Chapter 4

Welfare and Descriptive Statistics

4.1. Descriptive statistics (means, standard deviation, coefficients of variation)

The table of descriptive statistics in Appendix 1, Table 1 shows the outlier's test. The mean, observation and standard deviation of the overall study and separate research sites were shown in the table.

The results from the descriptive table can tells us the cooperative means between two chosen places and have more simplicity to grasp the situation of income, awareness, amount of land ownership etc. The results are sometimes difficult to conclude into a certain direction that we need to go further into cross-tabulation, post-hoc test and test of means.

Average awareness of benefit for the reforestation is not much different in the two study sites and in overall samples but the other variables for the awareness are negative and much less in Bagan than in Kyaintali area. Average attitude towards ecotourism and average environmental behavior is much higher than in Kyaintali. It is contradictory to each other according to the pattern of behavior change.

The people from Kyaintali possess less agricultural land than people in Bagan and have more scores in average attachment to land. The average attachment to land is derived from more than one factor that it is difficult to make a conclusion here.

4.2. Calculations of Lorenz curves, Gini coefficients, Decile and Quintile Ratios

In our case study of Myanmar, Gini coefficients were calculated to indicate the degree of inequality of the welfare distribution in the populations of the two study eco-marketing zones. The income, food expenditure and net income after consumption of food, which is the most necessary and regular basis consumption, was deducted are calculated as per capita per day in US dollar. Land property was measured in acres and nutritional status was derived from the food pyramid constructed endogenously from the pattern of local consumption.

Since the time series data and secondary data for the previous time period were not accessible in this study and the prices and income of a base year were unknown, real income and expenditures could not be calculated. Nominal income and expenditures were therefore used to indicate the state of distribution. Figure 4.1 shows the Lorenz curves for the commutative justice index access to land in Kyaintali and Bagan.

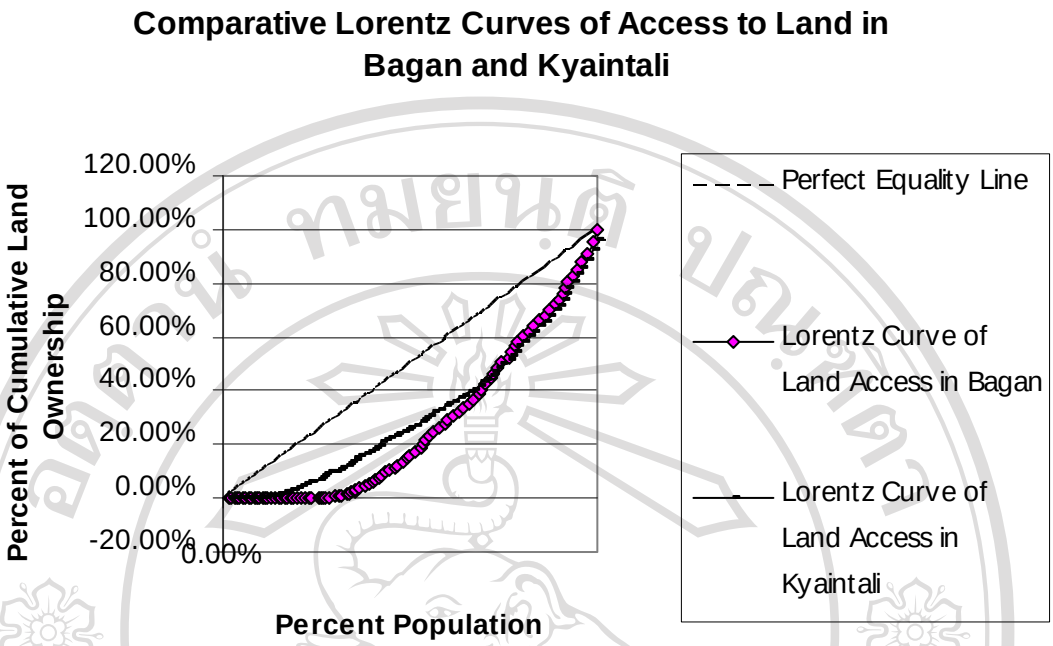

Figure 4.1 Comparison of land distribution in the two study area.

The Lorenz curve of land distribution in Bagan shows there is much more landless than in Kyaintali and descriptive statics tells us that there is greater means value in land ownership n Bagan. So, the inequality of natural resources may be much higher in Bagan. For the distribution among upper one third of the population, the pattern of distribution is similar.

In terms of economic outcomes, however, we see that there is very little difference in the Lorenz curves of gross income (Figure 4.2). This result is confirmed by the calculation of Gini coefficients. Gini coefficient in Bagan is 0.523 and Gini coefficient in Kyaintali is 0.55 which means Kyaintali is more intense in income inequality.

The Lorenz curve of income in Kyaintali sags nearer to the origin showing that poor people have severely lower income than poor in Bagan do. That is the

source of higher Gini coefficient since the rank of poor is weighted heavier in the normalization of Gini coefficient. Amongst the middle class, the Lorenz Curve of Bagan is closer to the equality line than in Kyaintali. That means, middle class people who lie above the lowest twenty percent and below the highest twenty percent get a better equality in Bagan than their counterparts in Kyaintali.

There are two significant problems with using gross income of the household as a measure of well-being, however. The first is that larger households tend to have more aggregate wealth, but not necessarily more wealth per capita. The second is the quite variable patterns of expenditure and savings that may result in negative incomes, as discussed above.

The Lorenz curves for net income per capita (Figure 4.2) therefore give a truer picture of the sustainability of current levels of welfare. The figure expresses the severity of the situation of negative income in the target population. The Lorenz vurves sag under the origin with negative values. This means that the study of Gini coefficient will not be reliable to compare but we can make the graphical comparison because we are comparing between the two population from points to points in each portion of the increase in net income. In Gini coefficient, the weight is given to the poorest population and then cumulating and normalizing blend the whole point that it is complicated to explain in terms of Gini coefficient if there is negative values in the variable under study. From comparing the two Lorenz Curves, it can predict that the net income per capita in Kyaintali is much lesser than in Bagan and people have less income in term of the use value of their nominal income other than food expenditure. About 40% of the population in Bagan and 65% of population in Kyaintali is living

with negative income. Inequality of net income in Kyaintali is much higher than in Bagan.

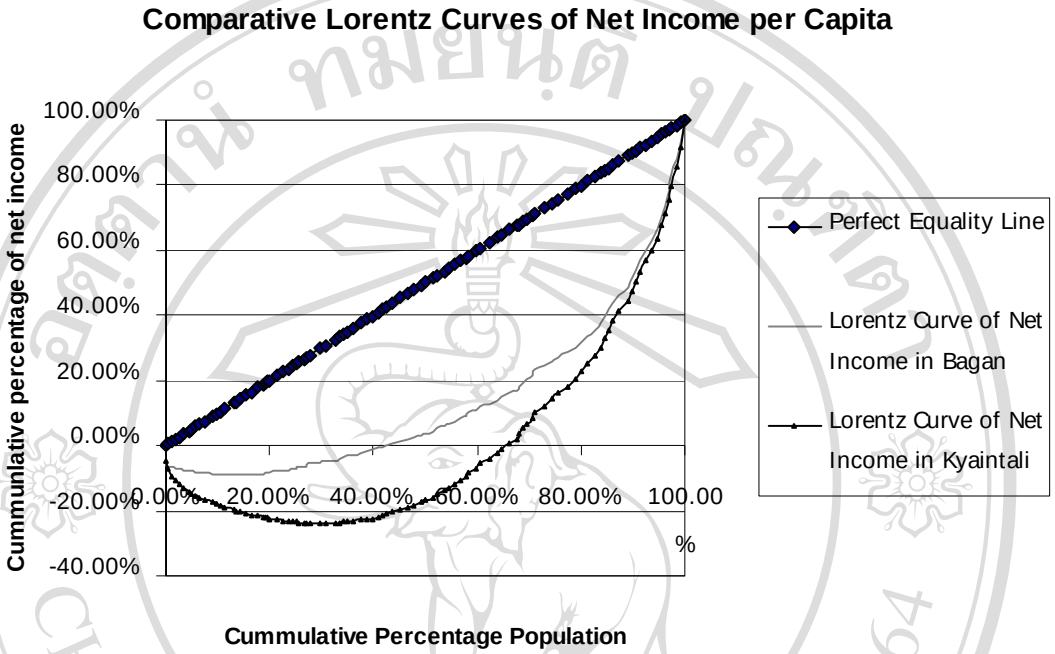

Figure 4.2 Income equality in Bagan and Kyaintali

According to observation, 10% of poor in Bagan live with zero income directly depending on the environment, food products from forest and common property resources. In Kyaintali, where there is closer to the forest and further away from market economy, such a kind dependency to the nature is higher up to 16%. Does dependency on nature or market economy bring better physical welfare (nutritional status) in Myanmar?

To answer this question the Gini coefficient of nutritional status is calculated. The resulting Gini coefficients of nutritional status in these two areas are contradictory to the Gini coefficients of gross income. The Gini coefficient of nutritional status in Bagan is 0.41 while Gini coefficient of nutritional status in

Kyaintali is 0.28. To form an idea of the distribution of nutrition in the population of these two regions, comparative Lorenz curves were drawn (Figure 4.3).

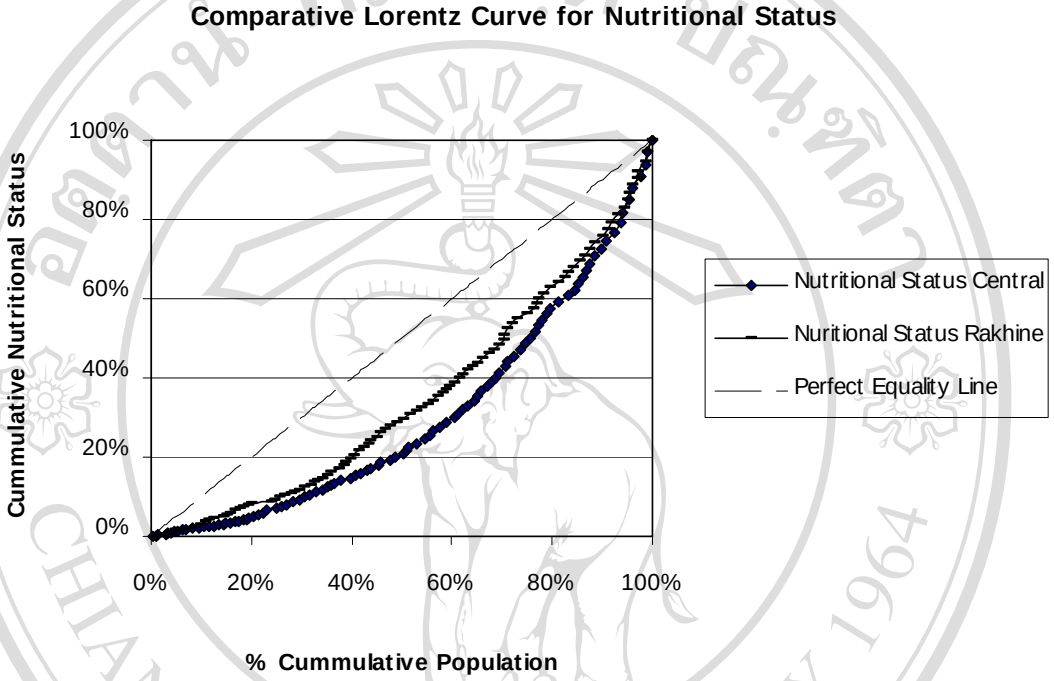

Figure 4.3 Equality of physical welfare in Bagan and Kyaintali

Similarly, the Lorenz curves and Gini coefficient of nutritional cost for the two eco-marketing zones were calculated (Figure 4.5). Nutritional cost from household to household was nearly perfectly equal in Bagan even though the nutritional status was unequal. Nutritional status in Kyaintali is much equal than in Bagan but nutritional expenditure is unequal. It means that physical welfare in Kyaintali is much more unpredictable and the underlying causes might be the forest and ecosystem services. That means that access to natural resources such as land

ownership and access to forest are the main reason other than income and expenditure to contribute on physical welfare.

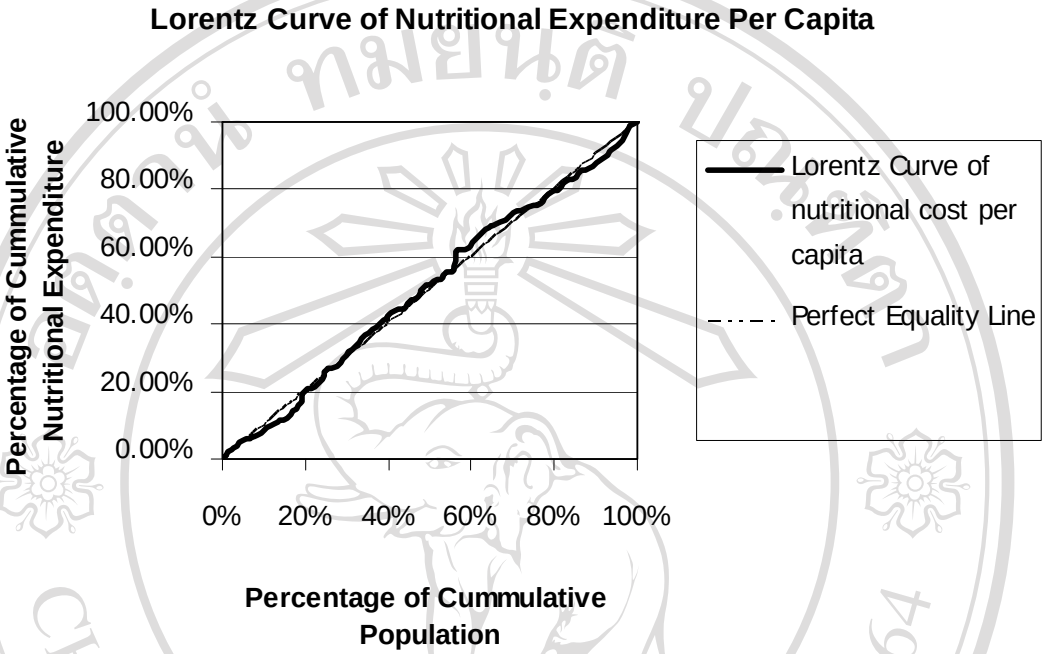

Figure 4.4 Equality in nutritional expenditure in Bagan

The nominal terms of income and expenditure on food are used to compare the state of economic welfare and distribution in the population. Since the time series data and secondary data for the previous time period is not accessible in this study, real terms of income and expenditure are not able to calculate. The prices and income of base year is not accessible that nominal income and expenditures are used to indicate the state of distribution.

4.3 Calculations of the incidence, depth, and severity of poverty

Incidence of poverty in Bagan is 82 and 95 in Kyaintali when we set the poverty line of one dollar per day in per capita income. The income is calculated in nominal value converted into US dollar with the price of (1 US$ = 1000[47] kyats). The table of Gini coefficients, incidence, depth or income gap and intensity of poverty in per capita income is shown in Table 1.

Table 4.1 Summary of inequality measures in the two eco-marketing zones, Myanmar

Eco-marketing zone:	Bagan	Kyaintali
Gini coefficient of income	0.52	0.55
Incidence of poverty	82	95
Income gap	-0.68	-0.71
Intensity	0.52	0.58
Gini coefficient of net income per capita	0.87	0.98
Average net income per capita	0.43	0.21
Gini coefficient of nutritional cost	0.1	0.37
Gini coefficient of nutritional status	0.41	0.28
Gini coefficient of land ownership	0.52	0.43

Here again, the Gini coefficients proves that Kyaintali which uses the ecosystem services more than Bagan has higher inequality in income and more poor but have more equality in physical welfare, which means better nutritional status in the overall population.

[47] Unit of Myanmar currency.

4.4 Tests of means of all of the above by village, region, gender, and social group

The independent sample t-test between central Myanmar and Rakhine State was run by using SPSS 13 to ensure the criteria for choosing samples in two different regions. The economic fundamentals and situations of agricultural methods were expected to be different and socio-economic variables are supposed to be similar.

According to the test, the mean of wealth rank, age of household heads, interviewee's age and interviewee's education are not significantly different. The mean and variance of household size, occupation of household head and interviewee's occupation was significantly different between two regions.

Factors concerning to the method of agriculture such, as quality of land, amount of the use and cost of chemicals and pesticides are significantly different. The situation of employment and diversity of jobs are significantly different. The use of hired labour and family labour is significantly different between two regions. Distance to the road is not significantly different between two regions and the distance to town is significantly different since the sample has to be chosen to have similar level of development among the villages in two differently size of economy to be comparable. However, time taken to road, which is an indicator of accessibility and outreach to the infrastructure is significantly different between two regions even though the distance is not significantly different.

4.5 Cross-tabulation analyses and bar-charts with Chi-square and other tests of significance for ordinal and nominal categories

Table 4.2 shows whether there is a significant non-random pattern of distribution linking wealth categoy and household size. There is no significant impact between of the two in the study villages. The household size ranges from 1 to 17 family members and 25% of wealthy families composed are composed of 4 family members. Although the Chi-square, lambda and Gamma Test all shows significant differences of wealth by household size, there is no consistence trend in the data (figure 4.5).

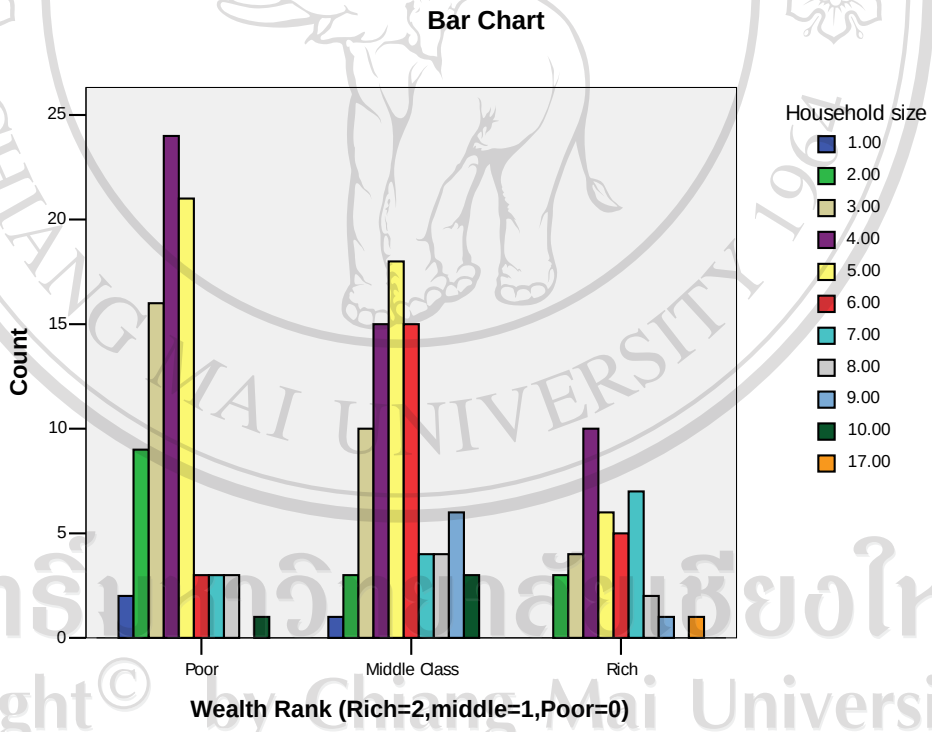

Figure 4.5 Cross-tabulation of wealth rank and household size

Similarly, diet diversity was expected to differ significantly by wealth and location . Specifically, Rakhine State was anticipated to have greater physical welfare

and better dietary composition since marketization and transportation were poor and crop diversity had been impressively large during the previous year's proxy survey. When actual data collection for the thesis was done the following year in Rakhine State, more frequent tropical storms and floods in the region had led to dramatic declines in output. As a result, Rakhine State farmers lost interest in certain crops, leading to a probably permanent decline in crop diversity Table (4.2) explains details diet diversity by region.

The highest level of diet diversity is consumed by 6% of households in Central Burma *vs.* only 1% from Rakhine State. The mode from Rakhine State straddles levels of diet diversity 2 and 3 respectively and mode from Central Burma lies in the level of diet diversity 1 and 2 which means most of the households from Rakhine State has more diet diversity than the households from Central Burma. In Rakhine State, diet diversity level 4 and 5 is consumed by 20% and 10% of households respectively. In Central Burma, only 19% and 3% of the households can consume the level of diet diversity 4 and 5 ,which means more households from Rakhine State still lies in the cluster of higher level of dietary composition.

Table 4.2 Cross-tabulation between region and diet diversity

Crosstab

			Diet_diversity							
			.00	1.00	2.00	3.00	4.00	5.00	6.00	Total
central_bur	Arakhan State	% within central_bur		4.0%	29.0%	36.0%	20.0%	10.0%	1.0%	100.0%
		% within Diet_diversity		14.3%	50.9%	65.5%	51.3%	76.9%	14.3%	50.0%
	Central Burma	% within central_bur	1.0%	24.0%	28.0%	19.0%	19.0%	3.0%	6.0%	100.0%
		% within Diet_diversity	100.0%	85.7%	49.1%	34.5%	48.7%	23.1%	85.7%	50.0%
Total		% within central_bur	.5%	14.0%	28.5%	27.5%	19.5%	6.5%	3.5%	100.0%
		% within Diet_diversity	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Relationship between wealth and diet diversity also brings about and interesting story. Diet diversity is normally distributed among each of the stratum. Level of diet diversity 2 is highest in poor people and level of diet diversity 2 and 3 is equally distributed and highest in middle class families, lies between the range of 34.5% to 41.8% of the population. 33.3% of households from the rich 20% of the sample population can consume level 3 of diet diversity. It seems that over all distribution of diet diversity amongst the stratum have normal distribution in the level of diet diversity.

Table 4.3 Cross-tabulation of wealth and diet diversity.

Crosstab

			Diet_diversity							
			.00	1.00	2.00	3.00	4.00	5.00	6.00	Total
Wealth	Poor	% within Wealth	1.2%	22.0%	28.0%	23.2%	19.5%	4.9%	1.2%	100.0%
		% within Diet_diversity	100.0%	64.3%	40.4%	34.5%	41.0%	30.8%	14.3%	41.0%
	Middle Class	% within Wealth		7.6%	29.1%	29.1%	20.3%	7.6%	6.3%	100.0%
		% within Diet_diversity		21.4%	40.4%	41.8%	41.0%	46.2%	71.4%	39.5%
	Rich	% within Wealth		10.3%	28.2%	33.3%	17.9%	7.7%	2.6%	100.0%
		% within Diet_diversity		14.3%	19.3%	23.6%	17.9%	23.1%	14.3%	19.5%
Total		% within Wealth	.5%	14.0%	28.5%	27.5%	19.5%	6.5%	3.5%	100.0%
		% within Diet_diversity	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

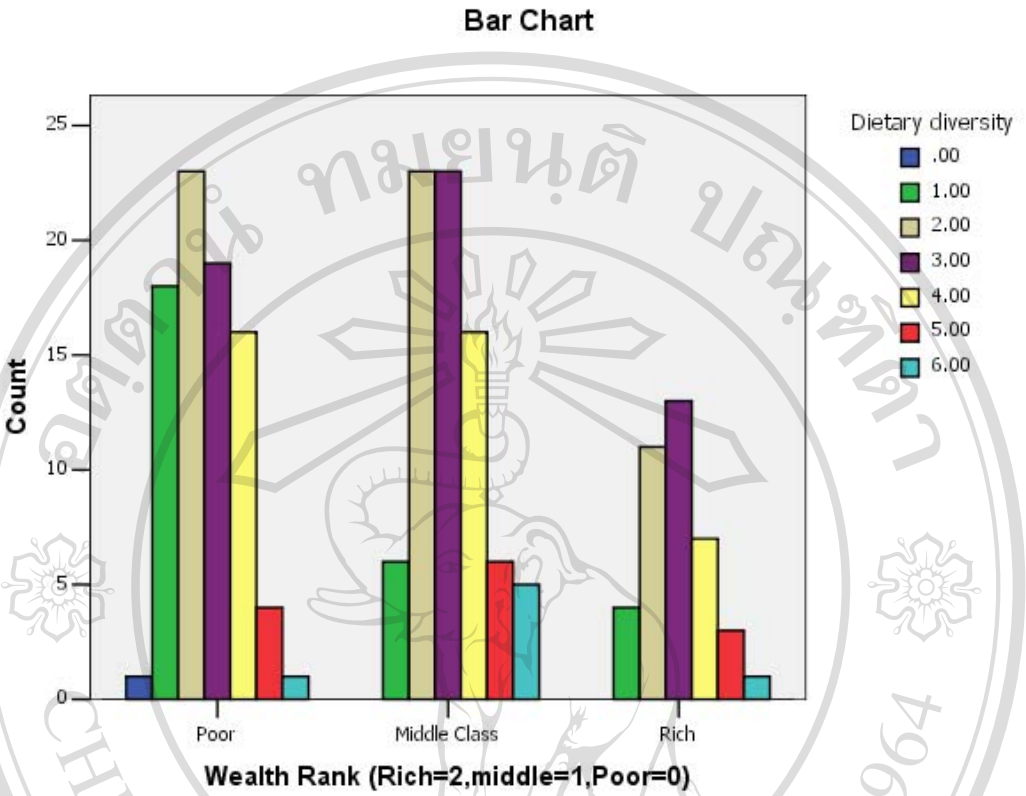

Figure 4.6 Bar graph showing wealth rank against diet diversity

Relationship between wealth and the quality of land they possess is tested with cross-tabulation. It has shown that 24.3%, 73% and 2.7% of rich families possess high, medium and low quality land respectively. Poor families have 16.3%, 44.2% and 39.5% of high, medium and low quality land respectively. According to the data, there is 26.8%, 55.7% and 17.4% of high, medium and low quality land respectively. Poor households possess 65.4% of low quality land and middle class households possess 30.8% of them and rich families possess only 3.8% . For the high quality land, poor households possess 17.5% , middle class households possess 60% and rich families possess 22.5% while the ratio of high, middle class and poor households is

1:2:2. From this point of view, wealth and quality of land they possess is highly related. The distribution of good quality land is not abundant in rich 20% of the households holding 22.5% of good land while 40% of middle class families possess 60% of good land.

Table 4.4 Cross-tabulation between wealth and land quality

Crosstab

			Land_quality			
			.00	1.00	2.00	Total
Wealth	Poor	% within Wealth	39.5%	44.2%	16.3%	100.0%
		% within Land_quality	65.4%	22.9%	17.5%	28.9%
	Middle Class	% within Wealth	11.6%	53.6%	34.8%	100.0%
		% within Land_quality	30.8%	44.6%	60.0%	46.3%
	Rich	% within Wealth	2.7%	73.0%	24.3%	100.0%
		% within Land_quality	3.8%	32.5%	22.5%	24.8%
Total		% within Wealth	17.4%	55.7%	26.8%	100.0%
		% within Land_quality	100.0%	100.0%	100.0%	100.0%

In this test, households that own enough land, that does not have enough land, that is clearing the forest to get more plot for cultivation and that does not have any land or any place to extend go under category 1, 0, -1 and -2 respectively. In this case, none of the rich families is under category -2, which means that wealth determination in the villages depend on the ownership of land. There are 92.1 % of total landless from poor households but 59.5 % of total agricultural land extension cases into the forest illegally is done by the middle class households and 13.5% by rich households and 27% by poor families. But people, who do not have sufficient land, are 50% from poor households and 25% from each rich and middle class. Here we could see that

land abuse is not from the pressure of poverty only but also from the policy flaw that makes the forest into common property resources that is not shared equally in the community. If there is a clear zoning and a process of land distribution to poor people than misuse illegally, poor people will get more chance and land use would be more efficient since the distribution is more efficient only when the good is distributed to the needs (Lenner).

Table 4.5 Cross-tabulation between wealth and sufficiency of land.

Crosstab

			Enough_land				
			-2.00	-1.00	.00	1.00	Total
Wealth	Poor	% within Wealth	44.9%	12.8%	12.8%	29.5%	100.0%
		% within Enough_land	92.1%	27.0%	50.0%	25.0%	41.7%
	Middle Class	% within Wealth	4.2%	31.0%	7.0%	57.7%	100.0%
		% within Enough_land	7.9%	59.5%	25.0%	44.6%	38.0%
	Rich	% within Wealth		13.2%	13.2%	73.7%	100.0%
		% within Enough_land		13.5%	25.0%	30.4%	20.3%
Total		% within Wealth	20.3%	19.8%	10.7%	49.2%	100.0%
		% within Enough_land	100.0%	100.0%	100.0%	100.0%	100.0%

In the situation of rice for household consumption, there were six category, bought from other region, bought in this region, self produced, others, and both self-produce and bought in this region represent with numerals, -1,0,1,2,3 respectively. There is no case for bought from other region and the category other, which means received as gift is only one family. Under the category 3, households with insufficient rice production are 16%, 14.3% and 5.1% among poor, middle class and rich households. The agricultural extension or new inputs for rice production should go to

the poor family and educational process for a proper land use should emphasize on middle class families.

Table 4.6 Cross-tabulation between wealth rank and rice production

Crosstab

			How_do_you_make_rice_for_your_household_consumption				
			.00	1.00	2.00	3.00	Total
Wealth	Poor	% within Wealth	61.7%	22.2%		16.0%	100.0%
		% within How_do_you_make_rice_for_your_household_consumption	58.1%	21.4%		50.0%	41.1%
	Middle Class	% within Wealth	33.8%	50.6%	1.3%	14.3%	100.0%
		% within How_do_you_make_rice_for_your_household_consumption	30.2%	46.4%	100.0%	42.3%	39.1%
	Rich	% within Wealth	25.6%	69.2%		5.1%	100.0%
		% within How_do_you_make_rice_for_your_household_consumption	11.6%	32.1%		7.7%	19.8%
Total		% within Wealth	43.7%	42.6%	.5%	13.2%	100.0%
		% within How_do_you_make_rice_for_your_household_consumption	100.0%	100.0%	100.0%	100.0%	100.0%

When the households are asked weather they do shifting cultivation or not (1 or 0), 31.6 % of rich households, 24.7% of middle class and 13.4% of poor households do shifting cultivation. The 45.2% of all cases of shifting cultivation is done by the middle class. Here again middle classes are most rigorous consumers and users of natural resources that they should be the target community to reduce environmental degradation.

Table 4.7 Cross-tabulation of Wealth and shifting cultivation.

Crosstab

			shift_cultivation		
			.00	1.00	Total
Wealth	Poor	% within Wealth	86.6%	13.4%	100.0%
		% within shift_cultivation	45.8%	26.2%	41.6%
	Middle Class	% within Wealth	75.3%	24.7%	100.0%
		% within shift_cultivation	37.4%	45.2%	39.1%
	Rich	% within Wealth	68.4%	31.6%	100.0%
		% within shift_cultivation	16.8%	28.6%	19.3%
Total		% within Wealth	78.7%	21.3%	100.0%
		% within shift_cultivation	100.0%	100.0%	100.0%

Table 4.8 Chi-square test of shifting cultivation.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.956[a]	2	.051
Likelihood Ratio	6.065	2	.048
Linear-by-Linear Association	5.801	1	.016
N of Valid Cases	197		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.10.

The situation of the impact of development projects on the improvement of income is significant according to the Chi-Square test. The scale has been given as never improve, not at all, not recognized, improve and well improved is given as -2,-1,0,1 and 2. According to the results, the improvement of income happen mostly in

rich households medium in middle class and less in poor households. The situation of income stagnation happen mostly in poor families, medium in middle class and lowest in rich families pointing out that the distribution of benefit of development channel unevenly in the local economy.

Table 4.9 Cross-tabulation of wealth and income improvement

Crosstab

			income_has_improved_over_the_past_5_years					
			-2.00	-1.00	.00	1.00	2.00	Total
Wealth	Poor	% within Wealth	6.3%	66.3%	6.3%	21.3%		100.0%
		% within income_has_improved_over_the_past_5_years	38.5%	50.5%	35.7%	27.4%		40.8%
	Middle Class	% within Wealth	9.1%	46.8%	9.1%	32.5%	2.6%	100.0%
		% within income_has_improved_over_the_past_5_years	53.8%	34.3%	50.0%	40.3%	100.0%	39.3%
	Rich	% within Wealth	2.6%	41.0%	5.1%	51.3%		100.0%
		% within income_has_improved_over_the_past_5_years	7.7%	15.2%	14.3%	32.3%		19.9%
Total		% within Wealth	6.6%	53.6%	7.1%	31.6%	1.0%	100.0%
		% within income_has_improved_over_the_past_5_years	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

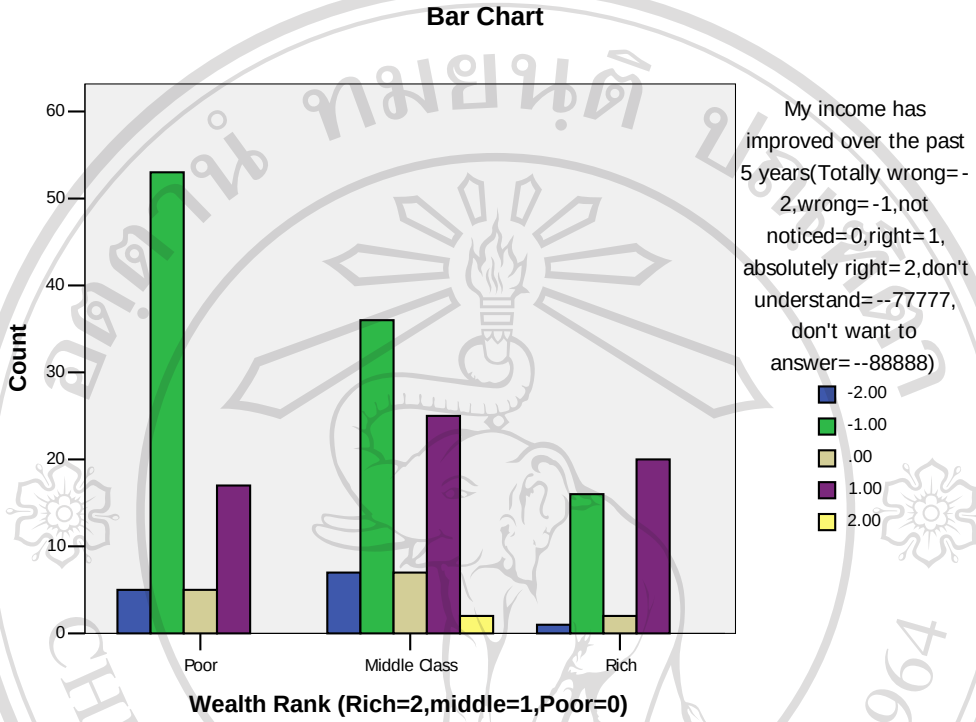

Figure 4.7 Wealth against improvement of income.

Table 4.10 Chi-square test of wealth and income improvement.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.221[a]	8	.028
Likelihood Ratio	17.651	8	.024
Linear-by-Linear Association	10.174	1	.001
N of Valid Cases	196		

a. 5 cells (33.3%) have expected count less than 5. The minimum expected count is .40.

The situation of loan repayment capacity also goes along with the wealth of households and is highly significant in Chi-square test. Rich people can pay off the debt in time and poor people mostly does not have capacity to pay back.

Table 4.11 Cross-tabulation of wealth and ability of loan repayment

Crosstab

			able_to_pay_off_my_debts_on_time					
			-2.00	-1.00	.00	1.00	2.00	Total
Wealth	Poor	% within Wealth	5.0%	42.5%		52.5%		100.0%
		% within able_to_pay_off_my_debts_on_time	33.3%	66.7%		34.7%		42.3%
	Middle Class	% within Wealth	11.4%	21.4%	4.3%	61.4%	1.4%	100.0%
		% within able_to_pay_off_my_debts_on_time	66.7%	29.4%	75.0%	35.5%	100.0%	37.0%
	Rich	% within Wealth		5.1%	2.6%	92.3%		100.0%
		% within able_to_pay_off_my_debts_on_time		3.9%	25.0%	29.8%		20.6%
Total		% within Wealth	6.3%	27.0%	2.1%	64.0%	.5%	100.0%
		% within able_to_pay_off_my_debts_on_time	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 4.12 Chi-square test of wealth and capacity to loan repayment.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.985[a]	8	.000
Likelihood Ratio	37.554	8	.000
Linear-by-Linear Association	15.901	1	.000
N of Valid Cases	189		

a. 8 cells (53.3%) have expected count less than 5. The minimum expected count is .21.

Financial capacity to pursue education for the offspring's educations is significantly low in poor families and high in rich households whiles middle class households are not in the extreme cases though in ability is 25%, which is quite high.

The education should be subsidized for poor and middle class households for efficient distribution of security for the welfare.

Table 4.13 Wealth and capacity to pursuit of education

Crosstab

			enough_money_to_send_all_children_to_school					
			-2.00	-1.00	.00	1.00	2.00	Total
Wealth	Poor	% within Wealth	12.2%	56.8%		29.7%	1.4%	100.0%
		% within enough_money_to_send_all_children_to_school	42.9%	63.6%		28.6%	10.0%	41.6%
	Middle Class	% within Wealth	16.4%	25.4%	4.5%	46.3%	7.5%	100.0%
		% within enough_money_to_send_all_children_to_school	52.4%	25.8%	75.0%	40.3%	50.0%	37.6%
	Rich	% within Wealth	2.7%	18.9%	2.7%	64.9%	10.8%	100.0%
		% within enough_money_to_send_all_children_to_school	4.8%	10.6%	25.0%	31.2%	40.0%	20.8%
Total		% within Wealth	11.8%	37.1%	2.2%	43.3%	5.6%	100.0%
		% within enough_money_to_send_all_children_to_school	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 4.14 Chi-square test of wealth and ability to pursuit of education

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.334[a]	8	.000
Likelihood Ratio	35.160	8	.000
Linear-by-Linear Association	20.692	1	.000
N of Valid Cases	178		

a. 7 cells (46.7%) have expected count less than 5. The minimum expected count is .83.

4.6

One-way ANOVA

The significant variables in each hypothesis are chosen only to include in the ANOVA table. Post Hoc comparison is done to emphasize in the differences among the villages. The villages from Rakhine State are Yaesankwin, Cisonekone, Supotekone, Doetan and Taungpatlel. The two villages from Central Myanmar are Taungphattan and Latpantal. Yaesankwin is nearest to the road within 3 miles from the nearest city and the lowest population and it is a Buddhist Chin Village. Cisonekone, Supotekone and Doetan are native Rakhine villages with medium population density and 3 miles, 3.5 and 4 miles respectively from the main road. Taungpatlel is Christian Chin Village that is about 4.5 miles from the nearest city and surrounded by the mountains. The village called Latpantal is in Central Myanmar and about 3.8 miles from the main road. It is in 5 miles away from Bagan-Nyaung Oo Township. Taungphattan is in Ngathayauk township that is separated from Bagan-Nyaung Oo Township in 2007 for its fast development. It is on the railway from Bagan-Nyaung Oo to Myingyun and it is 7 miles distance to Pakhokku by boat and 14 miles to Bagan.

Average attitude towards conservation is less in Yaesankwin where the language barrier is preventing people to communicate with strangers and have low level of institutional form even though it is nearest to the road in the villages in Rakhine State. At the same time, Taungpatlel has highest community institutions but same ethnic with Yaesankwin sharing the same language locating furthest away from Yaesankwin.

Yaesankwin has the lowest amount of land, lowest in community management, lowest in average awareness of the forest, which is a good thing since awareness of forest is determined as the awareness of people on the environmental problems and degradation impacting their livelihoods. The lowest community management explains that there would be lowest level of motivation to conserve the forest and environment. Secondly, the lowest attitude in conservation could be because of no awareness in the degradation problems too. Moreover, this village possesses more fertile soil than other villages and has lowest opportunity to access to inputs for their agricultural production from outside.

Taungpatlel is highest in average attitude towards conservation, environmental behavior, nutritional cost per day and rice consumption per day (or physical wellbeing), average community management, average financial viability, most likely to not be indebt. Most of all it has the highest opportunity to access new inputs to their agriculture apart from the most difficult in transportation and furthest away from the road having a different dialogue within the sample villages but has strong in community institutions such as churches and can seen some forms of local community institutions. Contradictory to the existence in the forest and in the middle of mountains, the time taken to fetch firewood is highest in Taungpatlel which might be the result of nearest to the National Park and being at the edge of the buffer zone of the forest area, that is allowed for people to come and fetch the firewood.

Cisonekone is the native Rakhine Village that is strong in community leadership being the village of the in charge of ten villages group around that mountainous area including Doetan, Yaesankwin, Supotekone and Taungpatlel. Cisonekone is highest in attachment to land, which mean the location and fertility of

land are good as well as the ownership is high level of security. Environmental foot print is lowest that means cutting trees is less and less dependency to the forest for food, shelter and income. Nutritional cost per day in Cisonekone is significantly lower than any other villages that can be the source of sufficient agricultural production that support people with food not depending on forest and still makes low cost on food. Gross income in Cisonekone is lowest among all the villages and time taken to fetch the firewood is lowest in Cisonekone too. In overall observation, Cisonekone seems to have a good management and fundamentals even though the general knowledge is much needed since the time elapsed in questionnaire interview took longest Cisonekone in general.

Table 4. 15 Post Hoc Test

Relevant hypothesis	**One-way ANOVA**	*Code: White = inter-village differences within the same zone*				
	Post-hoc comparisons	*Cream =Rakhine state villages sig. greater than central Burma villages*				
	LSD	*Grey = Central Burma villages sig. greater than Rakhine State villages*				
	Dependent Variable	(I) Village	(J) Village	Mean Difference (I-J)		Std. Error	Sig.
Hyp. 1	Average_attitude_conservation	Yaesankwin	Supotekone	-0.3283784	**	0.152	0.03
			Doetan	-0.3233333	**	0.157	0.04
			Taungpatlel	-0.65	**	0.314	0.04
			Taungphattan	*-0.52898*	***	*0.146*	*0.00*
			Latpantal	*-0.48083*	***	*0.147*	*0.00*
Hyp. 2	Average_attch_land	Cisonekone	Doetan	0.3046667	**	0.124	0.01
			Taungpatlel	0.428	*	0.248	0.09
			Taungphattan	*0.336133*	***	*0.115*	*0.00*
			Latpantal	*0.291133*	**	*0.115*	*0.01*
Hyp. 3	Average_evn_behave	Doetan	Yaesankwin	-0.3166667	*	0.186	0.09
			Taungpatlel	-0.8166667	**	0.356	0.02
			Taungphattan	*-0.35*	**	*0.136*	*0.01*
			Latpantal	*-0.53*	***	*0.136*	*0.00*
Hyp. 4	*Average_behav_footprint*	*Cisonekone*	*Taungphattan*	*-0.2768*	***	*0.086*	*0.00*

			Latpantal	*-0.192*	**	*0.086*	*0.03*
Hyp. 5	Diet_diversity	Cisonekone	Doetan	0.7333333	*	0.400	0.07
			Taungphattan	*0.86*	**	*0.372*	*0.02*
			Latpantal	*0.66*	*	*0.372*	*0.08*

Table 4.15 (Continued)

	Nu_cost_d	Cisonekone	Supotekone	-995.4262	***	308	0.00
			Taungpatlel	-1984.6154	***	613	0.00
			Taungphattan	*-1456.62*	***	*298*	*0.00*
			Latpantal	*-1426.62*	***	*298*	*0.00*
	Rice_cons_d	*Latpantal*	*Taungpatlel*	*-15.0333*	***	*2.909*	*0.00*
Hyp. 6	*Last_years_income*	*Latpantal*	*Yaesankwin*	*803559.5*	***	*249409*	*0.00*
			Cisonekone	*972950*	***	*242888*	*0.00*
			Supotekone	*854295.5*	***	*185680*	*0.00*
			Doetan	*824916.7*	***	*208231*	*0.00*
			Taungphattan	518947.28	***	166751	0.00
	How_many_acres_of_land_do_you_have	*Yaesankwin*	*Taungphattan*	*-5.68721*	**	*2.279*	*0.01*
			Latpantal	*-8.1225*	***	*2.284*	*0.00*
	Not_in_debt	Taungpatlel	Doetan	1.1666667	*	0.622	0.06
			Taungphattan	*1.729167*	***	*0.611*	*0.01*
			Latpantal	*1.458333*	**	*0.611*	*0.02*
Hyp. 7	*Average_financial_viabil*	*Taungphattan*	*Cisonekone*	*-0.35433*	***	*0.116*	*0.00*
			Supotekone	*-0.17186*	**	*0.085*	*0.05*
			Taungpatlel	*-0.63033*	***	*0.234*	*0.01*
Hyp. 8	Average_community_manage	Yaesankwin	Taungpatlel	-0.742	**	0.329	0.03
			Taungphattan	*-0.48047*	***	*0.153*	*0.00*
			Latpantal	*-0.34356*	**	*0.154*	*0.03*
Hyp. 9	*Average_aware_sustain*	*Latpantal*	*Yaesankwin*	*-0.75227*	***	*0.109*	*0.00*
			Cisonekone	*-0.88627*	***	*0.109*	*0.00*
			Supotekone	*-0.8383*	***	*0.080*	*0.00*
			Doetan	*-0.95327*	***	*0.085*	*0.00*
			Taungpatlel	*-1.1256*	***	*0.219*	*0.00*
			Taungphattan	-0.2054	***	0.074	0.01
	Average_aware_forest	*Yaesankwin*	*Taungphattan*	*-0.34333*	**	*0.139*	*0.01*
	Time_road	Doetan	Yaesankwin	15.416667	***	5.105	0.00
			Cisonekone	18.27381	***	5.216	0.00
			Supotekone	17.5	***	4.087	0.00
			Taungphattan	*48.41667*	***	*3.920*	*0.00*
			Latpantal	*53.36538*	***	*4.024*	*0.00*
	Soi ltype	Yaesankwin	Cisonekone	0.5333333	*	0.275	0.05
			Taungphattan	*1*	***	*0.229*	*0.00*
			Latpantal	*0.435897*	*	*0.234*	*0.06*
	Watercost	Taungphattan	Yaesankwin	114.5	***	12.887	0.00
			Cisonekone	101.16667	***	12.887	0.00

			Supotekone	114.47297	***	9.493	0.00
			Doetan	114.5	***	10.109	0.00
			Taungpatlel	*114.5*	***	*26.021*	*0.00*
			Latpantal	*44.12*	***	*8.755*	*0.00*
	Time_fetch	Taungpatlel	Yaesankwin	17430	***	2000	0.00

Table 4.15 (Continued)

			Cisonekone	19088	***	2000	0.00
			Supotekone	15492.037	***	1924	0.00
			Doetan	19070.476	***	1952	0.00
			Taungphattan	*19094.14*	***	*1900*	*0.00*
			Latpantal	*18732.15*	***	*1893*	*0.00*
	Time_elapsed	Cisonekone	Yaesankwin	17.4	***	3.854	0.00
			Supotekone	15.938739	***	3.231	0.00
			Doetan	16.866667	***	3.338	0.00
			Taungpatlel	24.2	***	6.676	0.00
			Taungphattan	*14.53333*	***	*3.122*	*0.00*
			Latpantal	*16.86667*	***	*3.122*	*0.00*
	Average_access_inputs	Yaesankwin	Cisonekone	-0.3666667	*	0.190	0.06
			Doetan	-0.3333333	**	0.165	0.04
			Taungpatlel	-0.6666667	**	0.329	0.04

Doetan is a large village that is famous with more poor population and shifting cultivation and flooding comes more frequently than any other villages among the samples. According to the post hoc test of means, Doetan is lowest in average environmental footprint. However, with the experience of natural disasters and environmental educational meetings, people in Doetan understand about environmental sustainability than other villagers among all these sample villages. Because of the far distance from the main road and people are poor to use any vehicles, it takes the longest time for people from Doetan to get to the road. As mentioned above, knowledge and experience is better than other villagers that villagers from Doetan took less time to answer about this entire questionnaire measuring about the knowledge and openness toward the environment.

About Latpantal and Taungphattan in Central Myanmar, Latpantal has a greening project that is trying to help people to get more livelihoods from non-

timber forest products and the latter has much more variety of transportation routes to connect to the market and have telephone line to have more access to information and much accessible to the market. Average attachment to land is lowest in Taungpattan and average environmental footprint is highest that could be the result of low viability in the land ownership and lowest land quality. Diet diversity is highest in Taungphattan that means people are more affordable to consume higher level of dietary combination than other places while people in Latpantal consume less in rice consumption per day. The least income of gross income for last year in Latpantal explains about the diet insufficiency apart from having much more agricultural land per households. People in Taungphattan are most in debt among all the villages as well as highest financial viability. There is a microcredit project in Taungphattan that would be the source of financial viability combining with highest debt rate. Latpantal has highest in average awareness in environmental sustainability while Taungphattan has highest awareness on forest degradation since there are more degradation without control and agricultural extension project without close monitoring. Water cost in taungphattan is highest among all the samples that is contradictory to the government water supply project and agricultural extension projects in dry season. That imply there is a threshold in the system or leakages in the project. Latpantal is the most convenient for getting to the road because of the arrangements of greening project that is also helping people for their livelihoods. And water cost is not the highest because of the arrangement of the local community managing for the reforestation gardens. Time elapsed for the questionnaire in Latpantal is lowest that means people are able to response with the test of environmental knowledge and have more confidence than other villages.