From poverty reduction to poverty relief: Impact of non-farm income in Integrated Agriculture Development Area (IADA) Samarahan, Sarawak, Malaysia

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Abstract

Eradication of poverty is the main agenda of the country since independence (1957) and a main thrust of the New Economic Policy (NEP) when it was introduced in 1970. As a result, Malaysia has been able to achieve the goal of reducing poverty, from 52.4% in 1970 to 1.7% in the year 2012. This study examines the impact of non-farm income on poverty and its effect on the time taken to attain relief from poverty. Face-to-face interviews with 220 households of farmers in the Area of Integrated Agricultural Development (IADA) in Samarahan, Sarawak were conducted from December 2005 to February 2006. The objective was to investigate the effect of non-farm income on poverty and to measure the length of time out taken for farmers to emerge out of poverty. The analysis on poverty measurement was done using FGT indices as proposed by Foster, Greer and Thorbecke; and the index introduced by Murdoch was also employed in this study. The results showed that non-farm income reduced poverty by 47.06%, while the poverty gap declined by 58.67% and the intensity of poverty (severity of poverty) decreased by 80.69%. The time required to break away from poverty for poor and hard-core poor farmer households with non-farm income were 8.16 years and 6.51 years, respectively compared with 11.49 years for poor and 8.67 years for hard-core poor farmers without non-farm income. This proved that non-farm income sources were essential in reducing the transition period from poverty reduction to poverty relief for farmers in the IADA .

Keywords: average exit time from poverty, farmers, non-farm income, poverty measurement, poverty reduction, poverty relief

Introduction

Eradication of poverty is the main agenda of the country since independence (1957) and a main thrust of the New Economic Policy (NEP) when it was introduced in 1970. As a result, Malaysia has been able to achieve the goal of reducing poverty, from 52.4% in 1970 to 1.7% in the year 2012. The reduction targets exceeded the expectation set in the Tenth Malaysia Plan (10MP) to 2.0% in 2015. Furthermore, the number of poor households decreased at about 52.7%, from 228,400 in 2009 to 108,000 in 2012 and the average monthly household's income increase at 24.22%, from RM4025 in 2009 to RM5000 in 2012 is more remarkable. It is further acknowledged that the increase of household income and poverty reduction is the result of development initiatives undertook by the government, including the implementation of the Tenth Malaysia Plan, the Economic Transfer Programs (ETP), the Government Transformation Program (GTP), the New Economic Model (NEM) and the National Key Result Area (NKRA) (Department of Statistics, 2013). Sarawak is noted to have among the highest poverty rate in Malaysia since 1970's. In 1976, it was recorded to be at about 56.5% and after twenty years it decreased to 7.3% (1997). However, the poverty rate increased at almost 3.6% within the next two years which at about 10.9% in the year 1999 due the adverse effect of the financial crisis in Asian region. In 2004, a revision was done to the

poverty line and the incidence of poverty in Sarawak state tremendously decreased to 7.5% and currently in 2012 it is recorded to be at 2.4%. However, among the states in Malaysia, Sarawak is ranked the third highest in poverty within Malaysia (EPU, 2013). In 2006, the agricultural sector was noted to be the fourth highest contributor to Sarawak's GDP valuing RM7472 million (16.33%) and it is expected to increase to the projected amount of RM9331 by 2015 (Malaysia, 2010). Yet, the workers in this sector declined from -0.2% in the Ninth Malaysia Plan to -0.1% in the Tenth Malaysia Plan. The disparity in income levels and economic status between rural and urban area are still wide. A variety of programs was designed to reduce this gap and one of such agriculture program for rural people, is known as the Integrated Agricultural Development Area (IADA). The program serves as a platform for rural socio-economic improvement. It has adopted several strategies designed to increase productivity, maximize farmer's income and modernize farm operation. Established since 1986, the program was enforced in an area covering 86,170 hectares. The main objective is to turn the area into the most important food production zone in Sarawak. The crops that were grown in this area included cultivated pineapple, fruits and short term crops. The impact of this project is seen when it has successfully alleviated poverty rate from 77 percent in 1986 to 19.5 percent in the year 2005 (Nor Diana Mohd Idris, Siwar, Talib, & Berma, 2012). Although agricultural resources are essential to the livelihood of the farmers in this area, diversification of income is important in terms of their adaptation to vulnerability factors such as those related to insufficient aids provided by agencies and climate change that could threaten the farmers' day to day live. This strategy is a preparation for various purpose, namely to attain a sustainable livelihood for farmers as a contributor to national food security, the ecological maintenance of environment and sustainable social development through the improvement of living standards towards a more peaceful and conducive environment. In relation to this circumstance, this article has two main objectives; the first examines the impact of non-farm income activities, and second, the average review time frame to get out from poverty among the poor and hard-core poor with and without non-farm income in IADA Samarahan, Sarawak area.

Aim and scope

Off-farm livelihoods strategies are extremely important (Ellis, 2008). They are important sources of income for households, serve as engine of growth for rural areas (Haggblade, et al. 2010) and also as a key to success to poverty alleviation and reduction of income inequality. They are also found as tools to accelerate the time it takes to exit from the poverty trap among the farmers who are involved in these activities compared to those who did not participate (Siti Hadijah Che-Mat, et al. 2012). A study was conducted by USDA researchers (Fernandez-cornejo, et al., 2007) among farmers in United States and it was concluded that non-farm income clearly does not only add to total household income, but also improve efficiency and other measures of performance of the farm households. According to (Janvry & Sadoulet, 2001), more than half of farm households' income in the Mexican agriculture sector were generated from non-farm activities. Their participation in these activities helped to reduce poverty and contributes to greater equality in the distribution of income. Non-farm income is one of the financial assets among the rural people as well. It is also an important indicator tool that can be used to measure their level of contentment. One example is seen in research done by Roslina et. al. (2013), who employed non-farm income as this indicator among the paddy farmers in Kedah beside human asset. It was highlighted that this is so because the people here acquired livelihoods in a variety of ways, with varying degrees of success regarding to their possession of livelihoods assets, access to resources and capability to manage their assets and resources. Another study done by M.Diiro (2013) reported that the diversification of household income was a strategy used for increasing capital availability in elevating the uptake of the modern purchased inputs to enhance an efficient maize production in Uganda. Furthermore, the role of non-farm income was also applied to measure farmers' household ability to repay their debt in the United State (Briggeman, 2011). Involvement in non-farm activities also depends on age, gender, liabilities, income and type of crop grown (Norsida Man & Sami Ismaila Sadiya, 2009). Worldwide, the literature

on the effect of non-farm income on the farm sector presents mixed conclusion, depending on the objective of the studies done by the scholars involved. The exit time can help policy makers contemplate ways to promote economic growth and alleviate poverty. Targeting interventions that enhance livelihood diversification would ultimately have a positive impact on farmer's welfare. Non-farm income is generated when a farmer, spouse or other family member works off of the farm, thereby generating extra income for the family. In this study, non-farm income is an income from business activity and salary/wages from non-farm activity.

Methodology

Study area and data collection

The study area for this research is the Integrated Agriculture Development Area (IADA) in Samarahan, Sarawak involving 14 villages in the Central Division and Ulu Samarahan. The aim of the area is to promote integrated approaches in the effort and activities of all departments and agencies under the Ministry of Agriculture and Agro-Based Industry of Malaysia. One of the activities of this area is to boost farm productivity and maximize income of the farming community here in order to reduce the income gap among the people in the Division. The study was conducted within the production period of December 2005 to February 2006 by using questionnaires and conducting face to face interviews with 220 farmers who were randomly identified from stratified sampling frame.

Measuring poverty

To fulfil the first objective, FGT index was used to identify the impact of non-farm income to poverty and also among the distinguished groups. The study utilized the method used by Siti Hadijah Che-Mat et al., 2012 in their study to examine the average exit period from poverty among farmers in Kedah, Malaysia. This study employed the FGT indexes to estimate the impact of non-farm income on poverty with three special cases of measurements that correspond to three different values for α: 0, 1, and 2 (EPU, 2005).

1. The headcount ratio:
When $\alpha = 0, P_0 = \frac{1}{n}\sum_{i=1}^{m}\left(\frac{z-y_i}{z}\right)^0 = \frac{m}{n}$: the most commonly used poverty measure, where P_α index is collapsed to the headcount ratio - the number of poor individuals and (m) is expressed as ratio of the total population(n).

2. Normalize income gap:
When $\alpha = 1, P_1 = \frac{1}{n}\sum_{i=1}^{m}\left(\frac{z-y_i}{z}\right)^1$: this equation is for the income gap ratio, where the measurement captures changes in the incidence and intensity of poverty, but not changes in the equality of income amongst the poor.

3. Normalize income gap squared:
When $\alpha = 2, P_2 = \frac{1}{n}\sum_{i=1}^{m}\left(\frac{z-y_i}{z}\right)\left(\frac{z-y_i}{z}\right) = \frac{1}{n}$: this is the measurement equation of severity and the sensitivity of poverty to changes in income distribution among the poor.

To achieve the second objective, which is to identify the length of time required to reach zero poverty and hard core poverty, the study used the method proposed by Morduch (1998). He improved the index introduced by Watts (1968) by dividing the index in (eq.1) with a certain income growth rate (eq.2). The index proposed by Watts is defined as:

$$W\ (Watts\ indexs): W\ = \frac{1}{n}\sum_{i}^{m}[\ln z\ - \ln y_i] \qquad (1)$$

Murdoch further noted that we could find the period of time for the population to escape poverty using the following equation:

$$t\gamma = \frac{1}{n}\sum_{i=1}^{n} t_j \gamma\ = \frac{1}{n}\sum_{i=1}^{m}\frac{\ln z - \ln y_i}{\gamma} = \frac{W}{\gamma} \qquad (2)$$

Where;
z = poverty line income (PLI)
y_i = individual income of i to m
m = listing of households below PLI
γ = income growth rate
n = total sample

This method is important to achieve the study objectives in making decisions on the average length of relief from poverty for all respondents at the specific growth rate of income (γ). To obtain the value for average exit time for the poor to come out from the poverty trap $t^p(\gamma)$ is divided by eq. (2) or $t(\gamma)$ with head count of ratio, as follows:

$$t^p\ (\gamma) = \frac{t(\gamma)}{P_0}$$

Where, P_0= head count ratio =m/n, with m as the total number of poor households and n is the total sample of study

Findings and discussion

The discussions of the results begin with the sources of household income in IADA Samarahan which are on-farm income, non-farm income and other income. On–farm income covers those earned from main crops, while non-farm income is gained from wages, salary and business activity. Other income on the other hand includes remittance, transfer payment, royalty and dividend. As illustrated in Table 1, the largest portion of income (with more than half of the total portion) earned in the household the hard-core poor farmers came from on-farm activities, followed by other income (17 percent) and non-farm income (12 percent). It can be concluded hence that the groups still heavily rely on remittance and agencies to support their day-to-day living cost. But an interesting result can be observed in poor farmers' group, whereby the monthly non-farm income is equal to the income per capita of the households in this area. It is shown that the non-farm income is able to support the expenditures of the household individually; the portion of the income is not much more than the on-farm income indeed. Whereas the non-poor groups they showed more capability to get involved in non-farm activities and to spread their skill to diversify their income with 25 percent of their sources being drawn from activities yielding this income. This result reveals that the higher the rank of the groups in the category, the more reliance there is on non-farm income to survive. The share of non-farm income is positively correlated with the overall income, indicating that the relatively richer households benefit much more from the non-farm sector.

Table 1. Types of income among farmers by category of poverty in IADP Samarahan, Sarawak

Category	Ringgit Malaysia (RM)/USD*			
	Farm income	Non-farm income	Other income	Total income
Hard core poor	241.89 /63.65 (71.35%)	40.71 /10.71 (12.01%)	56.41/14.84 (16.64%)	339.01/89.21 (100.00%)
Poor	340.00/89.47 (62.32%)	106.58/28.05 (19.54%)	98.97/26.04 (18.14%)	545.55/143.56 (100.00%)
Non-poor	1339.54/352.51 (58.36%)	565.96/148.94 (24.66%)	389.99/102.63 (16.98%)	2295.49/604.08 (100.00%)
All	1148.72/ 302.10 (58.57%)	478.26/125.85 (24.38%)	334.43/88 (17.05%)	1961.41/516.16 (100.00%)

Source: Nor Diana MI (2011)
Note: All the figure are measured by Ringgit Malaysia (RM)/US$ percentages are in parentheses
*1US$ = RM3.8 during the period of data collection

As Table 2 indicates, almost 60 percent of all households sampled have at least some non-farm income; on-average, non-farm income accounts for 24% of the total household income. More or less, 30 percent of the households earned less than RM500 per month from non-farm activities. Meanwhile, about ten-percent of the households gained within the range of RM1001 – RM2000 from this source. This indicates the importance of non-farm income generated among the farmers in IADA Samarahan.

Table 2. Distribution of non-farm income among farmers in IADA Samarahan, Sarawak

Monthly income (RM@US$/month)*	No.	Percent (%)
No non-farm income	88	40
< RM500 (US$ 131.58)	65	29.5
RM501 – RM1000 (US$131.84 – US$263.16)	41	18.6
RM1001 – RM1500 (US$263.42- US$394.74)	9	4.10
RM1501 – RM 2000 (US$395.00-US$526.32)	6	2.73
>RM2000 (US$526.32)	11	5.00
Total	220	100.00

Source: Nor Diana MI (2011)
*1US$ = RM3.8 during the period of data collection

The impact of non-farm income to poverty alleviation

The results of this calculation can be used as a basis for the effect of non-farm and other income on poverty as illustrated in Table 3. These indications are achieved using three different methods of measuring poverty based on the PLI of RM765/US$201.32. The first measurement of the poverty rate measured the percentage of those who were destitute below the poverty line. However, this index does not take into account the depth of poverty which includes the average amount of dollars which were below the poverty line. Furthermore, the second measurement was employed to measure how much of the income among the poor shortfall from the poverty line. The third poverty measurement was obtained by squaring the poverty gap with the severity of poverty. This method is more meaningful and useful to estimate the sensitiveness of changes in the distribution of income among the poor. Column (a-d) in Table 3 shows the results of the poverty indices by using PLI RM765/US$201.32.

Table 3. FGT Index: Impact of non-farm income to the poor in IADP Samarahan, Sarawak, Malaysia

PLI/α	On-farm Income (OF_i) (a)	On-farm Income (OF_i) + Non-farm income (NF_i) (b)	On-farm income (OF_i) + Others income (O_i) (c)	On-farm income (OF_i) + Non-farm Income (NF_i) + Others Income (O_i) (d)	Percentage change (%) $\frac{[(b)-(a)]}{(a)*100}$ (e)	Percentage change (%) $\frac{[(c)-(a)]}{(a)*100}$ (f)	Percentage change (%) $\frac{[(d)-(a)]}{(a)*100}$ (g)
0	0.6182	0.3273	0.3636	0.1955	-47.0588	-41.1765	-69.1176
1	0.2690	0.1112	0.1390	0.0553	-58.6687	-48.3142	-79.6420
2	0.1470	0.0519	0.0728	0.0256	-80.6923	-64.6769	-82.8649

Note: The first line in each PLI (RM765/US$201.32) is $\alpha = 0$, which refers to the poverty incidence, $\alpha = 1$ refers to the poverty gap, and $\alpha = 2$ refers to the square of poverty gap that is taken into account in relation to the income inequality among respondents. Column (a) is the measurement of poverty index of on-farm income for 220 farmers (non-farm income and others income not included). Column (b) is the index measuring poverty using the income of farmers consisting only the on-farm income and non-farm income. Column (c) calculates the poverty index by using on-farm and others income only. Column (d) measures the incident of poverty into all types of income the farmers possessed consisting on-farm, non-farm and other income. Column (e), (f) and (g) are the calculation of poverty in terms of the percentage change derived from comparison made between columns (b) (c) and (d) into column (a), multiplied by 100. (OF_i) refers to on-farm income, (NF_i) refers to non-farm income and; (O_i) refers to other income covering transfer payment, remittance and others transactions.

Column α shows the results of the index without taking into account the non-farm income and other income. Column 2 reports the results index when the non-farm income is added to the on-farm income. Column 3 reports the results of the index when other income is included into the on-farm income. Next, Column 4 reports the index of which non-farm income and other income are included into the total of on-farm income. The result shows that non-farm income and other income would reduce poverty in IADA Samarahan. However, the size of poverty reduction depends on how poverty is measured, either in terms of poverty incidence, the poverty gap or squared poverty gap. For headcount ratio measurement, the reduction is observed at 47.06%, while the poverty gap and squared poverty gap show reduction at 58.67% and 80.70%, respectively. Other income also helps in poverty reduction. By using PLI RM765/US$201.32, the poverty reduction, poverty gap and severity of poverty are about 41.18%, 48.31% and 64.68%, respectively.

When the both sources of income are taken into account, poverty is reduced to 69.12%, while poverty gap and squared poverty gap decreased by 79.64% and 82.86%, respectively. One of the more significant findings to emerge from this study is that poverty reduction can be more effectively achieved by employing the methods measurement that focus on the poverty gap and squared poverty.

Impact of non-farm income to the average relief period from poverty

The impacts of non-income to the length of period of relief from poverty are presented in Table 4. As shown in the figure, the assumption of growth rates of income are by 3%, 5%, 5.8%, 7.2%, 8% and 10% of which 5.8% is the actual growth rate of income prescribed in the Ninth Malaysia Plan.

Table 4. Average relief period from poverty among poor farmers in IADP Samarahan, Sarawak

	On farm income only m = 136, P_0 = 61.81%		Total of on-farm and non-farm income m = 72, P_0 = 32.73%	
Hypothetical growth rate of income (γ)	Relief period from poverty for all respondents $t(\gamma)$	Relief period from poverty for the poor only $t^p(\gamma)$	Relief period from poverty for all respondents $t(\gamma)$	Relief period from poverty for the poor only $t^p(\gamma)$
0.03	13.73	22.22	5.16	15.78
0.05	8.24	13.33	3.10	9.47
0.058*	7.10	11.49	2.67	8.16
0.072	5.72	9.26	2.15	6.57
0.08	5.15	8.33	1.94	5.92
0.10	4.12	6.66	1.55	4.73

Source: Authors analysis, 2014

Note: * Growth rate of income in 9th Malaysia Plan; PLI, z = RM765/US$201.32(Malaysia, 2006).

The second major finding is that the assumption made on the higher rate of income growth rate ranging from 3% to 10%, the period of relief from poverty and hard-core poverty are dropped. In other words, there is a negative relationship between income growth rates with relief period from poverty. The result shows that by placing PLI RM765/US$201.32 as a cut-off line to distinguish the poor and non-poor households, a total of 136 out of 220 families are identified to be poor without non-farm income, compared to the number of households with non-farm income with 72 households only. This means that non-farm income contributes to the poverty reduction among the farmers in IADA Samarahan, Sarawak. Apart from that, it also is able to shorten the length of relief period from the cycle of poverty. This is proven through the results which reveals that the farmers without non-farm income who experienced an assumed income growth rate occurring at 5.8%, would take about 11.49 years to achieve relief compared to those who are involved in non-farm activities with a period of 8.16 years. The results of the numerical simulation indicate that the average exit period from poverty among the farmers is 8 to 11 years with the level of income growth rate at 0.058 per cent as mentioned in the Ninth Malaysia Plan, with the PLI of Sarawak at RM756 (RMK-9, 2006). Meanwhile, when the income growth rate is at the level of 3 percent, the length of time out of poverty could be longer, which is about 15.78 years. The results of this investigation show that the assumed higher income growth rate could lead the length of period of relief from poverty to become increasingly short. This means based of the 2006 data and the estimation of income growth rate of 3 per cent per annum, it can be generalized that the farmers of IADA Samarahan, Sarawak would be able to achieve zero poverty level in about 16 years, which is about the year 2022 (2006 + 15.78). Therefore, it can be gathered that the average time out of poverty can be reduced when there is a high rate of income growth; for example at the assumed rate of 5 per cent, they would achieve zero poverty level in 2015 (2006 + 9.47). This study thus shows that through a difference in the income growth rate at only 2 per cent per annum, the period of relief from poverty can be shortened to up to7 years. Period of relief from poverty can be also reduced by engaging in non-farm activities where it would take only 8.16 years, compared to those who are not involved in these activities, with the period of an additional 11.49 years, if the income growth rate is at 5.8 percent. This proves that the role of non-farm income can shorten the relief period from poverty to almost 3 years. The study's findings further reveals that the reduction in depth of poverty reflects a decline in the time it would take for the average poor household to be free from poverty.

The same method was employed to calculate the average time out of poverty for hard-core poor in IADA Samarahan, Sarawak. From the data in Table 5, it is apparent that a similar trend is observed in results shown in Table 4. With PLI of RM482 as a reference cut-off rate to distinguish the hard-core poor with non-hard-core poor, the survey results shows that there were 79 households in the cluster of hard-core poor without non-farm income. With the income growth rate at 3 and 5 per cent per year, it would take about 16.76 and 10.05 years respectively for the farmers in this group to be free from poverty,=. In

other words, by using the data from 2006, zero hard-core poverty would be achieved in the year 2023 (2006+16.67) and 2016 (2006 +10.05). This means that by assuming the difference in income growth rate at 2 per cent per annum, the average length of relief from poverty can be reduced to almost 7 years.

Table 5. Average period of relief from poverty among hard core poor farmers in IADP Samarahan, Sarawak

	On farm income only $m = 79$, $P_0 = 35.91\%$		Total of on-farm and non-farm income $m = 29$, $P_0 = 13.18\%$	
Hypothetical growth rate of income (γ)	Relief period from poverty for all respondents $t(\gamma)$	Relief period from poverty for poor only $t^p(\gamma)$	Relief period from poverty for all respondents $t(\gamma)$	Relief period from poverty for poor only $t^p(\gamma)$
0.03	6.02	16.76	1.66	12.59
0.05	3.61	10.05	1.00	7.55
0.058*	3.11	8.67	0.86	6.51
0.072	2.51	6.98	0.69	5.25
0.08	2.26	6.28	0.62	4.72
0.10	1.81	5.03	0.50	3.78

Source: Authors analysis, 2014
Note: * Growth rate of income in 9th Malaysia Plan; PLI = RM482, EPU 2006.

In the case where non-farm sources is included in the total households income, the number of hard-core farmers would fall to 29 families which also sees a contribution to the reduction of relief period from poverty. Based on the assumption that the income growth rate occurs at 5.8 per cent per annum, the period of relief from poverty would take about 6.51 years. Therefore, in a generalized sense, this group would reach the level of zero poverty in 2013. Even though the economy was growing strongly (at 5.8 per cent per year) during the first three years of the Ninth Malaysia Plan, the contraction in 2009 has affected the growth period of the entire plan by reducing it to an average of only 4.2 per cent per annum (Malaysia, pp 36: chart 2-1, 2010). With this impact on the income growth rate, an average period of relief from poverty is speculated to take about 9 years, which would be in the year 2015 (2006+9).

Conclusion and policy implications

The present study, however, makes several noteworthy contributions to poverty measurement as part of the effort to combat poverty among poor farmers in Malaysia. The author has indicated that farmers are the lowest earning income group consisting of 40 percent from the total population in this area with an average household wage of RM1440. The study finds that the diversification of income through non-farm activities are be able to reduce poverty and thus can accelerate the time to achieve relief from poverty among the poor and hard-core poor. However, this would depend on the national income growth rate. Rural development must be part of efforts at promoting regional development to accelerate the economic growth of regions and enhance the availability of non-farm income opportunities for rural households. Promotions and incentives must be provided to those involved in non-farm activities, specifically to hard-core poor to participate in the agro-based industry activity. By giving training, extension servicing and monitoring to develop the confidence level, self-esteem and capability to sustain as a long-learning process can be attained. As Malaysia practices open economy that is highly depending on foreign trade, especially with developed countries, the country could be exposed and vulnerable to external shocks. Thus, the main coping strategy is to increase domestic demands as the main driver of growth by intensifying the private sector. In this regard, necessary effort should made to create an environment that encourages productivity, competitiveness and innovation. Revenue growth would accelerate through higher productivity gains compared to capital and labours. Increasing productivity also would subsequently contribute to the returns obtained following the removal distortions in efficiency within the

country's economy. Hence, productivity growth can be achieved if the input of human capital is high and by adopting new technologies and entrepreneurial development to encourage innovation and creativity to raise the country's level towards a high income nation.

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