

CHAPTER 5

UNDERSTANDING ENVIRONMENTAL PARTICIPATION

5.1 INTRODUCTION

This chapter presents a multivariate model, summary and discussion of key findings, and relevant policy and programme implications.

5.2 A MULTIVARIATE FRAMEWORK

The aim of a multivariate model is to provide an understanding of the simultaneous effects of various variables on the respondents' participation on environmental activities. As highlighted earlier in Chapter 2, the dependent variable for the multivariate model is PARTICIPATE, which includes actions such as sending things for recycling, volunteering at recycling centres and buying environmentally friendly products. The explanatory background and socio-economic variables to be incorporated in the multivariate model, as highlighted in Chapter 2, include age, gender, ethnic group, education, ownership status and type of living quarters.

Table 5.1 presents the frequency table of PARTICIPATE. About 47 per cent of the respondents have either sent things to recycling centres, volunteered at recycling centres or buy environmentally friendly products.

TABLE 5.1: FREQUENCY DISTRIBUTION OF PARTICIPATE

PARTICIPATE	Per Cent	n
<i>Yes</i>	47.3	175
<i>No</i>	52.7	195
Total	100.0	370

Table 5.2 presents the per cent of respondents who participate by selected characteristics. The results show that only ownership status is significant at 5 per cent

level. Respondents who are owners are more likely to participate compared to tenants.

TABLE 5.2: PER CENT OF RESPONDENTS WHO PARTICIPATE BY SELECTED CHARACTERISTICS

Characteristics	Per cent	n
Gender	47.3	370
<i>Male</i>	47.5	212
<i>Female</i>	56.6	158
Ethnic Group	47.3	370
<i>Malays</i>	52.8	195
<i>Chinese</i>	51.2	41
<i>Indians</i>	44.2	86
<i>Others</i>	27.1	48
Age Group	47.3	370
<i>30 and below</i>	41.9	167
<i>31 – 40</i>	47.0	117
<i>41 – 50</i>	53.8	52
<i>51 and above</i>	64.7	34
Education	47.3	370
<i>None</i>	40.5	37
<i>Primary</i>	49.0	100
<i>Secondary</i>	45.2	188
<i>Tertiary</i>	57.8	45
Types of LQs	47.3	370
<i>Low cost</i>	46.6	324
<i>Med. & High Cost</i>	52.2	46
Ownership Status*	47.3	370
<i>Owner</i>	53.9	128
<i>Tenant</i>	43.8	242

* Significant at 5 per cent

Based on the analysis of Chapters 3 and 4, additional explanatory variables that have been found to be significant are selected for the multivariate analysis. The study examines the effects of knowledge, attitude towards handling of household wastes and attitude towards environmental friendly actions on PARTICIPATE. Knowledge variables include whether respondents are aware of the effects of

pollution and the outcome of household waste. The model also includes knowledge of recycling centres. Variables measuring attitude towards environmentally friendly actions include whether respondents are willing to buy used items (buying new things is not important), whether respondents car pool, ensure vehicles do not emit excessive smoke and are willing to report on open burning. To limit the number of explanatory variables, the relevant attitude variables are combined into groups for the purpose of multivariate analysis. In addition, the subgroups PARTICIPATE were selected based on the study by Tan, 2000.

The initial dummy variables were combined for analysis. Dummy variables are applied as a means to introduce qualitative regressors in regression analysis. However, the introduction of many dummy variables consume a large number of degrees of freedom (Gujarati, 1995) and render the analysis less meaningful. Hence, the number of dummy variables introduced were weighted against the total number of observations available.

PARTICIPATE, the dependent variable, is '1' if any of the following actions are undertaken by the respondent:

- Send things for recycling;
- Have been a volunteer at recycling centres;
- Willing to buy environmental friendly products;

'0' if otherwise.

The coding for the explanatory variables are as follows:

AGE AGE1 = 1 if respondent is 30 years and below, 0 otherwise,

AGE2 = 1 if respondent is 31 to 50 years, 0 otherwise,

GDR

GDR=1 if the respondent is male, 0 otherwise;

MLY

MLY=1 if respondent is Malay, 0 otherwise;

EDU

EDU1=1 if respondent attained secondary education, 0 otherwise;

EDU2=1 if respondents attained tertiary education, 0 otherwise,

OWNSHP

OWNSHP=1 if owner occupied, 0 otherwise;

LQ

LQ=1 for low cost houses, 0 otherwise,

AWRE

AWRE=1 if respondent is aware of one or two environmental issues (pollution effects or/and outcome of household wastes), 0 otherwise;

RCTR

RCTR=1 if respondent is aware of the location of the nearest recycling center, 0 otherwise;

ATDE

ATDE=1 if respondent undertakes two or more environmentally friendly actions (buy used items, car pool, ensure vehicles do not emit excessive smoke and report open burning), 0 otherwise;

5.3 RESULTS OF ANALYSIS

The result is reflected in the following equation.

$$P(\text{PARTICIPATE}=1) = 1/(1+e^{-Z})$$

$$\begin{aligned} \text{Where: } Z = & -0.4265 + 0.2500\text{GDR} + 0.5661\text{MLY}^* - 0.3598\text{AGE1} - 0.1974\text{AGE2} \\ & (0.5526) \quad (0.2286) \quad (0.2409) \quad (0.3929) \quad (0.3815) \\ & -0.0868\text{EDU1} + 0.2273\text{EDU2} - 0.2543\text{LQ} + 0.2773\text{OWNSHP} \\ & (0.2468) \quad (0.3904) \quad (0.3484) \quad (0.2494) \\ & -0.1034\text{AWRE} + 0.9578\text{RCTR}^* + 0.5457\text{ATDE}^* \\ & (0.2082) \quad (0.3642) \quad (0.2278) \end{aligned}$$

The results show that the coefficient of variables MLY, RCTR and ATDE are significant at 5 per cent level. The Chi-square statistics for the model is 30.962 and significant at 1 per cent level ($p=0.0011$). The model accounts for approximately 11% (Nagelkerke R-square) of the variance in the dependent variable.

The coefficient signs are consistent with expectations except for AWRE. A positive coefficient indicates a higher probability of participation in environmental programmes. The positive coefficient is observed for the following variables: GDR, MLY, EDU2, OWNSHP, RCTR and ATDE. As an example, the positive coefficient of ATDE means that the more environmentally friendly actions undertaken, the more likely the respondents will participate in environmental activities.

The model shows that increased awareness, AWRE does not cultivate a higher participation rate in environmental activities contrary to expectation. Two reasons are suggested to explain this finding. Firstly, it could mean that unless the respondents see direct benefits of environmental actions (or realise environmental impacts

affecting them), they are unlikely to participate in environmental activities even though they are aware of environmental issues. Another explanation could be due to the social background of the respondents. 87 per cent of the respondents live in low cost houses. Assuming that the type of living quarters is an indicator for income level, this could mean that the respondents are more likely to be concerned with raising their income levels rather than spending time on environmental activities. Hence, in order to enhance participation in environmental programmes especially among lower income groups, the programme needs to consider supporting ways that would also improve the standard of living of the local communities.

The multivariate analysis shows that ethnic groups respond differently towards environmental programmes. The analysis also shows that knowing the location of recycling centres and commitment towards environmentally friendly activities are important when designing environmental programmes.

Table 5.3 presents the estimated probability of participation in environmental programmes by different combinations of explanatory variables. 12 scenarios are generated to provide an indication of the estimated probability of participation by various characteristics.

As an illustration, a Malay respondent who knows the location of recycling centres and at the same time undertake two or more environmentally friendly actions, has approximately 83 per cent probability in participating in environmental programmes. This probability is reduced to 65 per cent if he/she does not know where the recycling centre (Table 5.3). If the respondent undertake less environmental actions (less than 2) the probability of participating in environmental actions is further reduced to 52 percent.

TABLE 5.3: ESTIMATED PROBABILITY OF PARTICIPATION IN ENVIRONMENTAL PROGRAMMES BY VARIOUS SCENARIOS AND CHARACTERISTICS

<i>Explanatory Variables</i>									
No	RCTR	MLY	ATDE	EDU1	EDU2	AGE1	AGE2	z	Prob
1	1	Malay	>1					1.6046	0.8327
2	0	Malay	>1					0.6468	0.6563
3	1	Non Malay	0					0.4928	0.6208
4	0	Non Malay	0		Tertiary	<30		-0.5021	0.3770
5	0	Malay	0					0.1011	0.5253
6	1	Non Malay	>1					1.0385	0.7386
7	1	Non Malay	0		Tertiary	<30		0.4557	0.6120
8	1	Non Malay	0		Tertiary		30-50	0.6334	0.6533
9	1	Non Malay	0	Secondary		<30		-0.0019	0.4995
10	1	Malay	>1		Tertiary	<30		1.5675	0.8274
11	0	Non Malay	>1					0.0807	0.5202
12	0	Non Malay	0		Tertiary		30-50	-0.3244	0.4196

Note: >1 means two or more times

In another illustration, a non Malay respondent with tertiary education and below 30 years old has approximately 37 per cent probability of participating in environmental actions. The probability of participation is increased to 41 per cent if the respondent is a non Malay respondent with tertiary education and is between 30 to 50 years old.

5.4 POLICY AND PROGRAMME IMPLICATIONS

This study has found that knowing the location of recycling centre, ethnicity and the number of environmental friendly actions undertaken influence participation in environmental programmes. This research indicates that providing specific and relevant information is important in encouraging participation in environmental programmes. For example, large numbers of the respondents do not volunteer at recycling centers because they are not aware of the location of recycling centres.

The study has shown that respondents with higher awareness levels may not necessarily participate in environmental activities as they do not see the direct link and benefits of environmental activities to their own well being. Hence, this study

shows that it is imperative to incorporate an effective communications strategy that indicates the importance and benefits of proper waste management to the community. At the same time a strong supporting system of environmental programmes that provides user-friendly information and convenient chain of activities are also important elements towards increased participation.

The study has also shown that ethnicity influences participation in environmental programmes especially among squatter communities. Hence, it would also be important to consider social and cultural aspects of ethnic groups when designing environmental programmes among squatter communities. An example could be to coincide environmental programmes such as recycling activities with festive seasons as purchase of recyclable materials are increased. As in this study, ethnic groups may reflect variations in income levels, it should be noted that it may be income levels are causing the differences. Hence, policy development should also consider the designing environmental programmes according to different income groups.

In addition to targeted awareness raising, an effective communication strategy and strong support system, it is also useful to consider the potential of other policy instruments such as legal and economic tools such as setting guidelines/rules or providing incentives or implementing charges.

5.5 FUTURE STUDIES

The findings have highlighted how future studies could provide more detailed understanding of the issues of urban pollution. Specifically, the issue of ownership could be assessed in future studies. In terms of the squatter communities, the issue of property and land ownership is a delicate matter due to the state policy to ensure

Selangor be a state free of squatter settlements by 2005. Whilst the policy may have all the right intentions in ensuring more conducive living environments for the community or addressing illegal settlements, important social implications need to be carefully assessed. Therefore, understanding the linkages between ownership and environmental action is important in order to assess the success rates of environmental programmes. In particular, the programme needs to have an indication if the communities would be committed in the long run period or whether due to the 'threat' and possibility of being removed, the communities may have short term interests in improving the environmental conditions.

In addition, it is also suggested that the present questionnaire can be extended to include questions that would capture the respondents' priorities in terms of environmental protection compared to other problems of urban living such as traffic jams, flooding, education and so on.

CONCLUSION

The study has provided important insights into the behaviour and opinion of the squatter communities in terms of waste disposal. The core conclusion of the study is that the community would be sensitised to environmental programmes if sufficient and suitable support systems such as awareness materials and relevant infrastructure are provided in order to make participation more convenient. Hence awareness, strengthened with community relevance to environmental programmes are important considerations, similar to conclusions of studies reviewed earlier. The environmental awareness of the squatter communities is fairly low. However, there is keen interest to learn more about environmental issues especially through television, newspapers and radio. In addition, the results also indicate a strong motivation to work as a community to solve environmental problems as shown in chapter 4. This highlights opportunities for strengthening environmental awareness and designing appropriate programmes to further the cause of environmental conservation and protection especially amongst squatter communities, many living near river sources.

Whilst the study focussed on squatter communities in Kg. Sg. Kayu Ara and Kg. Pelumut, the policy and programme implications could potentially be inferred for other squatter communities. Potential areas for further studies based on the findings of this study include the examination of appropriate mechanisms for involving communities in environmental protection. Examples of the mechanisms include analysing the possibility of introducing market incentives for encouraging higher recycling and reusing rates.

In addition to the end user initiatives, complementing policies such as reducing the resources used for packaging is an important aspect of waste management. According to Young (1991), 'source reduction' which means cutting

wastage by using less material in the first place should be the top choice on virtually everyone's list of waste management strategies. The reasons are obviously linked to the option of reducing the need for disposal, minimising the extraction and processing of virgin materials, and even reducing energy and pollution from recycling.

Whilst recognising the need for holistic policies in effective waste disposal management, the analysis of the study has highlighted the need for strengthening awareness and participation of the squatter communities. This is succinctly summarised in the Programme for the Prevention and Management of Marine Pollution in the East Asian Seas; *"to make the general public realize that they are part of the growing problem and, therefore, must be mobilised to take some of the responsibilities towards solving environmental pollution problems"* (MPP-EAS, 1996).