269
4,000-4,999	10	4,582	296	6	4,447	238	8	4,618	295
5,000-5,999	4	5,328	150	2	5,527	252	1	5,756	-
6,000-6,999	3	6,328	284	1	6,952	-	1	6,812	-
7,000-7,999	2	7,446	71	1	7,577	-	1	7,042	-
more than 8,000	6	9,808	2,557	1	8,779	-	6	15,338	7,840
Overall average	42	4,792	2,793	40	2,947	1,989	42	4,895	5,335

Farm households income	Kelantan (N=39)			Terengganu (N=41)			Overall (N=202)		
	Frequency	Average (ringgit)	SD	Frequency	Average (ringgit)	SD	Frequency	Average (ringgit)	SD
less than 1,000	16	546	246	7	522	281	29	581.4	238.9
1,000-1,999	8	1,390	351	8	1,417	131	41	1,431.0	256.9
2,000-2,999	7	2,312	207	8	2,328	288	36	2,507.8	296.0
3,000-3,999	5	3,400	251	10	3,419	323	33	3,443.3	273.4
4,000-4,999	1	4,908	0	3	4,610	258	25	4,508.6	287.4
5,000-5,999	0	-	-	2	5,735	139	14	5,547.5	291.1
6,000-6,999	1	6,083	0	1	6,808	-	6	6,547.3	381.4
7,000-7,999	1	7,092	0	0	-	-	4	7,288.7	238.9
more than 8,000	0	-	-	2	10,916	1,885	13	12,258.0	5,992.2
Overall average	39	1,824	1,617	41	2,969	2,433	201	3,470.7	3,237.9

Source: Own survey in 2006, 2008, 20010 and 2011.

Table 2: Income distribution of total household income in the five areas.

3.2. Income inequality

Income distribution explained the different characteristics of household income in terms of on-farm and off-farm income. In this section, we attempted to measure quantitatively the degree of skewness of the income distribution by using the Gini coefficient. The Gini coefficient indicates the degree of concentration and income inequality. It is based on the covariance between income Y of an individual or household and F

rank that the individual or household occupies in the distribution of income, and this rank takes a value between zero, representing the poorest, and one, representing the richest. Denoting the mean income by Y thestandard Gini coefficient is defined as: Gini=2 cov (Y, F) / Y . Table 3 shows the Gini coefficient of total household income in terms of on-farm and off-farm income in the five areas. Comparing the Gini-coefficients in both coastal areas, it can be seen that there was wider inequality on the West coast (0.428 among 121 farm households) than on the East coast (0.378 among 79 farm households). In terms of off-farm income, there was wider inequality in Selangor and Kedah. There were rather lower Gini-coefficients in Kelantan and Terengganu. This could be due to the fact that off-farm income is not a predominant income source in the income structure in Selangor and Kedah. The Gini-coefficient for Kelantan indicated that the state had wider inequality than the other areas in farm household income in both on-farm and off-farm income. Overall, the Gini-coefficients for the states on the West Coast were smaller than the East Coast for both on-farm and off-farm income.

Table 3: Gini-coefficient of household income in the five areas.

Areas	Gini coefficient		
	Total income	On-farm income	Off-farm income
West coast (N=121)	0.428	0.619	0.477
Penang (N=42)	0.280	0.253	0.209
Kedah (N=40)	0.354	0.402	0.620
Selangor (N=42)	0.445	0.498	0.604
East coast (N=79)	0.378	0.509	0.541
Kelantan (N=38)	0.499	0.609	0.517
Terengganu (N=41)	0.396	0.608	0.459

Source:Own survey

3.3. Determinant factor of household income

As described previously, household income in each area has a different character. This section attempts to clarify which variables are significant in determining farm household income by conducting regression analysis. The model used is as follows:

$$Y=a + bi\ Xi+...+bjXj+u;\ \text{Where;}$$

-Y is the total monthly household income (Ringgit).

-X1 is the number of family members (persons); -X2 is the farm size in acres.; -X3 is the age of the head of the household in years; -X4 is a dummy variable for characteristics of the household: 0 for full-time and 1 for part-time farm households; -X5 is a dummy variable for the occupation of the head of the household: 0 for a full time farmer and 1 for a part time farmer; -X6 represents the location: 0 is given for the East coast and 1 represents the West coast-X7 is a dummy variable for Kedah: where 1 is given for Kedah and 0 is given for the other states; -X8 is a dummy variable for Penang state: 1 equates to Penang and 0 is given for the other states; -X9 is a dummy variable for Selangor state: where 1 is given for Selangor and 0 equates to the other states; -X10 is a dummy variable for Kelantan state: 1 represents Kelantan and 0 represents the other states; -X11 is a dummy variable for Terengganu state: 1 equates to Terengganu and 0 is given for the other states,

One of the characteristics of a household in the granary areas is the pattern of employment of whether the family members are employed as workers in the off-farm sector or are employed on the farm itself. The other characteristic is the occupation of the head of the household as to whether they are a full-time or part-time paddy farmer. Four regression models were estimated: 1) Model I examines the differences in household income between the West and East Coast areas; 2) Model II examines the difference among the two areas on the East Coast; 3) Model III examines the difference among the three states on the West Coast except for Kedah; and 4) Model IV examines the difference among the three areas on the West Coast except for Selangor. The result of estimation in the regression analysis is shown in Table 4. The estimated regression for Model I shows that farm size and household characteristics between full-time farmers and part-time farmers were statistically significant at the 1% level which had a positive sign on household income. The tenancy (renting of land) is significant at the 5% level which had a negative sign. This meant that when paddy farmers rent more land for farming, it actually had a negative impact on their income even

though the farmers could produce more paddy in the larger area. Between both coastal areas, household income on the West Coast tended to be higher. Model II showed that the number of family members was an important factor on the East Coast. Because there are numerous self-employed jobs in Kelantan and Terengganu such as rubber tapping, the number of family members had a positive impact on household income. The location factor showed that there was a similar trend in total monthly household income between both areas. In Model III, type of employment on the farm (full-time or part-time) was an important determinant and was statistically significant at the 5% level. This is because off-farm income could have influenced household income on the West coast especially considering the Penang granary is located nearby industrial parks. Locational differences showed that farm households in Penang and Selangor tended to earn more household income in Model III, but farm households in Kedah was shown to earn a lower income in Model IV.

3. Conclusion

Average household income was RM4,895 in Selangor and RM4,397 in Penang. These were the highest and second highest average household income in the five areas respectively. Also the average household income in Terengganu and Kedah were similar at RM2,969 in Kedah and RM2,947 in Terengganu. We measured income differences in household income in terms of total household income that comes from on-farm and off-farm incomes. There was wider inequality on the West coast areas (0.428) than the East coast areas (0.378). Household income in Penang had the lowest Gini coefficient which came to 0.280. In fact, the Gini coefficients for both on-farm and off-farm income in Penang were very low at 0.253 and 0.209 respectively.

As for the East coast, although Terengganu had a lower Gini coefficient compared to Kelantan, inequality in Terengganu was still higher than in Kedah state on the West Coast. The Gini-coefficient for off-farm income was higher in Selangor and Kedah than the other areas. This is because there are fewer opportunities to earn an off-farm income from a secondary job in both of these areas, which means that the households in these states rely a lot more on on-farm income than on off-farm income.

Table 4. Determinant factor of household monthly income in the five areas.

	Model I		Model II		Model III		Model III	
	Regression coefficient	T-value	Regression coefficient	T-value	Regression coefficient	T-value	Regression coefficient	T-value
a	6.828 ***	5.480	347.013	0.158	-6,555.441 ***	-3.103	-3,705.300 *	-1.862
Farm size (in acre)	0.381 ***	5.656	264.609 ***	4.503	443.788 ***	10.528	443.788 ***	10.528
Age of HH (in years)	0.000	-0.352	-18.833	-0.621	50.014 *	1.618	50.014 *	1.618
Education of HH (in years)	-0.073	-1.088	-13.999	0.203	174.770 **	2.274	174.770 **	2.274
Farming experience of HH (in years)	-0.032	-0.565	9.207	0.35	1.208	0.55	1.208	0.055
Occupantion of HH (Full-time=0, Part-time=1)	0.196	1.399	1,464.991 *	1.971	-475.264	-0.787	-404.558	-0.751
Full and part-time farm household (Full=0, Part=1)	0.599 ***	3.584	727.853	0.857	2,540.656 ***	3.538	2,540.656 ***	3.538
Number of family member (in person)	-0.676 ***	-5.906	362.673 ***	3.193	120.119	0.976	0.976	0.331
Tenancy (Renting land in=1, No rent=0)	-0.340 **	-2.393	-1,549.959 *	-1.648	-404.558	-0.751	-404.558	-0.751
Location dummy (West coast=1, East coast=0)	0.503 ***	3.908						
Location dummy (Terengganu=1, Kelantan=0)			-772.239	-0.678				
Location dummy (Kedah=1, other areas=0)							-2,850.141 ***	-5.077
Location dummy (Penang=1, other areas=0)					3,887.644 ***	5.709	1,037.503	1.559
Location dummy (Selangor=1, other areas=0)					2,850.141 ***	5.077		
R square	0.368		0.417		0.602		0.602	
F-value	14.070		5.408		17.059		17.059	
N	200		77		123		123	

Source: Own survey

Note: On-farm income includes subsidies.

: *** denotes significant at the 1% probability level. ** denotes significant at the 5% probability level. * denotes significant at the 10% probability level.

We examined the determinant factors influencing household income in paddy granaries in both coastal areas of Peninsular Malaysia. The results of the estimation indicate that characteristics like full-time or part-time farm occupation status, tenant status, education and farm size were the main variables affecting paddy farmers' income throughout the five areas. Location was also an important factor in influencing household income. I was shown that farmers located in Kedah, Terengganu and Kelantan had lower incomes.

This study investigated the actual structure of farm household income from not only the income level but also from income difference among the selected five main granaries in Malaysia. It showed that the granary areas in Penang and Selangor had the highest income households, while Kelantan, Terengganu and Kedah

had much lower income households. However, income structures were not the same as the income household levels between the higher and lower income households. For example, even though the level of total household income in Terengganu and Kedah were almost similar on average, the direction of rural development needs to be considered in a different way i.e. in Terengganu for example the off-farm sector such as rubber tapping activities help to increase household income. In the case of Kelantan, the policy needs to leverage the on-farm and off-farm sectors in order to increase their limited household income.

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