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FOREST RECREATION USE PATTERNS USER BEHAVIOUR AND RECREATIONAL VALUE IN MALAYSIA

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Ph. D. NOVEMBER 1987

FOREST RECREATION USE PATTERNS, USER BEHAVIOUR AND RECREATIONAL VALUE IN MALAYSIA

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November, 1987

ABSTRACT

The study is concerned with an examination of outdoor recreation at three forest recreation areas situated within and at the periphery of a large and major population region in Peninsular Malaysia. It was undertaken primarily to investigate the features that describe the use of these areas and to estimate the use-demand and quantification of consumers' surplus. Initially, a brief description of forest recreation in Peninsular Malaysia is presented. This is followed by a review of techniques for estimating consumers' surplus, after which it was concluded that an application of the travel cost method was appropriate for this study. An on-site questionnaire survey was used to gather a reasonable amount of user information. The questionnaire surveys carried out were found to be valuable; the information gathered facilitated the description and analysis of the areas' consumption, travel and use patterns and the behaviour of the users. Thus the surveys also provided information which was appropriate for the application of the travel cost technique. Subsequently, a detailed description of user behaviour is presented. Difficulties of the travel cost approach were identified and addressed through the use of appropriate sample and extra-sample data. Particular attention was paid to the problems of multi-purpose trips, travel time bias and the influence of alternative sites on participation. Problems with functional forms and the weighting of points for the trip demand model were also given considerable attention. It is believed that the model selected in this study is an improvement on previously known models. The resulting estimates of consumers' surplus for the three areas are reasonably acceptable and conform to a priori expectations. Finally, the main conclusions of the thesis are highlighted and some aspects that have a bearing on planning and management issues are discussed along with brief recommendations for further and future research efforts.

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CONTENTS

	Page
Declaration	(ii)
Abstract	(iii)
Acknowledgements	(iv)
List of Figures	(x)
List of Tables	(xi)
CHAPTER 1 INTRODUCTION	
1.1 General Background	1
1.2 Objectives of the Study	4
1.3 Conclusion	5
CHAPTER 2 FOREST RECREATION IN PENINSULAR MALAYSIA	
2.1 Introduction	7
2.1.1 A Historical Perspective	7
2.1.2 Current Concerns	11
2.2 The Demand for Outdoor Recreation	14
2.2.1 Effective Demand	17
2.2.2 Determinants of Demand	19
2.3 Forest Resources Supply and Its Influence on Recreation Demand	33
2.3.1 Forest Land as a Recreation Resource	34
2.3.2 Recreation Forests	38
2.4 Conclusions	48
CHAPTER 3 METHODS AND PROBLEMS OF ASSESSING USE, USER BEHAVIOUR-ATTITUDES AND AREA BENEFITS	
3.1 Introduction	53

Page

3.2 Methods of Assessing Recreational Use 59

3.2.1 The Assessment of Recreational Needs 59
3.2.2 The Context of Demand Analysis 64
3.2.3 Area-Specific Recreation Demand Estimation Models 69

3.3 Methods of Estimating Recreational Benefits 80

3.3.1 An Overview of Techniques for Estimating Recreational Benefits 81

Gross Expenditure Method
Market Value Method
Cost Method
Property Value Studies
Household Production Functions
Consumers' Surplus Method

3.3.2 Consumers' Surplus 85

Methods of Estimating Consumers' Surplus

3.4 The Travel Cost Method 93

3.4.1 Problem of the Travel Cost Techniques and Data Requirements 101

Monetary Cost of Travel
Travel Time
Journey Utility
Multi-stop or Purpose Trips
Time spent at the Area
Congestion
Competing Areas
Quality of an Area
Income Effects

3.5 Conclusions 134

CHAPTER 4 THE AREA UNDER STUDY AND QUESTIONNAIRE SURVEY

4.1 Introduction 137

4.2 Description of the Region and Recreation Areas 138

4.2.1 The Region 138
4.2.2 The Recreation Forests 144

Page

4.3 The Visitor Survey 157

4.3.1 Questionnaire Design and Survey Organisation 162

Field Reconnaisance and Pilot Survey
The Interview Survey

4.3.2 The Interview Response 171

4.4 Data Preparation and Analysis 174

4.5 Conclusions 178

CHAPTER 5 CHARACTERISTICS OF TRAVEL-USE PATTERN

5.1 Introduction 180

5.2 The Recreational Visits 180

Number of Visit Groups
Period of Visit
Visitor Base
Origin of Visits
Means of Travel to An Area

5.3 Visitors' Reasons for Choosing to Visit an Area 191

5.4 The Features of Trip-Travel 199

5.4.1 Weekend Trips 203

Multi-stop Visits
Distance Travelled
Journey Utility
Time Spent Travelling

5.4.2 Weekday Trips 220
5.4.3 Monetary Cost of Travel 231

5.5 Length of Visit 237

5.6 Alternative and Competing Areas 240

5.7 Characteristics of the Areas 244

The Special Features of the Areas
The Quality of an Area

5.8 Conclusions 255

Page

CHAPTER 6 RECREATIONAL USER BEHAVIOUR - VISIT PATTERNS, ATTITUDES AND ACTIVITY PARTICIPATION

6.1 Introduction 259

6.2 Visitors' Profile Characteristics and Visits to Recreation Areas 263

6.2.1 Visit Patterns Between Different Areas 268
6.2.2 Visit Patterns for Individual Areas 270
6.2.3 Comparison Between Some Characteristics of the Sampled Visitors and the Regional Population 276
6.2.4 Frequency of Visits by Demographic/Socio-economic Variables 277
6.2.5 Attitudes Towards the Visit 283

6.3 Effects of Non-price Variables Upon Visitation 289

6.4 Participation in Activities 298

6.4.1 Activity Participation in the Different Areas 299
6.4.2 Activity Participation by Categories of Visitors 301

An Assessment

6.5 Conclusions 314

CHAPTER 7 RECREATION AREA USE-DEMAND MODELS AND ESTIMATION OF CONSUMERS' SURPLUS

7.1 Introduction 318

7.2 Derivation of Area Use-Demand Models 319

7.2.1 Review of the Variables for Analysis 319

The list of variables

7.2.2 Review of the Estimation Procedures 333

Aggregation
Functional Forms
An Assessment

7.2.3 Estimation Procedures Adopted for this Study 345

Individual Participation Function (V_{ij})

Semi-Disaggregated Demand Function (VPC)

Page

7.3 Regression Results 351

7.3.1 Estimation of Individual Participation Model 352
7.3.2 Estimation of Semi-Disaggregated Use-Demand Model 357

7.4 Calculation of Consumers' Surplus 367

7.5 Conclusions 370

CHAPTER 8 GENERAL CONCLUSIONS AND DISCUSSIONS 375

REFERENCES 385

APPENDICES 408

LIST OF FIGURES

		Page
1.	Malaysia and neighbouring countries	8
2.	Factors influencing the consumption of outdoor recreation	21
3.	Peninsular Malaysia	36
4.	Hypothetical recreation area system	66
5.	Demand curve	77
6.	Demand curve for good X_i	86
7.	Hypothetical relation between cost and visit rate	95
8.	Hypothetical aggregate demand curve	98
9.	Demand curve under different levels of congestion	117
10.	Aggregate recreation demand given a level of congestion	118
11.	The region - Selangor and the Federal Territory	139
12.	Distribution of forest reserves	145
13.	Kancing Forest Reserve	147
14.	Ampang Forest Reserve	152
15.	Sungai Lalang Forest Reserve	156
16.	Survey stages	159
17.	The visitor survey - the information and data collected	161
18.	Demographic/socio-economic factors and participation in forest recreation	264
19.	The socio-economic factors and visitation to the three areas	273
20.	The socio-economic categories of visitors to recreation sites compared to that of total population of the region	278
21.	Frequency of visits by socio-economic variables for the total sample	280

Page

22. The proportion of visitors participating in different activities 300

23. Picnic and profile indicators 306

24. Swimming and profile indicators 307

25. Relaxing and profile indicators 308

26. Viewing and profile indicators 309

27. Photography and profile indicators 310

28. Camping and profile indicators 311

29. Hiking and profile indicators 312

30. Walking and profile indicators 313

31. The effect of time cost on the demand curve 364

LIST OF TABLES

		Page
1.	Number of visits to Taman Negara	20
2.	Total number of tourists to Peninsular Malaysia	20
3.	Socio-economic characteristics of visitors to several recreational centres	23
4.	Population in given age categories, Malaysia 1980	26
5.	Weekends, weekdays, public holidays and vacation weeks spent outdoors per family per year by income groups	30
6.	Forest recreation area development in Peninsular Malaysia	41
7.	Percentage and mean household income distribution by districts in Selangor and Federal Territory	143
8.	Number of usable interview responses	172
9.	Number of visitors	183
10.	Seasonal use pattern	184
11.	Weekly use pattern	184
12.	Base of visits	185
13.	Origin of visits by sub-districts	186
14.	Origin of visits by districts	187
15.	Means of travel to the recreation area	189
16.	Visitors' reasons for visiting the survey area - Sungai Lalang	195
17.	Visitors' reasons for visiting the survey area - Ampang	196
18.	Visitors' reasons for visiting the survey area - Kancing	197
19.	Number of first-time visitors	201
20.	Mean number of visits already made during the survey year and the year before	201

Page

21. Multi-stop visits 204

22. Features of multi-stop visits - places of stop 204

23. Features of multi-stop visits - reasons for stop 205

24. Distance travelled by visit group (short questionnaire) 207

25. Distance travelled by visit group (extended questionnaire) 207

26. Distance travelled to recreation area - Ampang 211

27. Distance travelled to recreation area - Sungai Lalang 212

28. Distance travelled to recreation area - Kancing 213

29. Visitors' attitude to journey - within region visits 216

30. Mean distance travelled versus attitude to journey - within region visits 216

31. Time spent travelling on weekend trips (single journey from home to recreation area) 217

32. Time spent travelling on weekend trips 219

33. Multi-stop visits - weekday 221

34. Features of multi-stop visits - places of stop (weekday) 221

35. Features of multi-stop visits - reasons for stop (weekday) 222

36. Distance travelled by weekday visitor groups (short questionnaire) 224

37. Distance travelled by weekday visit groups (extended questionnaire) 224

38. Distance travelled to recreation area (weekday) - Sungai Lalang 225

39. Distance travelled to recreation area (weekday) - Ampang 226

40. Distance travelled to recreation area (weekday) - Kancing 227

41. Visitors' attitudes to journey - weekday 228

42. Mean distance travelled versus attitude to journey - weekday 228

Page

43. Time spent travelling on weekday trips (single journey from home to receation area) 228

44. Time spent travelling on weekday trips 229

45. Monetary cost of travel - weekend trips 233

46. Monetary cost of travel - weekday trips 234

47. Monetary cost of travel 236

48. Length of visit 237

49. Length of visit - weekend and weekday 238

50. Mean length of visit by origin of visit - day visits only 238

51. Number that had visited other recreation areas 241

52. Number of visitor groups who have visited alternative recreation areas 242

53. Special features of the survey areas 245

54. Special features of alternative to the survey area 248

55. Mean rating values for travel and area characteristics 250

56. Differences between rating means of survey and alternative areas - travel and area characteristics 250

57. Mean rating values for facilities available at the areas 253

58. Differences between rating means of survey and alternative areas - facilities on site 253

59. Reasons for visiting the survey area and not the alternatives 254

60. Number of visitors by age groups in a visiting party 266

61. Composition of group visitors 266

62. Chi-square test of association among categories within a variable and the three areas 269

63. The chi-square goodness-of-fit test of the profile variables for each area and all areas combined 271

64. Level of significance on number of visits among categories within a variable - for total sample 279

Page

65. Level of significance on number of visits among categories within a variable - for individual areas 281

66. Differences in perceived travel and area characteristics among surveyed areas 284

67. Differences in perception of travel/area characteristic by demographic/socio-economic variables 286

68. Travel and area characteristics determining the frequency of visits 288

69. Stepwise regression results for Ampang 293

70. Stepwise regression results for Kancing 294

71. Stepwise regression results for Sungai Lalang 295

72. Percentage of participation in activities at the three areas 302

73. Association between activities participation and non-participation and categories of visitors 303

74. Hypothetical observation and distance zones 335

75. Regression results for Sungai Lalang 353

76. Regression results for Ampang 354

77. Regression results for Kancing 355

78. Stepwise regression 358

79. Use-demand regression results - without value of travel distance 359

80. Use-demand regression results - with a generalised travel cost 363

81. Estimated site consumers' surplus from the demand equation 368

82. Total estimated consumers' surplus 380

CHAPTER 1

INTRODUCTION

1.1 General Background

1.2 Objectives of the Study

1.3 Conclusion

1.1. GENERAL BACKGROUND

Socio-economic trends in Malaysia indicate a considerable future economic growth and a society with plenty of leisure time. It is estimated that a third of a typical worker's time in a year is free time (Wan Sabri, 1983). This is possible because Malaysian workers are fortunate enough to have many public holidays plus paid annual leave. The population of Peninsular Malaysia in the year 2000 will be about 18.3 million, assuming a rate of increase of around 2.6 per cent per annum (Anon., 1981). The largest percentage of the population will consist of young adults (less than 39 years old). Most of the people will be concentrated in urban centres. By the year 2000, there will be more than 3.4 million motor vehicles on Malaysian roads and, with road development being encouraged by the government, the mobility of the people will definitely increase.

The processes of economic growth, urbanisation and automation are likely to result in increasingly stressful situations within the lives of the people, especially for those living in the crowded urban settings. They are thus expected to take the opportunity to leave their place of residence or work for occasional engagement in outdoor leisure pursuits. The present exodus of people to the countryside and coastal areas during the weekends and paid holiday seasons is a testimony and an example of this phenomenon.

From the rather simplistic description above it can be anticipated that the demand for outdoor recreation in Malaysia will increase. Forest recreation will certainly meet a significant proportion of this increase. Forests are a recreational resource because of their attractions. The reason that has led to the use of these resources for recreation has mainly

been their relatively easy access. In this respect, the situation in Peninsular Malaysia is more satisfactory than that in European countries where the main forest areas tend to be either too small in size or too far from the main centres of population. It is therefore a prudent gesture that the opening of the Malaysian forests to the public and the provision of recreational facilities such as nature trails, picnic sites, information centres and play areas for children have become major elements not only of forest policy but also of social forestry (Forestry Headquarters, Peninsular Malaysia, 1978).

Development in the field of forest recreation, however, has to be seen in a wider perspective. In Malaysia, one of the world's largest exporters of tropical hardwoods, forestry is still lacking in the practice of true multiple use management. The country's policy calls for the sustainable production of timber, the conservation of environmental resources and the provision of opportunities for recreation to be pursued concurrently, though perhaps not necessarily in the same area. However, timber production is still the predominant objective in more than 70 per cent of the total forest areas; even where environmental or recreational considerations should predominate, timber production is rarely completely excluded. It is only in exceptional circumstances and on relatively small areas, haphazardly delineated, that environmental and recreational objectives are pursued to the complete exclusion of timber production. The setting up of national parks in Malaysia was primarily to achieve environmental conservation and recreational objectives. However, in the Malaysian national parks, provision for outdoor recreation is still secondary to the preservation and conservation of its flora and fauna.

To fulfil the requirement for intensive outdoor recreational pursuits in a natural environment, much will have to depend on the allowance of "right-of-way" into the forest areas managed by the Forest Department. An immediate problem in accommodating the spectrum of recreational opportunities is the rapid disappearance of forest areas close to urban areas. In the context of rural recreation in Malaysia, the population seeking recreation is predominantly urban. This is true in areas such as Kuala Lumpur (the capital city) and Petaling Jaya (a heavily populated area adjacent to Kuala Lumpur). Site surveys at recreation areas such as Kancing (a forest area), Templer Park (a semi-developed park) and Mimaland (a commercially developed area) have shown that most visitors come from Kuala Lumpur, Petaling Jaya or its immediate surrounding areas. The annual visitation to these areas is estimated to be in the range of 10,000 to 70,000 visits (Wan Sabri, 1983).

The anticipated increase in the demand for forest recreation is expected to impose a tremendous amount of pressure on the allocation, selection and distribution of forest recreation areas, the number and distribution of the population seeking recreation, and the accessibility of the areas concerned to people in terms of distance. The importance of distance will depend upon detailed characteristics such as the visitors' level of income, the cost of travel and the value attached to travel time. The users are expected to be critical of the resource characteristics, the provision of facilities, the activities that they can participate in, the level of congestion and the environmental and sanitation conditions. Alternative or substitutable sites will also play a role in users' preference patterns.

If the forest is to be seen as providing an effective complementary role in satisfying the need for outdoor recreational enjoyment, the current ad-hoc and haphazard development of forest recreation areas in Malaysia will have to be revised. Among the essential pre-requisites towards a more systematic planning for better development and management of forest recreation areas is the collection of a comprehensive set of information on the existing level of use of the areas. Such information is sadly lacking. A first attempt must be made to identify clearly the factors that generate consumption and to observe how these factors interact with one another. The justification for this study is hence clear.

1.2. OBJECTIVES OF THE STUDY

The principal objective of this study is the investigation of the features that describe the use of three forest recreation areas in Peninsular Malaysia, located at the periphery of a large population centre. However, this statement of a general objective does not reflect the purpose of this dissertation fully. It is thus appropriate to break down this overall objective into three, more specific objectives. It is the author's intention and hope that the achievement of these three objectives will prove a helpful and sufficient start in the effort to provide the much needed information, the lack of which is currently inhibiting the systematic planning and management of forest recreation areas in Malaysia. Moreover, each of these objectives is felt to be worthwhile in its own right and the approach used to achieve each one reflects this. The three objectives are stated below.

(i) To describe the characteristics of the recreational travel to and use patterns of the forest recreation areas (Chapter 5 provides this description).

(ii) To identify the recreational users, their behaviour within the areas and their attitudes towards the areas (This is the predominant concern of Chapter 6).

(iii) To identify the best practicable means of quantifying the consumers' surplus of non-priced recreation areas and to yield surplus estimates for each of the three survey areas (Techniques and their application are dealt with in Chapter 3, 5 and 7).

1.3. CONCLUSION

It has been known that the demand for outdoor recreation has imposed a certain amount of pressure on the existing forest recreation areas surrounding urban centres in Malaysia. At present there is a lack of knowledge with regard to forest recreation participation rates and preferences for activities. Very little is known about the visitors, their needs, wants and opinion of the area that they visit. This lack of information presently inhibits systematic planning and management.

A need exists for the assessment of the present patterns of recreational use of forests in the effort to assist and facilitate the optimal siting and distribution of potential recreation areas. Another aspect associated with the use of forest recreation areas is the behaviour of the recreationists and their attitudes towards the site itself and its management. The collection of this information should give a better

insight into the existing strengths and deficiencies in the provision of appropriate activities and facilities and could help towards more efficient overall management of the areas.

In addition, the information generated from this study will have other applications. It will show, in terms of various visitation characteristics, differences or similarities that exist among three forest recreation areas in a region where urban forest recreation use is a growing phenomenon. Also, there are other agencies, both public and private, which provide recreation and which hence have the need for use (demand) statistics. As such, the research and the discussion of the results is seen to be a valuable public relations exercise. Perhaps above all, since studies into forest recreation in Malaysisa have never before been conducted at this level and scale, it is hoped that the process and product of this research will prove to be a substantial contribution to and provide an impetus for future research in the field of outdoor recreation in Malaysia.

2.1 INTRODUCTION

2.1.1 A Historical Perspective

Very little is known of the early development of forest recreation in Malaysia (Figure 1). It is perhaps fair to say that the concept of the amenity park and forest recreation was never a prominent feature or concern prior to the mid 1970's. What little interest there was shown in outdoor-based recreation during the early British colonial period was restricted to the precincts of hill resorts and certain hunting grounds which were monopolised by the elite. During the initial periods of British occupation, expatriate officers were allowed an extended leave of one year after every six years of service. It is the idea that the tropical climate could be a health hazard that led to popular movements of expatriates in search of cool refuge in the hills both within and outside Peninsular Malaysia, then known as Malaya, hence the establishment of hill stations. Penang Hill was first used as a hill resort in the late 1800's followed by subsequent decisions to build hill bungalows in Taiping (1884), Gunung Kledang (1892) and Bukit Kutu (1893). Maxwell Hill, Gunung Angsi, Fraser Hill, Cameron Highlands and Gunung Jerai were completed by the early 1920's.

The pre-independence period of exclusiveness slowly changed to the period of post-independence economic growth after a lull of interest in resorts and tourism during the depression years of the 1930's and the Second World War. As in most Third World countries prior to the Second Development Decade of the 1970's development strategies of post-independence Malaya were geared towards maximising economic growth, a part of which was to be achieved through modernising the rural primary export sector. With the establishment of land development schemes, large tracts of

CHAPTER 2

FOREST RECREATION IN PENINSULAR MALAYSIA

2.1 Introduction

2.1.1 A Historical Perspective

2.1.2 Current Concerns

2.2 The Demand for Outdoor Recreation

2.2.1 Effective Demand

2.2.2 Determinants of Demand

2.3 Forest Resources Supply and its Influence on Recreation Demand

2.3.1 Forest Land as a Recreation Resource

2.3.2 Recreation Forests

2.4 Conclusion

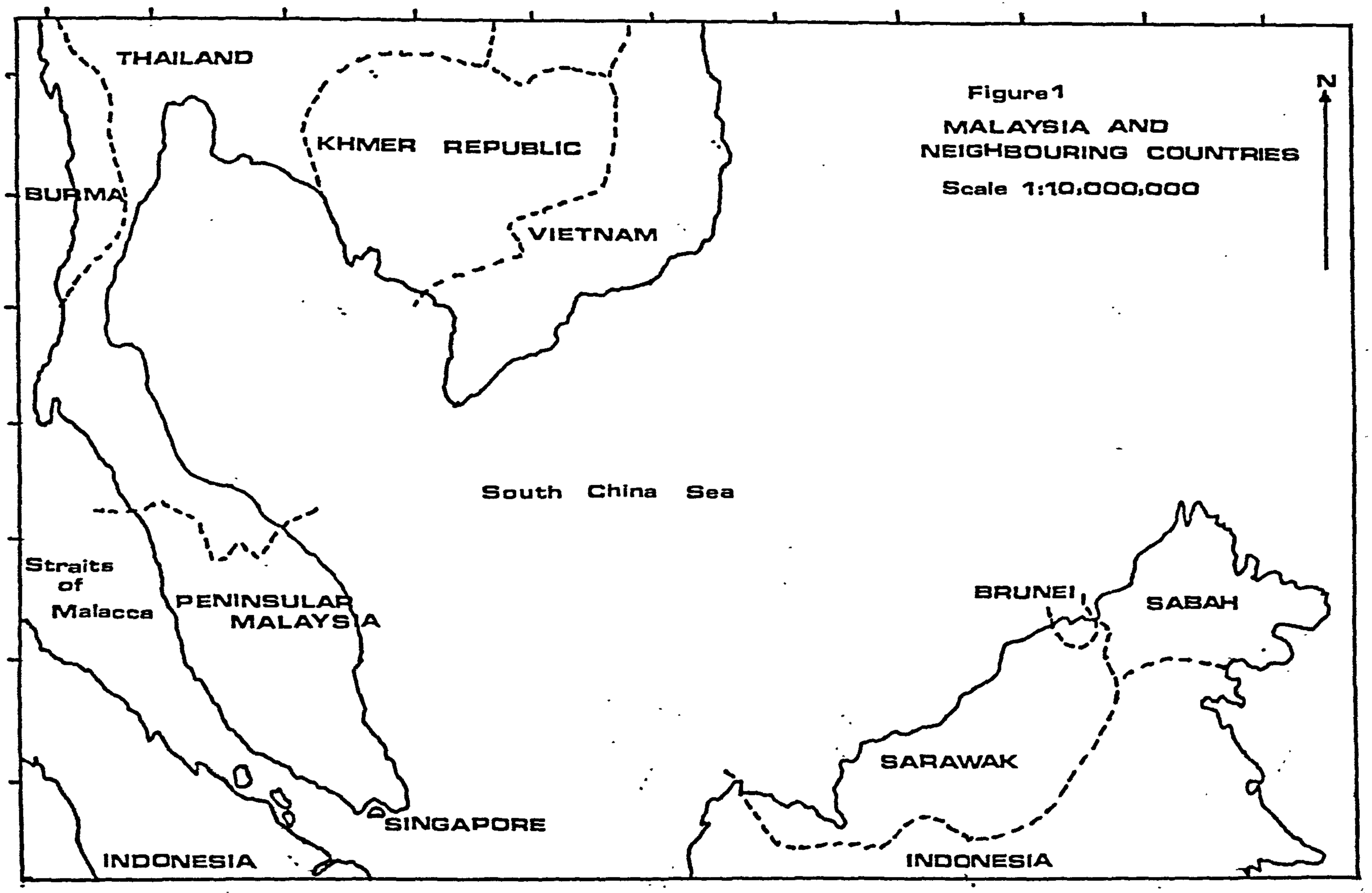

Figure 1
MALAYSIA AND NEIGHBOURING COUNTRIES
Scale 1:10,000,000

virgin jungle were cleared for agricultural use while the main thrust of the forestry sector was aimed at attaining increased volume of timber production, both for export and for local consumption. By the late 1960's the trends of rapid industrialisation and urbanisation and the consequent large scale deforestation brought forth a corresponding concern for environmental protection.

'Environmental protection' is a relatively new piece of jargon in the context of Malaysian life. It is not the lack of inherent awareness of the importance of the environment and its protection that creates this rather ambiguous situation. It is more the lack of concerted effort from all parties to emphasise the truth about environmental protection that seems to create the impression that the country is facing a new dilemma or another element threatening development strategies. Such reaction is possibly inspired by the new awareness of conservation issues generated overseas, which have filtered down through a few local expatriates. Local environmental groups have played a significant role in increasing environmental awareness among Malaysians, even though there were controversies as regards their effectiveness. At the same time, the role of foreign consultants (private practitioners and volunteers) should not be underplayed. The forestry department itself also had some in-house engagements of foreign advisors.

While all this was happening, it would be unfair to say that the Forest Department was unaware of the environmental degradation of its vast forest holdings. The problem was that political decisions made in connection with the matter were beyond and above the department's

jurisdiction. The vast clearance of forest areas for agricultural cash crops accentuated the desire for monetary returns. The Forest Department had very little say. Forestry had always been in the background when it came to the issue of land use. In that they had possession of about three-quarters of the total land area of the country, the forest department and the state politicians who make the decisions were quite complacent about multiple-use management of the forest areas. Only when the effects of deforestation were felt did the Forest Department begin to realize the severity of losing its area to other land uses.

The resultant effect of increasing competition on land use and the concern for environmental and conservation issues prompted the Forest Department to work on projecting its image as a multiple land use agency. Emphasis began to be given to the conservation of forest areas for education, scientific studies and forest recreation, though implementation at the ground level was slow and cautious. The emergence of the concept of 'amenity forests' by the mid 1970's bore witness to this. One of the first papers to appear on the subject of forest recreation lamented the lack of attention given to outdoor recreation and called upon the Forest Department to prepare itself in anticipation of increasing public demand for outdoor recreational amenities (Winston and Luqman, 1972). To capture the public's imagination and at the same time to promote the recreational role of forestry, the Forest Department since 1967 had begun to build facilities with many of the structural designs inspired by a foreign advisor who was attached to the headquarters in Kuala Lumpur. Again this <u>in situ</u> development appears to have been implemented top-down, and in a rather incomplete fashion.

The points raised thus far suggest that many things we have in Malaysian society in general and forest recreation in particular have originated from the West. The ideas that guide policies affecting almost every aspect of our economy, law, administration, education, lifestyle and even environmental concerns have their origin elsewhere. Surely this need not and should not be so, given the state of modernisation and needs. We cannot be over-sentimental concerning the past. In many instances the colonial legacy has been an asset to the present Malaysian generation. In terms of open spaces, for example, Kuala Lumpur is perhaps better endowed than Bangkok, thanks to the British administration. But in the sphere of outdoor recreation, whether forest or water-based, there seems to be room for an indigenous input.

2.1.2 Current Concerns

A steady social and economic development has given Malaysia the status of a rapidly developing nation. The population is more affluent. The government is more wholesome, having a well rounded policy towards socio-economic and natural resources development. The element of natural resources conservation is gaining its rightful place among the modern needs of the nation. Thus conservation of forests, coastal areas, rivers and the surrounding seas are looked upon as a rightful step towards enhancing the quality of life of its population. The forestry sector has played an important role in the economic development of Malaysia. This has been conducted through an integrated approach to the development of the forest sector. The strategy is based on the premise that there is a need to develop the processing of forest resources further into the secondary and tertiary products while at the same time ensuring the preservation of the

environment. Implementation of this integrated approach will be guided by the principles of the National Policy which was approved by the National Forestry Council in 1978.

The principal objectives of the National Policy can be identified as the development of forest resources for conservation to meet the ecological requirements for the protection of the environment, sustained yield management of the production forest known as the Permanent Forest Estate and the optimisation of the contribution of the forestry sector to the national economy. For a more organised and co-ordinated co-operation of the state governments[1], the diverse State Forest Enactments were unified through legislation by means of a uniform forestry act, known as the National Forestry Act and accompanied by the Wood-based Industries Act. Through the National Forestry Council, the state governments agreed to adopt the uniform legislation in place of the separate state enactments. In addition, through such a policy, various measures have been drawn up, such as the reduction of the total felling rate, the banning of log exports (for logs of 40cm diameter and above) from Peninsular Malaysia, the creation of compensatory plantations of fast growing species, a coordinated programme of silviculture of the national forest and the establishment of forest recreation centres to bring about greater consciousness of the need to conserve and protect the forest (Ministry of Primary Industries, Malaysia, 1985).

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1 There are 11 states and a Federal Territory in Peninsular Malaysia, namely Johore, Pahang, Trengganu, Kelantan, Perlis, Kedah, Pulau Pinang, Perak, Selangor, Negeri Sembilan, Melaka and Wilayah Persekutuan (Federal Territory).

However, policies are never easy to implement on the ground. The government machinery has to catch up with what is being asked by the policy-makers in its undertaking of natural resources development. In addition, there are the needs and demands of the private sector and the general public to attend to as well.

In the development of a nation, it is often likely that outdoor recreation will be found to be the last on the list of development projects. In Malaysia, however, the situation has recently been quite encouraging. This is because the government considers tourism as an important foreign exchange earner. But how does tourism relate to conservation and outdoor recreation? It can relate in many ways, but the most significant of these is the assurance of the continued presence of the tropical environment. The natural heritage complements the cultural heritage, and together they enhance the uniqueness of Malaysia, which attracts tourists from all over the world.

The scenario described above can only lead to a brighter future for forest recreation development in Malaysia. The development is, however, punctuated with many difficulties. Being a new phenomenon, at least in the context of the population it wants to serve, development is besieged with problems unfamiliar to and unheard of by the administrators, both in the government and in the private sector. To apportion blame for lack of efficiency and, more importantly, lack of knowledge about facets of development on those who are involved would be premature at this stage. Everybody is trying to grasp the situation in a more meaningful manner. Even the general public is just beginning to become more aware of the

importance of conservation, clean air, pollution and other related issues.

This chapter will next assess the determinants of demand for outdoor recreation, the supply of facilities, and the factors of supply that influence demand and the planning and management of recreation forests. The conclusion of this chapter will form a basis for further deliberation.

2.2 THE DEMAND FOR OUTDOOR RECREATION

It is widely accepted that the phenomenon of outdoor recreation is a by-product of industrialisation within a country. Kando (1975) mentioned that recreation in any form is actually a sort of play or leisure which will only reach a high degree of sophistication and intensity when the society has reached advanced technological, social and economic status. In this respect, Malaysia is not an exception. However, the growing participation in outdoor activities appears to have started earlier or before industrialisation reached full scale level. The historical perspective elaborated upon earlier gives us a clear understanding as to why this is so. The western approach towards life brought new 'fashions' into the country perhaps earlier than it should. This is not necessarily a bad thing, but the ensuing problems encountered were unprepared for. Corrective measures became the rule of the day. Naturally, in general the country would like to anticipate and plan in accordance with the social needs of its population. However, for Malaysia the legacy of outdoor recreation was already there when the colonials left the country. The government agencies were then left with a rather small knowledgeable consumer group who were predominantly urban. This small recreation consumer group will grow bigger. Why is there such optimism that this group will increase in size? Perhaps the answer can be obtained by understanding what

is meant by recreation as well as what kind of lifestyle the urban people of Malaysia lead.

Recreation has been defined in many ways (Cosgrove and Jackson, 1972; Seeley, 1973). The definition of outdoor recreation that seems most attractive is that by Douglass (1975), whose opinion is that 'outdoor recreation is a wholesome recreation that is done without the confines of a building. Recreation is any activity that refreshes the mental attitude of an individual, that is, the restoration of physical and mental powers which have been worn out by stress and strain'. This definition is attractive or appropriate in the sense that the population of a rapidly developing country like Malaysia, especially in the more densely populated areas, would easily qualify as a people who experience the stresses and strains that come with rapid socio-economic development. One possible outlet for the tension and emotional strain is through participation in recreational activities. Outdoor recreation in particular is ascribed a great value of an almost therapeutic kind, as stated by Clawson and Knetsch (1966). Butler (1968) described the benefits from outdoor recreation in that it serves as an outlet for self-expression, for release and for attainment of satisfaction in life. In other terms, recreation is the pleasurable and constructive use of spare time (Brockman and Merriam, 1973).

In order to describe the status of forest recreation in Peninsular Malaysia, it is felt necessary to define the concepts of demand and supply for outdoor recreation. There is considerable treatment of these subjects in literature reviewed, for example, by the Countryside Commission, (1970). Consequently, the definitions are briefly explored in order to relate to

the factors that determine the demand for outdoor recreation in Peninsular Malaysia.

Recreational demand consists of two components. Firstly, there is effective or expressed demand, that is, the existing use of facilities for recreation. Secondly, there is latent demand, which includes both deferred demand (demand not realised owing to lack of facilities) and potential demand (demand not realised owing to the personal circumstances of likely participants) (Countryside Review Committee, 1977). For the purpose of further discussion, existing demand will be identified and several factors which determine and which might alter the demand will be elaborated upon.

Information on recreation from either site visitor surveys or more general demand surveys is very limited in Malaysia. However, there have been several site surveys and one household survey that will be used to give a general idea on outdoor recreation participation. Visitor surveys merely indicate the present level of effective demand at particular sites and are a common feature of recreational planning at the local level. The more general demand surveys are usually home-based and are designed to elicit information on participation and the factors which determine recreation behaviour. There are several problems with the results of the surveys used here. There are differences in the ways in which the samples were drawn, in the form of questions used and in the ways in which the data were recorded, analysed and presented. In short, the surveys are not directly comparable. This is especially true in the case of the site surveys. The single household survey by Bracken Tisen (1984) is quite reliable in terms of sample size, but there are no similar surveys to compare it with. This means that the information presented in the

discussion that follows will only serve to give a general and rough picture of outdoor recreation participation.

2.2.1 Effective Demand

Assessments of existing participation are made by reference to data on activities undertaken. However, recreation trips may be an activity in themselves or, since most participants live in urban areas and have to travel to the sites, they may be used as a guide to actual participation rates. The study by Bracken Tisen (1984) found that, out of the 1026 households interviewed, 57.7 per cent listed sightseeing for pleasure, picnicking, and holiday travelling as the most popular activities after watching television and other home-based pursuits. The figure of 57.7 per cent participating in outdoor recreation activities is significant, in so far as it exceeds activities such as visiting friends (51%) and staying at home (31%).

Estimates of participation in forest recreation were obtained from the sample population by asking the respondents if they had been and would go to forest recreation areas. 82 per cent had been at least once within the year and 63 per cent would participate or rather had decided to participate in the near future (Bracken Tisen, 1984). Among the more popular forest recreation activities participated in were picnicking (64%), forest hiking (60%), nature walks (56%), swimming (33%), birdwatching (25%) and camping (23%), (Bracken Tisen, 1984).

Site surveys revealed direct use of a particular area. A study by Mazlan Mohd. Salleh (1983) showed an average of 104 visits per day to

Kancing recreation forest for a total of 8 survey days during the weekend (Saturdays and Sundays). Another popular recreation area, Templer Park, revealed an average of 539 visits per Sunday on four survey days (Wan Sabri, et al., 1985). The reason why the number of visits is given as a mean out of the days sampled is because direct extrapolation of the estimate on a yearly basis is quite dubious. However, if one were to do this, the total number of weekend visits per year to each of the areas, based on the two site surveys mentioned above, would be about 30,000 visits and 26,000 visits for Kancing Recreation Forest and Templer Park respectively. Other site visits recorded by the forest department gave an average visit number of between 900 and 6,450 visits per month for some of their recreation areas. These estimates are, however, suspect because they are 'visually estimated as visitors come and go' (Chee Tong Yiew, 1981). However, records of visits to Sekayu and Teluk Bahang recreation forests are quite reliable since they were monitored by the presence of permanent staff stationed there. In 1981 Sekayu Recreation Forest recorded a total of 29,785 visits, of which more than 97 per cent were visits made by Malaysians. Between the years 1978 and 1980, Teluk Bahang recorded an average of 68,000 visits per year for the three years, and the number of visits per year was increasing (Siliviculture Unit, Forestry Headquarters, 1981).

National parks are considered as forest-based recreation areas. Since the inception of Taman Negara (the only national park in Peninsular Malaysia), visits to the area have been made by people from within the country and abroad. Before Malaysia became independent (before 1957) the most frequent visitors to the Park were the Europeans (Jasmi Abdul, 1985). However, at present, visits from within the country have increased from 405

in 1978 to 4,954 in 1982, a 27 per cent per annum increase during that period (Table 1). The figures given in the table are considered reliable because before anyone can visit Taman Negara an entry permit must be obtained at the headquarters in Kuala Lumpur or at the main entrance into the park.

The demand for outdoor recreation is related to the tourist industry (Douglass, 1975). The number of visitors that visited Malaysia between the years 1974 and 1980 increased from 1.08 million to 1.53 million (Table 2).

Clearly, one of the most significant revelations from the above information is the sheer volume of visitation to the forest recreation areas and the increasing number of visits to the national park. There are various factors which determine the pattern of visits and activity participation.

2.2.2 Determinants of Demand

The growth in the demand for outdoor recreation opportunities in the countryside during the last twenty or thirty years has been attributed to many factors. A great deal of research has been carried out in the United Kingdom and United States to investigate these factors, their inter-relationships and their precise effects (Law, 1970). Williams (1976) isolated five main factors influencing the consumption of outdoor recreation, namely, demographic characteristcs, socio-economic characteristics, increased leisure time, greater mobility, and environmental factors (Figure 2). These factors were also shown to be significant in two major national British surveys (British Travel

Table 1 Number of Visits to Taman Negara

Year	Total Visits	Visits by Malaysians		Visits by Foreigners	
		No.	%	No.	%
1978	1 390	405	29.0	985	71.0
1979	3 231	1603	49.6	1628	50.4
1980	3 793	1506	39.7	2287	60.3
1981	6 206	2875	46.3	3331	53.7
1982	8 790	4954	56.4	3836	43.6

Source: Jasmi Abdul (1985)

Table 2 Total Number of Tourists to Peninsular Malaysia

Year	Number of visitors*
1974	1080200
1975	1183014
1976	1224815
1977	1288995
1978	1399058
1979	1416378
1980	1529915

* The figures exculde those arriving from Singapore by road.

Source: Tourist Development Corporation (TDC) (1981)

Associaton - University of Keele, 1967; Sillitoe, 1969). Their influence, however, depends upon the characteristics of supply, in respect of the activities possible and the location of the facilities.

The factors mentioned above will be discussed further in the Malaysian context. The numerous factors that affect demand will be grouped as

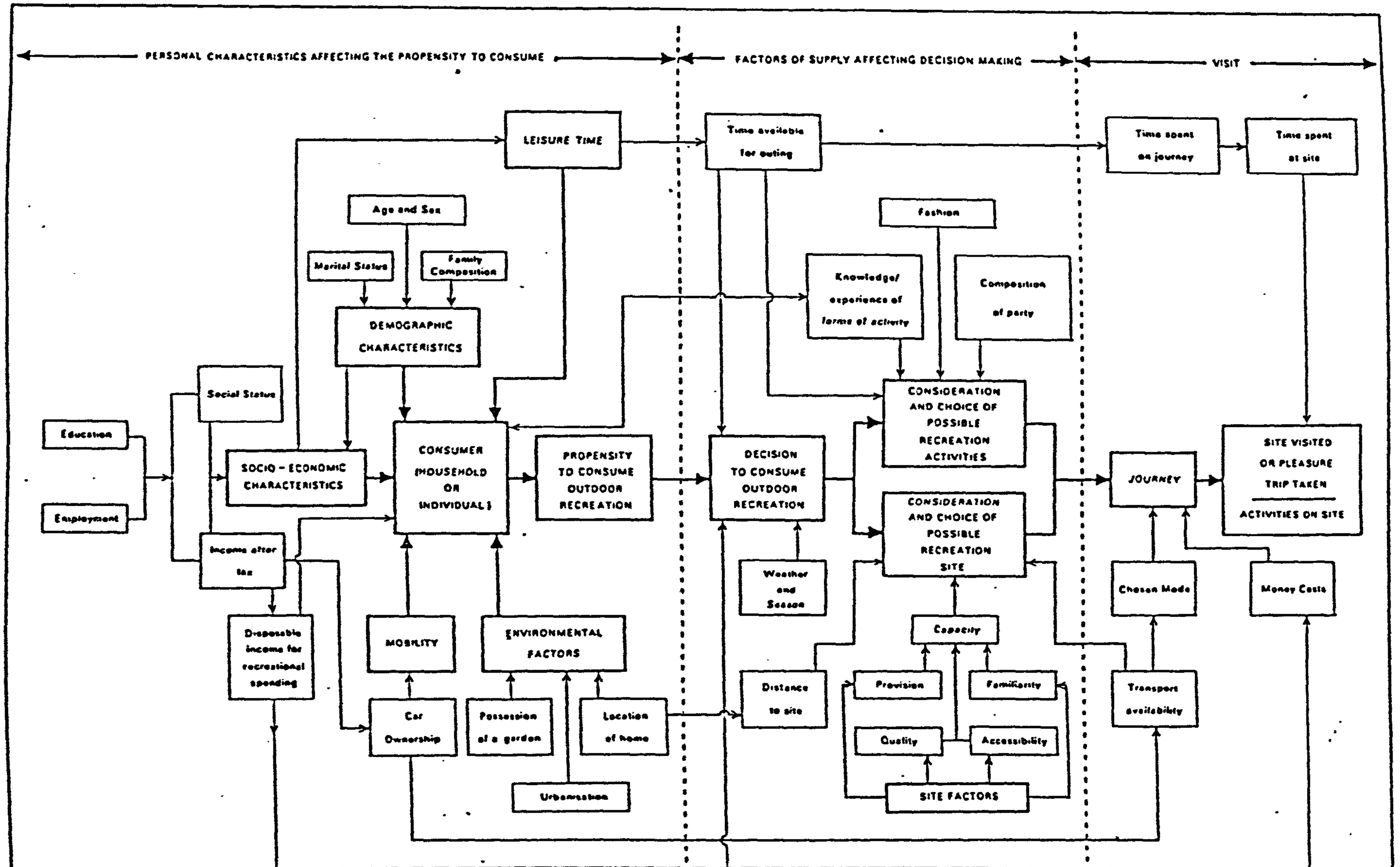

Fig 2. FACTORS INFLUENCING THE CONSUMPTION OF OUTDOOR RECREATION

[Based upon figures produced by Law (1970) and Williams (1976)]

demographic, income/socio-economic status, availability of leisure time, and mobility. The factor of supply will be treated in the next section of this chapter. In order to provide for comparisons, the information that will be used to discuss each of the factors will come from several site survey studies of different types of recreation area or centre (Table 3).

Demographic Characteristics

The demographic characteristics which influence consumption include the population size and distribution, the age and sex structure, marital status and family composition. Population growth in Malaysia would be the most likely factor to increase the consumption of outdoor recreation, especially the population growth in and around urban areas.

The population of Malaysia has increased from 2.33 million in the year 1911 to 10.61 million in 1976. The population in 1980 was 13.4 million and growing at a rate of about 2.7 per cent annually (Anon., 1977, 1980 and Drysdale, 1981). A change in the total population implies ceteris paribus a proportional change in recreation demand, whilst any change in the distribution of the population is likely to bring about a proportionate increase in the pressure exerted upon the recreational resources close to the area of growth (Standing Conference on Regional Planning in South Wales and Monmouthshire, 1973).

In Malaysia the pattern of settlement is rapidly changing. The change is not so much in the shift towards new settlements, but rather more that people want to settle down in or near already established major townships. This is not surprising. Economic growth has increased the development of

Table 3 Socio-economic Characteristics of Visitors to Several Recreational Centres

RECREATION CENTRE / SEG	Public parks and gardens in Kuala lumpur	Kancing Recreation Forest	National zoo	Taman Negara	Bako National Park	Mimaland	Desaru Resort	Templer Park
Sex	Mostly male	Male(72%)	--	Male(79%)	Mostly male	Male(74%)	Mostly male	--
Ethnic group	Mostly Malays	Malay(75%) Chinese(16%)	Chinese(45%) Malay(44%)	--	Malay(38%) Chinese(40%)	Malay(55%) Chinese(38%)	Mostly Chinese	--
Age group	Mainly those of 19-30 yrs	19-30 yrs (64%)	20-29 yrs (45%)	21-30 yrs (51%)	10-19 yrs(42%) 20-29 yrs(40%)	19-30 yrs (60%)	25-30 yrs (35%)	19-20 yrs (54%)
Education level	--	Secondary (64%)	Secondary (74%)	Tertiary (50%)	Secondary(50%)	Tertiary (40%)	Secondary	--
Income per month	Mostly $300-$500	Less $700 (56%)	$10-$100 ($10-30%)	$750-$1500 (50%)	Less $500 (41%)	$1000-$1900 (46%)	$500-$700 (22%)	$100-$300 (54%)
Occupation	--	G-(35%) S-(30%) P-(23%)	--	P-(40%) G-(41%)	--	G-(32%) P-(29%) S-(19%)	Mostly government	G-(58%) S-(27%)
Visitor type	Usually in group of 2-3 persons	Friends(55%)	Peer group (43%)	Peer group (66%)	Peer group (50%)	Family(34%)	Friends (39%)	Friends (60%)

G-GOVERNMENT EMPLOYED
P-PRIVATESECTOR EMPLOYED
S-STUDENTS

1£ equivalent to about M$ 3.60

industrial and business complexes which, more often than not, are situated within urban areas or at their peripheries. These areas provide employment, entertainment, a 'modern' way of life - in other words, major attractions. Hence the expansion of urban settlements is further enhanced by rural-urban migration which has risen considerably. In 1911, 10.7 per cent of the population lived in towns whose population size was 10,000 or more. By 1970, 28.8 per cent of the total population lived in towns of the same size (Anon., 1977). It can be safely envisaged that in the future, as at present, the majority of the population would live in towns and cities, and would experience the pressures and difficulties of life in an urban environment.

The pressure exerted upon the recreational resources close to the urban areas in Malaysia would presumably increase as the population increases. The emphasis on the demand of the urban population for outdoor recreational opportunities arises because the rural population is perhaps less demanding than the urban population with respect to outdoor recreation facilities (Williams, 1976). This is the reason why this study is an attempt to look at the pattern of forest recreational use emerging from the behaviour of a principally urban population.

The age of the consumer influences both the level and the type of demand. It appears that the age group that forms the majority of visitors to a number of recreational centres is the 20-30 years age group (Khalid Abd. Rahim and Mohd. Shahwahid Othman, 1985). The household survey by Bracken Tisen (1984) showed that the variation in the percentage of participation in outdoor recreation activities by age groups is

significant. The most popular activity among all age groups was sightseeing. The percentage participation increases with increase in age, except for the age group 65 years and above (Bracken Tisen, 1984). In contrast, although the analysis of variance on percentage participation in forest recreation activities by age group was also highly significant, the most popular activity among all age groups was picnicking, except for the age group 15-24 years who indicated nature walking or hiking as the most popular activity. The results obtained from a site survey (Mazlan Mohd. Salleh, 1983) at Kancing Recreation Forest also indicated that a high percentage of the visitors were of the age group 19-30 years (63.8%) and that the most popular activity was nature walking and hiking (27.94%).

Whether this is a reflection of the inclination of younger individuals towards active and physical recreation pursuits (Rodgers, 1969; Coppock and Duffield, 1975) is not very clear. One would have thought that visits to these recreation centres are by no means strenuous. Seen in this light therefore, it would seem that the younger individuals are perhaps more mobile and more willing to travel to these selected recreation centres than the older age groups. Despite enjoying the largest amount of leisure time, those in the younger and older age groups tended to be the least prominent in the surveys listed in Table 3. Perhaps for the children the choice of leisure pursuits is normally restricted by the parents and by the usually limited amount of pocket money given for them to spend (Giddens, 1964). However, in terms of the effect on the future demand for recreational pursuits, the children (26.2%) and the young adults (20.7%) would require special attention and facilities, for they comprise the largest percentage of the 1980 population census (Table 4).

Marital status is an important factor because studies have shown that married people tend to make fewer outings than do single people, and are less involved in active recreation. This is probably due to domestic demands which encroach upon the leisure time available to married persons and the constraints imposed by the presence of children (Molyneux, 1970). From the recreation site surveys (Table 3) most of the visitors to three of the areas were single. This was reflected in the type of visitor groups that visit these areas; seven of the areas were mainly visited by members of groups who considered themselves as 'peers'. They were most likely of the same age, single and mainly males. 'Friends' may be a better term to use here.

Table 4 Population in Given Age Categories, Malaysia 1980

Infants and Young Children	Children	Adolescent and Young Adults		Middle Ages Early	Middle Ages Later		Elderly	Old and Very Old	Total
0-4	5-14	15-24	25-34	35-44	45-54	55-64	64-74	75+	
Number (thousands)									
1829	3512	2776	1969	1329	903	587	337	145	13391
Percentage distribution									
13.7	26.6	20.7	14.7	9.9	6.8	4.4	2.5	11.1	100.0

Source: Latifah Mohd. Yatim (1985).

These findings, however, do not necessarily indicate that families with children do not like to visit outdoor recreation areas. As shown in

Table 4, children form 40 per cent or almost half of the total population of Malaysia. Further breakdown of the statistics reveals that the toddlers (0-4 age group) constitute 13.7 per cent while older children (5-14 age group) constitute almost double this amount (26.2%). Whether or not a recreation area would attract a family visit would depend to a great extent on the facilities that the area can provide. Mimaland, a privately managed recreation area, caters for the needs of a family. One of the main attractions there is a large outdoor swimming pool where people of all ages can enjoy a swim or a wade in the shallow section for the children. In addition, Mimaland integrates within it all other family orientated facilities and activities. Mazlan Mohd. Salleh (1983) and Mohd. Nor (1981) reported that the majority of the visitors there were families. This might indicate that facilities for playlot, playground and recreation areas that orientate or cater for family visits should be represented more, both quantitatively and qualitatively (Latifah Mohd. Yatim, 1985).

Socio-economic Factors

In socio-economic terms, Malaysian society has the potential to reach an advanced state of development. The per capita income growth is about 5.9 per cent per year (Anon., 1981). Part of this income is likely to be spent on leisure activities. In 1973 alone, 6.5 per cent of the total household expenditure was on recreation (Anon., 1977).

However, the effects of socio-economic characteristics on recreation are complicated because socio-economic status is a function of education, employment, income and socio-economic group or class (White and Dunn, 1974). These factors are closely correlated since education is inclined to determine employment and income, and all three determine social class.

However, Douglass (1975) mentioned that it is not the intellectual background but rather the affluence (a combination of spending power and values) of the individual that influence demand for outdoor recreation. Generally people in the lower income and low educational categories are much less involved in recreational activities and require modest facilities and very modest space allocations (Bardon, 1978).

This is not the case where the urban lower income group in Malaysia is concerned, at least not those living in Kuala Lumpur. If the recreation area is within or near an urban area (town gardens and city parks), the frequent visitors would most likely come from the lower income groups (Wan Sabri, 1983). Table 3 indicates that four out of eight recreation centres surveyed were frequented by the lower income group who earn less than M$500 a month. This is especially true for those who visit the parks and gardens within the city area (Parnon Saikon, 1979).

It appears that the higher income group, who enjoy a greater amount of leisure time than those in other categories and generate enormous land demands or require the provision of very specific facilities localised in a particular site (British Travel Association - University of Keele, 1967) prefer to travel to a more distant and 'exclusive' recreation area. Sightseeing for pleasure was found to be the most popular outdoor activity for all categories of income group within the population of Kuala Lumpur, but the second most popular activity among the high income group was found to be holiday travelling, while for the medium and low income groups it was picnicking (Bracken Tisen, 1984).

Availability of Leisure Time

Employment is fundamental in determining recreation demand as it is a significant factor controlling the amount of leisure time available. Leisure can be seen as the time when an individual is free from work or other formal duties, and which may be utilised for purposes of relaxation, diversion, social achievement or personal development (Gist and Fava, 1964). It is often stated that increased recreational demands have, in the past, been caused by a shortening of the working week and availability of paid holidays. A typical government employed worker in Malaysia, on average, is given about 120 days in a year as holidays (weekends, public holidays and paid annual leave). A rough estimation would show that the worker would have about 33 per cent of the total number of days in a year as free time! On average, Malaysians do have plenty of leisure time. What do most of them do with their free time? Also, how much of the free time is spent on outdoor recreation?

In a household recreation survey, Bracken Tisen (1984) obtained data on weekdays, weekends and public holiday leisure time per family : for the sample population in Kuala Lumpur (1,039 samples) an average of about 111 days per year was cited as the amount of leisure time available per family (see Table 5). Table 5 also shows that more of the households spent a higher percentage of time outdoors during their vacation time (longer leisure time block) compared with daily and during weekends and public holidays (shorter leisure time block).

Douglass (1975) explains that people require longer leisure periods to get involved in depth in outdoor recreation activities and the shorter

Table 5 Weekends, Weekdays, Public Holidays and Vacation Weeks Spent Outdoors per Family per Year by Income Groups

	Income Groups			
Leisure time	High	Medium	Low	Total
Weekdays, weekends and public holidays				
Leisure time per family per year (days)	111.24	111.45	109.21	110.61
Total leisure time spent outdoors (days)	5278.89	12373.18	996.54	27639.79
Average leisure time spent outdoors per year (days)	27.35	26.90	26.59	26.94
Percentage of leisure time spent outdoors per family	24.6%	24.1%	24.3%	24.3%
Vacation time				
Total vacation weeks	51.8	121.9	1107.5	2844.5
Average vacation weeks per household	2.68	2.65	2.97	2.77
Average vacation weeks spent outdoors per household	1.055	0.874	0.820	0.892
Percentage of vacation time spent outdoors	39.4%	32.0%	27.6%	32.2%

Source: Bracken Tisen (1984)

leisure time block may be too short for such activities. On the other hand, the shorter time period could be used to visit recreation areas within a day-use distance. The availability of different types of recreation area near Kuala Lumpur, catering for the needs of different income groups, such as Mimaland for the high income group and the Kancing Recreation Forest for the lower income group (Mazlan Mohd. Salleh, 1983) reflects this possibility.

It can also be seen from Table 5 that the average number of vacation weeks per year for the different income groups does not vary much between the groups. However, the average vacation weeks spent outdoors per family per year significantly decreases with a decrease in income (Bracken Tisen, 1984). This supports the statement made earlier, that those of higher income tend to go to distant recreation areas and those of lower income may be restricted by the discretionary income and thus, perhaps, spend most of their vacation weeks at recreation areas nearer their homes.

Mobility

The socio-economic characteristics and leisure time available outlined above are also important in that they affect the mobility of the consumer. The increase in the standard of living during the last twenty years has contributed to an increase in the number of private cars among all levels of society. In 1982 it was estimated that Malaysia had about 3.0 million motorised vehicles (excluding motorcycles) on its roads (Ministry of Transport, 1982). In the Federal Territory (the centre of the catchment area under study) alone, the total number of private cars (based on an income growth projection) is projected to increase from 124 650 in 1980 to

578 000 in the year 2000, a 360 per cent increase over a twenty year period! (Dewan Bandaraya, 1982).

It is not only that the car has provided the transport required to travel to work, but pleasure driving itself has become a major activity. In Malaysia, like most countries, people prefer to use their own transport to visit a recreation area (Wan Sabri, 1983). Hence we see the obvious implication that increased mobility and car ownership bring about for recreation area visitation.

In conclusion, there is very little doubt not only that the consumption of outdoor recreation will increase, but also that the social groups that will undertake this leisure activity (and hence the pattern of consumption) will change over time. Since 1971, Malaysia has adopted the New Economic Policy (NEP) aimed at the reduction and eventual eradication of poverty, and the restructuring of the Malaysian society to correct economic imbalances. The first goal of the NEP would be achieved through progressively providing opportunities for the poor to participate effectively in the growth process. This would be done particularly by increasing access to land, with improved inputs and facilities for integrated development, replanting and crop diversification in existing agricultural areas and the absorption of poor households into modern agricultural land development schemes and mini-estates. The second goal of the NEP would be achieved through the promotion of training and assistance programmes, the restructuring of employment and asset ownership and direct government participation in the commercial and industrial sectors. This could only indicate that as the years progress, with the support of the people, Malaysian society as a whole would experience a better quality of

life. It is envisaged that the pattern, types and amount of outdoor recreation consumption and demand could be in a state of flux as society changes its structure and course. As the government attempts to achieve the first of the two goals of the New Economic Policy, the supply and distribution of outdoor recreation areas perhaps faces the biggest threat. The subject of supply of forest recreation areas is considered in the following section of this chapter.

2.3 FOREST RESOURCES SUPPLY AND ITS INFLUENCE ON RECREATION DEMAND

The influence of demographic or socio-economic variables on recreation consumption cannot be fully understood without considering some of the aspects of 'supply'. The highly correlated relationship between 'supply' and 'demand' is illustrated by the definition of demand given by Coppock and Duffield (1975). Demand refers to the amounts of various recreational activities in which a population will be willing and able to participate, given that access to facilities is very easy, that these facilities are all of high quality and that the limits of their capacity have not been reached.

Resources can exist in two forms, namely, 'intangible' (e.g. culture, expertise and aesthetic) or 'tangible' (e.g. money and natural resources). The 'absolute level of supply' is dictated by the physical environment, but as Zimmerman (1951) has pointed out, these should be seen as expanding and contracting in response to human behaviour. Supply is comparable with demand in that it may be considered as both potential and actual. Actual supply represents the portion of the potential supply which is available, or made available, at a particular point in time. Potential resources only

become actual when valued and exploited by a society (Linton, 1968). Therefore, the availability of resources will vary according to the knowledge possessed, the degree of technical expertise, changing individual desires and tastes and social objectives.

It is very important to examine the primary factors concerning supply because they relate to the consumers' decision to participate in outdoor recreation. These are chiefly related to the choice of recreational activities (Emmett, 1970; Williams, 1976; O'Riordan, 1970) and the choice of recreation site (Burton, 1967; Law, 1967; Seeley, 1973). These factors will be discussed in greater detail in chapter 3. This section will, however, elaborate, in a very general way, on the supply of forest areas for the provision of recreational opportunities in Malaysia.

2.3.1 Forest Land as a Recreation Resource

Clawson and Knetsch (1966) described recreation areas as land, water or other natural features that are actually used for recreation. It may be an area of land, with or without tree cover, a body of water or flowing stream, or it may be other natural features such as caves which extend far below the surface. Attributes of ideal recreation areas are difficult to identify because it is not the observable natural quality that makes an area suitable or desirable for outdoor recreation but, rather, it is reflected by the presence or absence of users and the availability or lack of better alternative areas. Wohlfarth (1978) stated that recreational areas should provide for an invigorating experience or relaxation. Thus different types of land including lakes, reservoirs, rivers and the sea and its coastline can be adapted to provide for various kinds of recreational

activities. For this study, the forest land under consideration is restricted to those designated as forest recreation areas within the Permanent Forest Estate[2] in Peninsular Malaysia.

The tropical rainforest of Malaysia is one of the most complex ecosystems in the World. It is a unique natural heritage which has evolved over millions of years, and is rich in varied plant and animal life. The total forested land in Malaysia is estimated to be 70.4 million hectares (61.8% of the total land area) with 6.4 million hectares in Peninsular Malaysia (Ministry of Primary Industries, 1984). According to Harun (1981), in 1957, the extent of forested land in Peninsular Malaysia was about 9.5 million hectares or 72.4 per cent of the total land area, whereas by 1977 it had been reduced to 6.96 million hectares or 52.9 per cent of the total land area. The reduction is a result of the conversion of forest land for agricultural purposes which was undertaken and systematically carried out under a series of 5-year development plans (refer to section 2.3). Although large scale forest land clearance for agricultural and urban development is continuing in Peninsular Malaysia, a total of 5.18 million hectares of forested land has been earmarked as Permanent Forest Estates to be managed for sustained yield. Approximately 1.9 million hecatres of this estate has been identified as protective and amenity forests (Borhan, 1985).

Under the Malaysian constitution, land and forest are defined as a state responsibility and thus within the jurisdiction of the respective states (Figure 3). As such, each state is empowered to enact laws on forestry and to formulate forest policy independently. The executive

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2 These are forest reserves permanently designated and which are to be managed for sustained timber production, protection of the environment and provision of recreational needs.

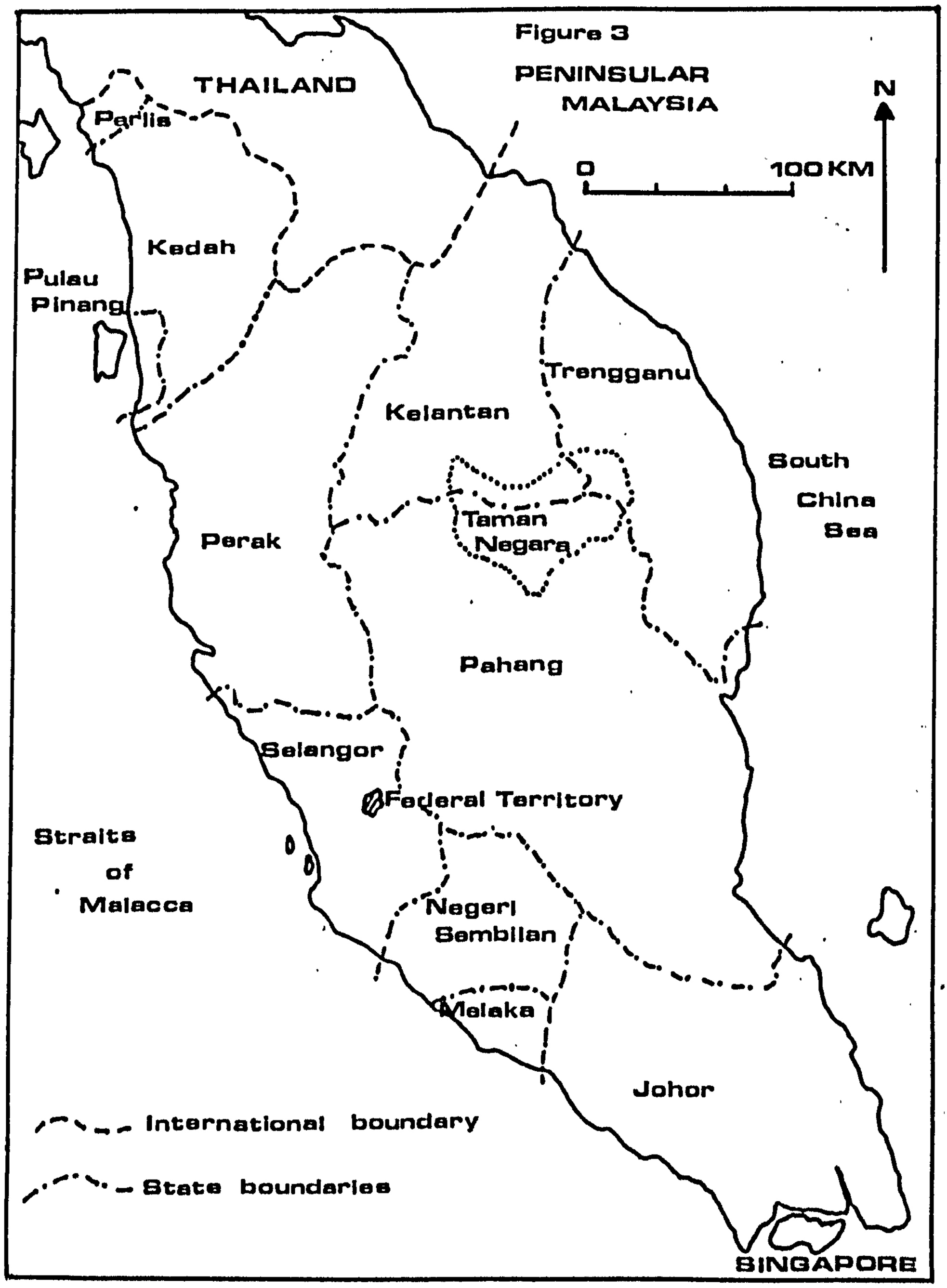
Figure 3
PENINSULAR
MALAYSIA
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100 KM
THAILAND
Perlis
Kedah
Pulau
Pinang
Trengganu
Kelantan
South
China
Sea
Taman
Negara
Perak
Pahang
Selangor
Federal Territory
Straits
of
Malacca
Negeri
Sembilan
Melaka
Johor
International boundary
State boundaries
SINGAPORE

authority of the Federal Government only extends to the conducting of research and maintenance of experimental and demonstration stations, training and the provision of advice and technical assistance to the states (Ministry of Primary Industries, 1984).

There is very little privately owned forest land. If there is any, it is only in small plots. The larger so-called plantations are managed either by the federal government, the state governments or on a joint venture basis between the private sector and the state governments. There are very few recreation opportunities on plantation lands. It is not that there is no de facto or statutory access for recreation, but recreation in the form of walking along footpaths across open land and through the cash crop plantations is not prominent and in fact is a most unlikely outdoor recreation feature in Malaysia. The 'countryside' is not looked upon as a place to visit, unlike the countrysides of Britain and other European or American countries. A very likely reason for this is the generally hot and humid weather throughout the year. Walking across the Malaysian countryside is not an attractive proposition, except perhaps in the mountains and hills. More likely a gathering in the shady forest environment or a picnic and swim along the miles of coastal beaches is preferred.

In a sense, the conflict of land uses for recreation is geographically and physically bounded. To ensure permanent and continuous recreational use, land or water areas have to be exclusively reserved for recreational purposes. The system of designating national parks (both land and marine), wildlife reserves, parks and gardens in city areas, recreational forests within the permanent forest estates and recreational beaches along the coastline are seen as an assurance to provide for the needs of this

particular kind of land use.

2.3.2 Recreation Forests

The task of describing the forest recreation areas in Peninsular Malaysia available for outdoor recreation should be easy because, as stated earlier, most of the areas concerned here are situated within the permanent forest estate. However, this is not the case, because no one has come up with a comprehensive inventory of these areas. As such, it is very unlikely that it could prove possible to classify the areas as exemplified by Clawson and Knetsch (1966) or the Outdoor Resources Review Commission, USA (1962a). Seen in that light, the description would be in the form of their designation as recreation forests within the permanent forest estate. This is the 'actual supply'. But when we consider 'potential' supply, the amount and type of forests suitable for recreation go beyond these boundaries. The description attempted here of Malaysian recreation forests will not essentially discuss the natural characteristics of the area. It will, however, describe the nature and characteristics of these areas as they relate to the factors which determine the consumer's decision to participate in outdoor recreation activities within the areas. The factors include distance-accessibility, the provision and quality of facilities, the availability of activities, familiarity and capacity.

The first two recreation forests in Peninsular Malaysia were developed in 1967. The Forestry Department began developing such areas by providing basic facilities for visitors. This is in line with the concept of multiple use of the forest. In fact, the section on forest recreation within the Malaysian forestry policy statement is quite specific in this respect. The

establishment of forest recreation areas within the 'amenity forest' is to achieve several objectives. Among the most important ones are:

(i) to provide facilities for pleasure and rest in the forest areas in the form of look-out spots, picnic areas, recreation parks and natural areas that are aesthetically pleasing for the people, especially those of the lower income groups,

(ii) to bring awareness to the public of the importance of the preservation of the environment, especially the forested areas, for the well-being of the population,

(iii) to encourage and provide opportunities for jungle walks within the forest and to enable enjoyment of the aesthetic beauty by the provision of jungle tracks, facilities for mountain climbing, canoeing and other active orientated activities,

(iv) to add to the existing areas suitable for scientific research and study, and

(v) to increase the areas that could attract more tourists to the country.

(Jalil Md. Som and Chee T.Y., 1985)

The first two recreation forests were developed during the period of the First Malaysian Plan (1966-1970). In the Second and Third Malaysian Plans (1971-1980) a total of 26 areas had been successfully developed (Table 6). To date 64 forest recreation areas have been developed in Peninsular Malaysia (Ministry of Primary Industries, 1984). The development

of recreation forests by the various State Forestry Departments was, in certain cases, jointly carried out by the private sector partners (mainly timber complexes where the suitable area was within their forest concession area) and the local councils. Recreation forests were developed and managed by the State Forestry Departments under funds allocated for 'social forestry' (refer to Table 6). As such, proportions of the funds were divided among the 'social forestry' projects. During the Fourth Malaysian Plan (1981-1985) period about M$ 4.9 million were allocated for 'social forestry' projects.

In comparison with the national parks and wildlife reserves, more areas within the permanent forest estates could be made accessible to the visiting public. The total size of the existing recreation forests is about 2 876 hectares. This is a meagre size, considering that the total area of permanent forest estate is 5.18 million hectares. However, recreation forest development is restricted within those delineated as 'protective and amenity' forests and the actual size of these forests is about 1.9 million hectares. The delineation creates several problems in relation to the provision of recreational opportunities. Firstly, the 'protective' forests are in the higher altitudes, usually very inaccessible to any form of motorised transport. Secondly, a majority of such areas are water catchment areas, serving the needs of water supply. Although water catchment forests may serve certain limited recreational purposes, the limiting factor is the distance and accessibility from the major urban areas. 'Protective' forests are considered important both for environmental reasons and as a source of water supply; thus the boundaries are well delineated.

Table 6 Forest Recreation Area Development in Peninsular Malaysia

State	Number of recreation area developed up till 1980	Proposals for the 4th Malaysia plan (1981-1985)	Total size of area in ha. up till 1981	In the stage of development under the 4th Malaysia plan	Total Allocation of funds@
Johore	1*	3	914	1+	281,000
Kedah	8	7	164	4	655,145
Kelantan	2	2	9	2	50,000
Melaka	-	1	-	1	300,000
Negeri Sembilan	2**	5	4	3++	271,223
Pahang	8***	9	426	1	446,000
Perak	-	3	61	3+++	1784,120
Perlis	-	-	-	-	-
Pulau Pinang	1	2	32	2	450,000
Selangor	1	1	1214	-	145,000
Terengganu	2	4	41	2	498,000
Wilayah Persekutuan	1	-	11	-	-
Total	26	37	2876 ha.	19	4,880,488

Note:

* Joint development with the District Council

** One area each was developed by the Forest Department and the District Council

*** One area was jointly developed by the Forest Department and District Council and another was developed by a Timber Complex

\+ Opened to the public in 1981

++ Two areas were opened to the public in 1982

+++ Two areas were opened to the public in 1981

@ These allocations are grouped under 'Social Forestry' which includes recreation, urban and village forestry and education

Source : Jalil Md. Som and Chee T.Y. (1985)

On the other hand, 'amenity' forests are arbitrarily assigned and the boundaries of the recreation areas that may be developed in them are not a permanent feature. In fact, most of the developed recreation forests are given the status of 'recreation forests' simply because they are so frequently visited by people. As such, the size of the areas varies from as small as 2 hectares to as large as 800 hectares. Sometimes the only focal point of a visit is a waterfall (Silviculture Unit, Forest Headquarters, Peninsular Malaysia, 1983). The 'ad hoc' fashion of recreation forest development is perhaps mainly due to this feature. When an area is known to have attracted a significant number of visits already, that area would be provided with some facilities for recreational purposes. This is not necessarily unsatisfactory but it does not guarantee that the long term demand for such areas would be accounted for.

Distance and Accessibility

Most of the existing recreation forests are easily accessible by private transportation. The distribution of recreational forests is so scattered that an area could be as close as a few kilometres or as far as a few hundred kilometres from a major urban centre (Silviculture Unit, Forestry Headquarters, Peninsular Malaysia, 1981). 'Distance' as a control upon supply can be measured in kilometres, time or money (Coppock and Duffield, 1975). However, Molyneux (1970) believes that time is probably the most useful variable for measurement. In this case, however, because of the close proximity of most recreation forests to urban centres, distance, travel time or cost would be less of a deterrent when a decision is made to visit an area. Colenutt believes that the frictional effect of distance in respect of pleasure trips cannot be equated with that operating on other

types of trips since the objective of the tripper is not necessarily to minimise travel time between trip origin and single destinations, as in most cases of weekend trips to recreation forests here; rather it is to maximise the recreational benefit he or she can obtain (Colenutt, 1969). Another reason why certain recreation areas in Malaysia are frequently visited by the public is because of their location along the major roads that traverse the country. Accessibility is further made much easier because the minor roads that lead to these areas are usually of reasonably good quality and are relatively safe to travel on.

Familiarity and Attractiveness

Perhaps a more likely reason why some of the areas are frequently visited is the nature of the areas themselves. As mentioned earlier, the development of these areas came about as a result of their popularity. Such areas are usually well known for their outstanding natural features. The public is very attracted to an area if there is a view, a stream or a waterfall. It also appears that familiarity and having a knowledge or information of a certain area could provide an incentive to visit the area, because most people tend to visit locations of which they have previous experience or at least some knowledge (O'Riordan, 1970).

The Provision and Quality of Facilities and Activities

If there is one thing that affects the decision to make a visit or the choice of location for a visit, it would most likely be the quality of the available recreation sites. Many of the problems that have to be faced in achieving a desired balance between demand and supply are rooted in people's feelings and reactions regarding the quality of existing facilities (Outdoor Recreation Review Commission, 1962b). Nevertheless,

'quality' is widely regarded as a subjective type of value that cannot be measured in absolute terms, and it is well known that individuals and groups often assign varying degrees of site quality to the same recreational resources.

The facilities that are provided in the recreation forests do not perhaps vary as much as they should, that is, they are usually of a standard type. The common infrastructure consists of picnic tables and benches, bridges across rivers and streams, forest tracks (mostly already in existence due to frequent use), shelter huts and litter bins. All the users' facilities are usually located centrally at the places where there is a river or waterfall and this has normally led to overcrowding at that location.

There are, however, several better developed areas among the recreation forests. A good example is the Teluk Bahang recreation forest on the island of Penang. The main attraction there is a forestry museum. In addition, the area is very attractive because it is near the coastal beaches. There are several excellent views of the coastline as one climbs the hills and walking along one of the forest tracks leads to the coast. Sekayu recreation forest in the state of Trengganu has its own unique features. In contrast to the former example it is situated further inland, and the area is more like a man-made recreation centre even though it is situated within a forest reserve. The area can accommodate visitors overnight in its chalets, resthouses, youth huts and hostels. Sekayu also has an exhibition centre, arboretum, fruit orchard, man-made gardens and a children's playground. Both the areas described are managed by a group of

permanent staff who reside close to the area. There are several other areas which are well developed but this is an exception rather than a rule.

The visitors choose to visit for different purposes. Among them are to rest, to enjoy the scenic beauty, to use the recreational facilities available, to escape from the busy city life and for sightseeing. An opportunity to rest and restore the tired mind and body seem to be the main reasons why many visit a recreational area (Wan Sabri, 1983). While the visitors are at the recreation areas, they participate in several activities. Among the activities are swimming, nature walking, picnicking and camping. Participation in activities at recreation forests are related to the facilities and the nature of resources available. In the natural environment the provision of facilities is not very important except for a few necessities. If an area has an interesting focal point and the number of visitors at that point is large, the provision of rest rooms and toilets is a necessity. In fact, most of the existing recreation forests have small 'effective' sites (usually near a waterfall or along a stream) and the rest of the .forest area serves as a background. Hill climbing, nature walks, forest tracking are 'background' activities and are not a prominent feature of most recreation forests (Wan Sabri, 1983). It is very difficult to judge the quality of the facilities provided and the effects of natural resources present on the quality of activities. Personal observations by the author on several of the existing areas tended to give an impression that some facilities were wrongly sited (e.g. a children's playground in the middle of a fairly inaccessible hilly area) and thus remained unused and have deteriorated due to lack of regular upkeep and maintenance. The most common defect noted by the author when visiting some of the areas was the lack of restrooms and toilets. Even when these were provided the conditions were

utterly deplorable.

Resource based activities are very difficult to evaluate. Most of the areas will allow for good forest camping and tracking. Perhaps, if some form of site interpretation and other useful information such as nature walk guides in the form of pamphlets or maps were made available to visitors, possible activities in the area could be effectively highlighted for the visitors' benefit and subsequent enjoyment.

Many of the problems faced by the managers of recreation forests are related to the activities of the visitors themselves. Their negative behaviour and lack of civic consciousness have very often lowered the quality of an area. Acts of vandalism towards the facilities and destruction of vegetation are common occurrences. There are some instances where fire danger has been created especially in areas of grassland that has just been planted with trees. Littering is a rampant and uncontrolled act (Silviculture Unit, Forestry Headquarters, 1981). Piles of litter scattered throughout a recreation area (plus unemptied litter bins) create a rather unpleasant sight and very unhygienic conditions. This occurs particularly in heavily used picnic areas beside the streams and around the waterfalls. The lack of workmen at the individual sites prohibits regular collection and disposal of litter. Clearly, a more effective and systematic approach to litter disposal in recreation forests needs further study.

Capacity

Very little is known about the physical carrying capacity of these areas. The author's observation is that some of the areas are overused and

overcrowded, especially on the weekends. The forest area is a fragile environment and the most visible effects of overuse and continual pressure is the degradation of the vegetational and environmental conditions of the sites. Administrators of the sites have reported vast areas of exposed soil and big trees have fallen or been wind blown due to over-exposure of their roots (Silviculture Unit, Forestry Headquarters, Peninsular Malaysia, 1981). Clearly, some areas are experiencing a strain on their capacity and on their ability to cope with the overuse.

Site Planning and Management Problems

The problems related to the supply of recreation forests are immense and a full, comprehensive discussion would require another study. It is appropriate to say that, in the context of the current study, the factor of supply is an important one and some aspects of it will be examined. Administrators within the state forest departments have lamented the lack of site planning and knowledge to utilise the natural characteristics of recreation forests fully in order to provide for a quality recreational experience for the increasing number of visitors. Clearly there is a lack of imagination in the design, construction and siting of recreation facilities. The overall planning and siting of new recreation forests is seen to be a job for the specialist in this discipline. The administrators on the other hand are aware of the problems of land tenure, the need to landscape some sites to make them more suitable as a recreation area, the allocation of adequate funds and manpower to manage the areas and the effects of production forestry practices and other competing land uses on the survival of recreation forests.

As mentioned earlier, there are vast areas of potential recreation sites, but their inaccessibility and the difficulty of ensuring safety for the visiting public make some areas inappropriate. Perhaps the most pressing problem is the lack of a proper inventory of the existing areas. Very little information is available to describe the recreational values of their environmental and natural features fully so as to ensure more effective use as a recreational outlet. The dissemination of this information is considered very important as it might help to redistribute the current unbalanced usage of recreation forests. In addition, a comprehensive description of all existing recreation forests would ensure a more systematic management of this resource. At present, very few recreation forests are managed according to a prescribed plan of management. Only one state, Kedah (in northern Peninsular Malaysia) has prepared a '10 year plan on Forest Recreation Planning and Management from 1976 to 1985' (State Forest Department Kedah/P. Pinang, 1976). The irony here is that the states of Kedah and Pulau Pinang have by now very little 'production' forestry within the forest areas. Perhaps, only when a similar situation exists in other states would recreation forests be considered important. By this time there may not be any more forests for recreational purposes! It is appropriate at this point to heed the opinion of a western counterpart who was working with the forest department, and mentioned that 'Malaysia can avoid the repetition of mistakes made by other countries by recognizing in time the importance of the forest for human life and not leaving it until it is too late' (Wohlfarth, 1978).

2.4 CONCLUSION

Recreation forests comprise an important element within the spectrum

of outdoor recreational opportunities in Malaysia. Depending on where the area is situated and the natural resources available, the recreation forest will provide for a multitude of recreational experiences. The initial foundation for the use of forests as a recreation area was well laid by the presence of the British administration prior to independence. The development of hill resorts and the involvement of an elite group in nature study and wildlife observation have led to the creation of national parks and wildlife sanctuaries. The approach taken in forest recreation area siting seems to have been based on an 'idea' generated concept or a 'honey pot' and moderate centralisation of facilities. Areas that are proven to attract an 'elite' group of visitors are earmarked for further development. Facilities are placed for cosmetic purposes.

While this pattern of use and subsequent development may be acceptable, it is felt that the present demand for outdoor recreation opportunities and the pressure on the existing recreation forests may lead to unfavourable consequences. The capacity to sustain a frequent and massive use of existing areas is limited. The approach to development is elitist, and perhaps hinges on the ability to coax or induce demand. Much of the forest recreation will occur in state-owned forest areas. However, even within the state-owned forests there is a limitation to the supply of recreation forests. The emphasis on production forestry and the availability of outstanding forest features as a prerequisite for recreational purposes imposes further problems in the designation of recreation forests.

There is, therefore, an urgent need to balance the demand for outdoor recreation with the supply of areas to accommodate it. In Peninsular

Malaysia, a number of site surveys have shown that forest recreation areas seem to attract the lower income groups (Mazlan Mohd. Salleh, 1982 and Wan Sabri, et al., 1985). This is not surprising because visiting a forest recreation area would incur a nominal cost. Thus, recreation forests would cater for the recreational needs of a segment of the urban population who are deprived of the more expensive recreational outlets. Careful consideration of the socio-economic characteristics of the visitors who visit several recreation areas will reveal that the clientele of a particular area is quite different from that of another. This has been found by Mazlan Mohd. Salleh (1982) when he compared the visitor characteristics of those visiting Kancing recreation forest and Mimaland, a commercial recreation area.

As a destination for recreation, the accessibility of recreation forests is crucial to their usefulness. Proximity to an urban area is important. 80 per cent of the visitors to Templer Park came from the state of Selangor or Wilayah Persekutuan. This is not surprising since the park lies within 80 km radius of Kuala Lumpur and its major residential areas (Wan Sabri, et al., 1985). Abas Said (1983), in a more detailed study, revealed that 90 per cent of the visitors who came to Kancing Recreation Forest (adjacent to Templer Park) came from within a radius of 80 km from the area. Probably, another reason why these two areas appeal most to the lower income groups is the availability of cheap public transportation to the area. It will cost a visitor M$ 2.30 for a return trip by public bus to Kancing Recreation Forest if they travel within a radius of 40-80 km (Abas Said, 1983). A most revealing piece of information is that most of the visitors indicated that their visit to the area was by no means the first.

The frequency of visits not only indicates a constant (probably growing) clientele of the area but those who go accidentally to the area are in a minority. It appears that there is a 'ready market' for forest recreation. People are willing to pay to travel a certain distance in order to obtain the benefits provided by a certain recreation area. There is, however, a limit to the distance that people are willing to travel. Kamaruzaman Yusof (1981) in a study of visits to a popular coastal beach resort area showed that for every 2.3 km (0.88 miles) increase in distance from the area there is a decrease in the number of visitors by one per 242 people.

In terms of the provision of recreational experience the natural features within the forest are crucial in their ability to provide for a range of activities. Unlike the man-made recreation areas, the forest environment is itself an attraction and a source of enjoyment. A mere walk through the forest can result in a rewarding experience. Clearly, for the more serious recreationist, especially the younger population, the forest is a playground where they can swim, climb and walk. The visitors who are in this age category are in the majority. If the population census is proven right, there will be more of them as the years pass by.

Provision of adequate and appropriate facilities in a forest recreation area has been an on-going issue. Planners, however, should have an open vision and they should also listen if not accede to public demands. Decisions as to where a recreation area should be, what should be provided in the area and for whom it should be provided lie between the aspiration and professional judgement of the planners and a recourse to what the public want.

However, different generations of the population are known to respond to different tastes and fashions. The participation and preferences for forest recreational activities will undergo a similar trend. Unlike other goods, the recreation forest is a product that is consumed directly, where it stands, and the attitudes of users towards the area are not revealed easily. Nevertheless, it is the understanding of the use patterns and the behaviour and opinions of the users that the planners and managers should seek in order to provide for a more satisfactory recreational experience.

CHAPTER 3

METHODS AND PROBLEMS OF ASSESSING USE, USER BEHAVIOUR-ATTITUDES AND AREA BENEFITS

3.1 Introduction

3.2 Methods of Assessing Recreational Use

3.2.1 The Assessment of Recreational Needs
3.2.2 The Context of Demand Analysis
3.2.3 Area-Specific Recreation Demand Estimation Model

3.3 Methods of Estimating Recreational Benefits

3.3.1 An Overview of Techniques for Estimating Recreational Benefits

Gross Expenditure Method
Market Value Method
Cost Method
Property Value Studies
Household Production Functions
Consumers' Surplus Method

3.3.2 Consumers' Surplus

Methods of Estimating Consumers' Surplus

3.4 The Travel Cost Method

3.4.1 Problems of the Travel Cost Techniques and Data Requirements

Monetary Cost of Travel
Travel Time
Journey Utility
Multi-stop or Purpose Trips
Time spent at the Area
Congestion
Competing Areas
Quality of an Area
Income Effects

3.5 Conclusions

3.1 *INTRODUCTION*

The methods and problems of assessing use, user behaviour-attitudes and area benefits should be looked at within the context of what has been revealed in Chapter 2. This is necessary considering the many issues surrounding forest recreation planning and management in Malaysia.

In order to observe the issues directly concerned, several important characteristics of the current use of the specific forest recreation areas, as revealed in chapter two, are reiterated here.

i) There is a distinguishable 'market' for forest recreation areas. The frequent visitors are the urban-based population. An additional dimension to this visitation pattern is that the majority of the visits are made by lower income groups.

ii) There are several factors that influence their visits; these include distance and accessibility, availability of facilities, presence of scenic natural features and the cost of travel to the area.

iii) The distribution and location of the recreation areas are determined by the popularity and constant use of the area. This 'ad hoc' nature of development has consequently led to very little planning and management inputs. Most revealing is the lack of guidelines for site planning and management of specific recreation areas.

iv) The few recreational site surveys that have been conducted have been on a single recreation area at one particular period in time and in isolation of the other existing areas. Thus, very little

is known on the effects of alternative opportunities provided by competing areas.

Within the context of the above characteristics, several features of this study can be delineated and emphasised. Firstly, in order to gain a more comprehensive knowledge of forest recreation use, several recreation areas need to be assessed. In this respect, this study will encompass the assessment of three recreation areas within a specified regional boundary. Secondly, the two main issues to be looked into are the derivation of a demand function for the three recreation areas and the use of these functions to estimate the value of the areas. These two issues are obviously related to one another. Thirdly, the nature of the supply and location of the recreation forests has revealed that most of the recreation uses are area specific. To understand and solve some of the problems of planning and management of specific recreation areas, the data and information would have to be limited to that gathered from the users of these areas and hence the inference of its results may only be appropriate to those areas.

The ultimate purpose of recreation planning in an area-specific context is to create opportunities for people to engage in activities in that area. Each specific area provides the recreation planner with special constraints and advantages that seldom apply in broad and general planning guidelines. Firstly, every area has physical characteristics that determine the kind of recreation possible. Secondly, every recreation area has a 'market' area - a population of potential users of the recreation opportunities provided. A planner can identify the market area

and can seek appropriate data about the probable clientele (Davis, 1963). Because both the specific resources and the potential users can be identified, it is possible to estimate both the costs and benefits of providing the specific recreation opportunity.

All this makes the estimation of use and the quantification of area-specific recreation benefit through a mathematical model a rather tempting proposition among many economists. Those models, which are commonly denoted as 'site-specific' recreation area models, combine economic analyses and various assumptions concerning travel and time cost to determine statistically a demand or willingness to pay function. Such functions are then utilized to measure the economic benefits of any proposed facility by measuring the time and income savings that the potential users of that facility would receive (Cicchetti, Smith, Knetsch and Patton, 1972). The literature dealing with such benefits estimation models is rich and generally well known (Clawson, 1959; Knetsch, 1963; Pearse, 1968; Cesario and Knetsch, 1970).

Thus the problem of planning for forest recreation areas has evolved through the process of economic decisions. This is only sensible. If our planning decisions are to be more sensitive and receptive to what the public actually want, we must then have information on social values and costs to make rational allocations of our public budgets to recreation (Davis, 1963; Daiute, 1966). Similarly, a recreation resource manager must find other sources of guidance, for example behavioral studies of users, in deciding what kinds and grades of facilities and activities to provide. An empirical analysis of observed data should, however, be used only in conjunction with a conceptual understanding of the process under

consideration. A reasonable understanding of user characteristics and behaviour through their 'total recreational experience' is vital (Clawson, 1959).

The visitation to recreational facilities is theoretically a function of many factors, among others the quantity and quality of available facilities, the socio-economic status of present and potential users and the availability of competing facilities (McCuen, 1974). Efforts in recreation research have continually been directed towards the development of conceptually and structurally more meaningful models which can be applied to data gathered from specific sites. This more realistic approach, aimed primarily at developing an understanding of complex recreational behaviour in spatially confined areas, usually leads to refinement of the original models (O'Rourke, 1974). These models will be reviewed in an effort to select the most appropriate approach to achieve the objectives of this study.

Another aspect of equivalent importance to the above is the notion of consumer valuation deriving from the existence of a market area, which suggests that outdoor recreation planning is an economic problem. Economic in this sense works in both directions. Assuming that society knows how much of a limited public budget it wants to assign to outdoor recreation development, the question is whether the agencies in charge of spending the funds can allocate them with optimal results. The answer depends on how well the decision makers can perceive the values to society of different units and kinds of recreation areas and facilities. Thus, an economic approach is useful at all levels of choice, from allocating the total share

of public funds to recreation programmes or choosing kinds and locations of areas, down to detailed decisions about developing a particular recreation area (Davis, 1963).

On the part of the consumer, recreationists know the relative amounts of satisfaction attained on their recreation products in comparison with other goods and the only problem which remains is to elicit those values from them. This then leads to the notion of consumers' surplus. Consumers' surplus captures all individual variations of values. Davis (1963) elaborated further that so long as we deal with total consumer willingness to pay for a product, we are recognizing personal variations in value. The willingness to pay reflects the intensity of wants and from that, perhaps, more rational decisions can be made to satisfy the consumers.

There are various methods for estimating the economic benefits from outdoor recreation. Stabler (1982) reviews various methods to estimate the economic benefits from recreational fishing and identifies eight techniques that have been advanced as being suitable for activity or site based studies. In selecting a possible method for this study, conceptual and practical criteria are used.

The preamble above reflects generally the aspects that will be reviewed in this chapter. The concepts in relation to these aspects are discussed minimally as they are widely covered in the literature. A conceptual framework will be presented when the method(s) for this study have been selected. The main focus for this review chapter, however, will be the practicality and feasibility of the various known methods. The

obvious consideration is that the method(s) chosen should be capable of yielding the desired results.

As outlined in Chapter 1, there are several objectives of this study. Various factors influence the propensity to use a particular recreation area. Methods best suited to generate data on these factors need to be compared. For the economic evaluation of recreation forests, techniques for quantifying consumers' surplus are assessed with reference to their capacity to yield ex post estimates. It has also been stated that a further objective of this study is to assess the behaviour of the visitors with respect to their participation in activities and their attitudes towards some supply elements of the recreation area itself. Consequently, ceteris paribus, assessment procedures which require data that do not have general descriptive worth are less appropriate.

At the practical level, the nature of the study dictates that it be conducted at an area-specific level. This is clearly different from the case where population-specific information is the main source of data. As such, some techniques are naturally excluded.

The use or consumption of an area is influenced by the factors of supply and demand. One indication of 'demand' and 'use' could be reflected in the nature of the demand curves. There are various mathematical and statistical methods to determine the demand curves in the form of a use function or model. A method suitable for this study could be chosen and used to estimate the consumers' surplus, as an indication of the value of the recreation area.

The section that follows will discuss the nature of use or demand estimation. Here, the review will include a brief account of related theoretical concepts, the performance of variables and models to estimate use and the methods used to gather information in order to generate a sound and theoretically acceptable use model. Methods for the derivation of recreation area benefits will be reviewed in the third section, where the focus will be on the concept of consumers' surplus and the methods that could be used to derive such a value. Finally, based on the above reviews, this chapter will conclude with a description of the most appropriate manner in which this study will proceed and a detailed discussion on the chosen method(s) to estimate area-specific recreation use and benefit evalution.

3.2 METHODS OF ASSESSING RECREATIONAL USE

3.2.1 The Assessment of Recreational Needs

Recreation planners have always sought to identify both actual and potential users of recreational facilities. In relation to this, a distinction needs to be made here. As made evident from the preceding chapter, the immediate concern of this study is that of assessing the use of specific recreation areas. Population-specific studies, that is, studies which involve the use of population data, also known as household surveys (Cicchetti, 1973) or participation studies (Colenutt and Sidaway, 1973), are not of concern here.

The nature and premises of population-specific studies are quite different from those of area-specific recreation research. The

information for population-specific recreational studies comes from a representative sample of households that includes both participants and non-participants in a variety of outdoor recreation activities. National recreation surveys have allowed the comprehensive study of participation patterns of the population as a whole (for example, the Recreation Resources Reviews Studies in the USA, 1960; and Pilot National Recreation Survey in the United Kingdom, 1967). The population survey information is best described as measuring the level of recreation service flows rather than the use of particular sites (Committee on Assessment of Demand for Outdoor Recreation, 1975). The need for a large input of labour, time, technique and cost makes the method inappropriate for this current study. Morever, very often, household surveys contain relatively less information about the utilization of particular recreation sites (Moeller and Echelberger, 1974) and as a result, they cannot be used to replace site surveys. Since the scope of this study covers the use of only specific forest recreation areas, the knowledge gained from past population-specific studies will be featured only where appropriate.

One common way to assess needs is in the use of attendance records at recreation facilities, because the records, if readily available, are empirical measures of demand. There are however, some obvious limitations. (1) While attendance records show how many people are willing to participate at a particular cost (costs defined in terms of monetary expenditure and time) they do not tell how changes in cost affect an individual's desire to attend. (2) Attendance records also contain a socio-economic bias for they do not show who would be willing to participate in recreation activity besides those who were recorded to have visited the recreation area (McClellan and Medrich 1969).

Another common method used for site selection and development is devoted to enumerating standards for different parks and recreation facilities. This is principally based on the comparison of existing supply of recreation resources for particular activities with expressed or projected demand for those activities. Normally, the way to arrive at specific quantities of needed areas and facilities is to apply time and space standards based on ideal use levels (Latifah Mohd. Yatim and Wee Huay Heo, 1985). This method, however, has been found to be inadequate. More often the standard is arbitrarily set, following 'a rule of thumb' (McClellan and Medrich, 1969). Standards provide a popular means for identifying deficiencies in the supply of recreation opportunities. This approach does not take into account the distributional effects of recreation resources location and also does not recognise variations in levels of use over time (Rogers, 1974).

In order to investigate the problem of variation over time in the supply of recreation resources, many state or local authorities conduct periodic inventories of recreation facilities which are combined with population projections as a means of estimating future recreation needs (Mueller and Gurin, 1962). At their best, these inventories plot current and/or projected population distribution on maps which locate outdoor recreation facilities. These maps are then used to help determine where new facilities should be located.

The more important limitation of all the above methods of collecting use information and using it for estimating future demand is that they provide no information on the costs and benefits of providing the

recreation opportunities. Recognising this limitation, various types of surveys have been developed to determine the demand for outdoor recreation. The use of surveys to gather information from the participants of outdoor recreation were prompted on the reasoning that consumer preferences for outdoor recreation services somehow need to be measured (Frey and Gamble, 1967). Surveys provide empirical data which, when combined with other information, give the planner or decision maker a picture of what people do, how they feel, and what they want. Surveys can produce both direct responses (factual, behavioral and attitudinal) and, through statistical analysis of the data, understanding of the relationships between those responses and factors such as income, age, education and access to recreation opportunities. This was reaffirmed by Burt and Brewer (1971) when they claimed that direct interviews are about the only feasible way to obtain data necessary for estimation of the demand equations.

There are many types of recreation surveys. Opinion surveys deal with the demand for different activities (as opposed to the demand for facilities). This is usually in the form of household interviews which, as mentiond earlier, are not suitable for estimating the demand for area-specific recreation facilities since, among other reasons, they do not reflect local conditions. A widely used method of gathering information is to interview users at the site where the recreation activity is being undertaken.

Various forms of on-site surveys have been used to elicit directly from appropriately identified groups of visitors, their expressed preference for programmes, facilities or resources. In this manner, the relative desirability of an area across sub-groups of the population or the

rank order of desires of a given sub-group can be identified. When repeated over time, surveys allow one to track changes in desires and to evaluate the success of new programmes and facilities.

On-site survey data have also been used as an input to analytic models of demand estimation. However, there are problems associated with them. Firstly, respondents may incorrectly state their preference for resources if no clear cost or benefit is associated with the choice. Secondly, the image conjured up by different people in response to the same verbal description could vary significantly. Thirdly, there may often be a discrepancy between what people say and what they do, not due to deliberate falsification, but due to inaccurate perceptions, especially of the future. Finally, deciding whom to survey is also a problem. In this case, on-site surveys could partially solve the problem through proper sampling procedures.

Additional difficulties arise when survey methods are used to evaluate the benefits of one recreation area to one group of potential users versus those of another area to a different group of potential users. There is the problem of obtaining objective comparisons when comparing benefits across different groups in the population. On the other hand, "with all its drawbacks, the questionnaire approach, sensitively applied, offers a means of diagnosing and correcting seriously unsatisfactory situations. In this it improves upon decision makers' intuition which is no less susceptible to self interested elitism than to erroneous logic" (Price, 1979). Techniques which use consumer preferences data could provide relatively accurate assessments of the demand for an area and of benefits

of alternative development of a particular site for a given population. It is for this task that on-site survey techniques have had their greatest potential and application.

Several socio-economic methods which attempt to measure the benefits to society also use the information gathered from the survey of the visitors to the recreation area. Two of the more popular methods are the 'survey method' and the 'travel-cost method'. Both have a measure of consumers' surplus as a base. The 'survey method' is based on a questionnaire interview which attempts to reveal directly the people's willingness to pay for the goods while the 'travel-cost method' derives the values indirectly from the visitors' travel and recreation behaviour. The result from both methods is a demand curve from which the consumers' surplus can be calculated (Clawson, 1959; Knetsch, 1963; and Cesario and Knetsch, 1970).

3.2.2 The Context of Demand Analysis

Estimates of 'demand' for existing and potential facilities are the most essential elements for an assessment of population needs. However, the term 'demand' is difficult to define. 'Demand' if strictly defined in economic terms refers to the quantity of goods or services which will be purchased at various price levels during a given time period. Several authors (e.g. Seneca, 1966; Clawson and Knetsch, 1968; Seneca and Cicchetti, 1969; Knetsch, 1969) noted that 'demand' when used in connection with outdoor recreation has at least two meanings. The first is the popular meaning as applied to a specific area or facility: the total number of visitors. The second is the economist's meaning: a schedule of volume (visits, user-days, etc.) in relation to a price (cost of the

recreation experience). The different interpretations of the word 'demand' could lead to a lot of confusion. If, for example, a particular study showed that the number of picnickers is twice the number of campers because there are more picnicking rather than camping facilities, to conclude that the 'demand' for picnicking is twice that for camping is clearly misleading. What it in fact indicates is merely that the 'demand' for a particular type of facilities will be higher if more such facilities were provided (Knetsch, 1967). In the conception of Burton (1971) 'consumption' is called 'demand' by the layman and others, while for the economist it is just a part of the real demand, called the economic demand. He differentiates between existing demand and latent demand: existing demand is 'a demand which currently exists', while latent demand is 'one which, for some reason, is not effective, but which could be so in other circumstances; it is a demand which is frustrated by such factors as the non-existence of facilities'.

To avoid confusion, this study will use the term 'demand' as an indication of 'use' or 'consumption' of the area. The 'use' of a recreation area involves the effect of both supply and demand factors on recreation participation. It is also thought the term 'use' or 'consumption' is more appropriate because the information for this study would come from the expressed opinions of the users of the specific recreation areas. Moreover, it is from the existing number of visitors currently using the area for participation in some recreational activity that a schedule of potential visits is derived. Only when this schedule of visits is derived in relation to a price or cost of recreational experience would 'economic demand' for an area be visible. In the same light, 'area' is used interchangeably with 'site' to indicate the recreation setting.

Economic demand studies have generally encountered difficult problems (Rogers, 1974). First of all, it is much more difficult to trace the costs of recreation services than of some other market goods, particularly when free public facilities are involved. Also, to be effective, analysis must include consideration of a number of socio-economic and associated supply factors involving extensive data collection and processing. Other problems with economic methods include the difficulty of quantifying some aspects of the recreation experience and the fact that the methods rely primarily on data from users who have already demonstrated their willingness to pay for the recreation services.

The necessity of relying primarily on data from users who visit a particular area gives an additional economic dimension to this study. This situation is not particularly helpful if area-specific demand studies are to be considered in terms of assessing the use of a system of recreation areas. Cesario (1969) described a system of recreation area as having basic components: a set of P origins (population centres), a set of R destinations (recreation areas) and a set of PR travel links connecting each population centre to each recreation area. An illustration is given below of a simple recreation system : obviously the real world system is much larger and more complex.

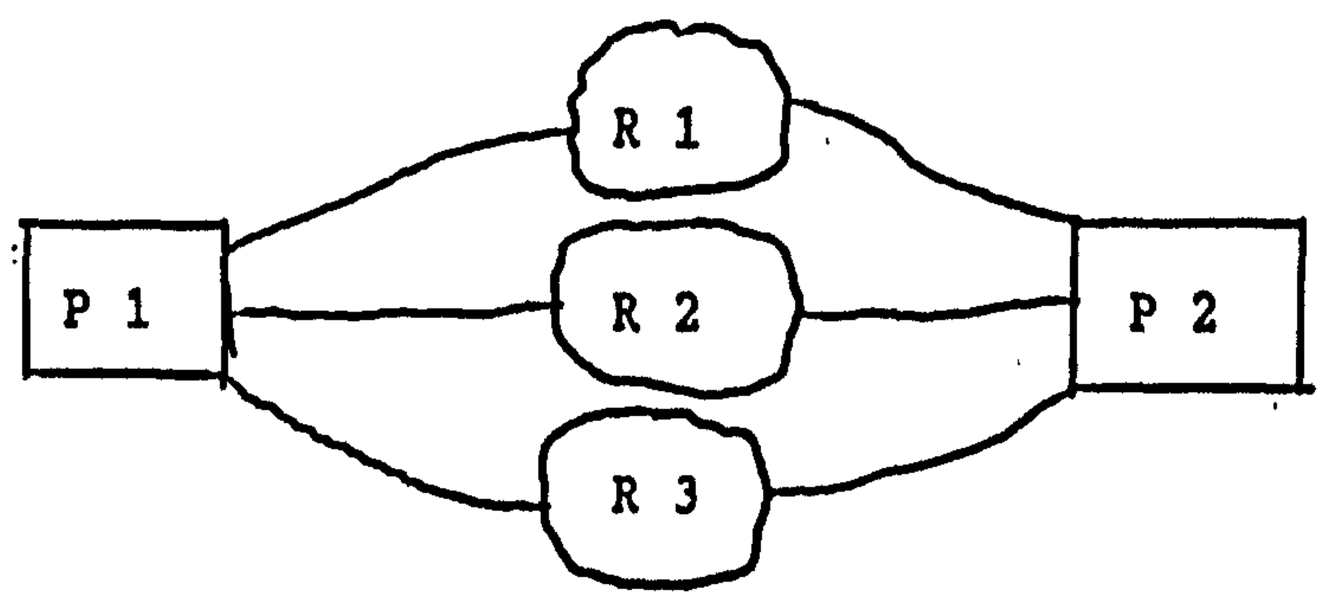

Figure 4 : Hypothetical Recreation Area System

There are many issues to consider that are related to the three components mentioned above. For example, since there are several recreation areas within a small geographic region, there is considerable overlap of 'market' areas. If travel distances were to be used for estimating the differences of number of visits made from a market area, the measures of distance from population areas to the recreation area have to come from a population unit which is of consistent size and is homogenous in character (Pearse, 1968). For this reason, districts or counties are usually chosen as the homogenous population unit (Pankey and Johnston , 1969; Smith, 1975; and Radford, 1985).

The destination areas are relatively different from one another. The differences could arise from the presence of natural features or man-made facilities. The heterogeneity of the recreation areas would contribute to different levels of use from the 'market' area. Thus, in a demand study of recreation system, the intervening opportunities or effects of substitutes become an important factor (Seneca and Cicchetti, 1969; Cesario, 1976; Knetsch, 1977 and Smith, 1980).

The link between the population centres and recreation areas by a measure of distance, usually road distance, poses several problems. The distance from each population centre to each recreation area is usually measured from the weighted mean population location of each population unit to the recreation area entrance over the most probable (usually, shortest) route (Smith, 1975). If the district is the population unit, distance is usually measured from the major city in the district. Thus error is immediately introduced into the analysis, especially where it is difficult to specify a major city from several candidates (Cesario, 1969).

It is with respect to these problems that outdoor recreation research, in determining the factors that influence travel and use of recreation areas, has expressed the characteristics of origins, destinations and the travel links in many forms. Some researchers have expressed the characteristics of origins (generation factors) in terms of the population size of a zone within a market area (Meretwitz, 1966) and some have shown that the individual socio-economic variable such as income, age, sex (Knetsch, 1963) and ethnic groups (Cicchetti, 1973) has the greater influence on recreation participation. Others have used the ability to own a car (Mansfield, 1969; Vickerman, 1974 and Collings, 1974) and availability of leisure time or increased recreational mobility as the factors which generate recreational travel and participation (Mansfield, 1971).

The destinations are expressed in many ways, too. The most important is the quality of the area in terms of its natural features or in the provision of man-made recreational paraphernalia (Cheung, 1972). The influence of alternative or substitute areas on recreational use are also looked at in terms of their attractiveness (Van Doren, 1967 and Cesario and Knetsch, 1976). The problem with attractiveness as a measure of an area's popularity lies in the difficulty in defining what is attractiveness and how to measure it.

The travel links component is perhaps most frequently used to determine the travel to and use of recreation areas. The most exploited characteristic is the distance between the origin and destination. The distance factor has led to the evolution of the 'gravity model' to observe its effect on the propensity of recreational travel and participation

(Wolfe, 1972; Beaman, 1974; Freund and Wilson, 1974). The distance factor has also contributed to the vastly debated concepts of travel cost and travel time and their effects on recreational travel and demand estimation.

The examples given above reflect only a small portion of the issues and problems that are associated with the estimation of recreation demand. It is very important, therefore, to recognise at this stage the influence the several origin, destination and travel characteristics have on outdoor recreation consumption. A description of the models to estimate recreation demand for a specific recreation area will first be attempted. The effects of the numerous influencing factors on demand will be discussed when a method for estimating use and benefits has already been chosen.

3.2.3 Area-specific Recreation Demand Estimation Models

It is well known that planning and management for recreation take place at different levels. In this study the decisions that are to be considered would take place at a specific area where one must consider management practices and their implications for the benefits derived from the use of that area. Other decisions related to the one above concern allocation questions associated with developing a new recreation resource or site. The decisions are distinct from those related to forecasting total levels of participation in specific recreation activities for a region or for the nation and interpreting the implications of those forecasts for the existing configuration of areas.

The author strongly believes that the assessment of recreation needs and preferences for area-specific recreation is best done through an on-site interview survey. The information that is gathered should reveal both social and economic characteristics of the consumer in question. More

importantly, the information should be descriptive in nature in order for the adopted empirical approach to be used, whereby it would then be possible both to gain a better understanding of the recreational process and to predict visitation rates (McCuen, 1974).

Since an empirical analysis of observed data should be used only in conjunction with a conceptual understanding of the processes and conditions under consideration, the premise of this study necessitated the exclusion of the use of several recreation models.

The models which have been put forward are several, but may be looked at as having four main approaches (Clawson, 1959; Thompson, 1967 and Van Doren, 1967) :

(i) Time Series Projection Models
(ii) Gravity Models
(iii) Inertia Models
(iv) Economic models

We will briefly describe the first three approaches to provide a background for further discussion.

(i) Time Series Projection Models (Clawson and Knetsch, 1966; Stevens, 1966 and Thompson, 1967) represent a simplified method of estimating recreation travel flow and assume that the prospective sites are already used for recreational purposes. The goal in this case is to decide where to allocate funds for upgrading or expanding facilities. Over time, the number of visits from the population centres to the recreation areas are extrapolated in the form of a least squares fit conforming to the

recognisable trend in the past years.Assuming all other variables are constant, the basic assumption is that a series of numerical values which cover a number of years and show constant or systematically changing patterns can be projected into the future.

(ii) Gravity Models (Ullman and Volk, 1962; Van Doren 1967) are based on the assumption that the number of recreational trips from an origin of a given population to a particular destination is a function not only of the population, but also of the distance between the two points. This distance can be measured in terms of miles or time.

Van Doren's Gravity Model (1967) assumes a standard formula for pair-wise interaction (Wilkinson, 1973) :

$$I_{ij} = GP_iA_j \ / \ TD_{ij}^{b}$$

where I = number of trips

G = the gravitational constant

P_i = population of origin i

A_j = attraction index of destination j

TD_{ij} = minimum time-distance on route ij

b = exponent

In contrast to regression models which are estimated statistically, gravity models are usually calibrated by trial and error procedures. This calibration is subject to most of the problems that arise constantly in regression analysis, primarily those of measurement (Cesario, 1969).

(iii) The 'Inertia' Model of Wolfe (1972) is actually a variation of the gravity model. It was developed to overcome what Wolfe perceived to be a major deficiency of the gravity model, that is, its unresponsiveness to the

fact that distance has an effect on the perception of the attractiveness of a site. In particular, the gravity model over-estimates the number of trips from nearby origin and under-estimates the number of trips from distant origins. To overcome this problem, the expression :

$$D_{ij}(\log (D_{ij}/m))/ n$$

is suggested as a form of "perceived distance" to replace actual distance. D_{ij} is distance from population centre i to recreation site j, where m and n denote the total number of centres and sites.

All the methods listed above have their own merits in estimating or predicting demand. However, because of several specific characteristics of the models, they have not been found to be particularly appropriate for application at the area-specific level. Several of these limiting characteristics are discussed below:

(i) Some may prove useful only in specific conditions and circumstances because of their a priori assumptions. Some of these models do not include more relevant determinant variables. Wilkinson (1973) summarises the advantages and disadvantages of some of these methods. Time series projections are simple and useful in the short-run, but generally unreliable in the long-run. Gravity models are also simple to operate, but are generally inaccurate for very short and very long distances. The inertia model, although requiring further testing, is a vast improvement, being much more accurate than gravity models with very little increase in complexity. Unfortunately, no attempt has yet been made to test the inertia models using data consisting of distances with a wide range. System theory models (Glover and Rogozinski, 1982) are probably the most accurate and beneficial to recreation planners in the long run if the

problems of program formation and data collection are overcome. The latter model is probably the best for demand projection purposes.

(ii) The source of information that generates the data to be used in the model is not from the actual users to the areas. As mentioned earlier, information from population surveys or household interviews is not suitable to estimate the use of a specific recreation area. Many of the methods mentioned above use population-specific data (this includes the time series model, gravity model and simulation model).

(iii) Even if some of the methods have applications in estimating consumption of a specific resource, the scope of the model and/or the difficulty (in terms of cost and time) in data collection renders the method inappropriate for this study.For example, the area production analysis model has been developed to determine the relationship between use intensity and physical characteristics of recreation facilities but predictive models based on supply features usually show that the size of a recreation area, in terms of facility units, is strongly correlated with recreation use (Moeller and Echelberger, 1974). The obvious conclusion is that the bigger an area, the more use it has received. The relationship reveals little about predicting consumption and the production function for a site merely yields an estimate of the site capacity, not use (Gosse, 1970). Sinden (1974), using the Ramsey model of utility estimation, admitted that the utility approach to benefit valuation required intensive face-to-face interviews. The data available for the derivation of area's demand which arise from the individual's or household's production of recreational services as mentioned by Cicchetti et al. (1976), Bockstael and McConnell (1980a) and Deyak and Smith (1978), unfortunately, rarely meets the needs of theory (Smith and Kopp, 1980).

(iv) A major deficiency in some of the models is the failure to incorporate a "cost" component. This is unrealistic since the supply of facilities available to a given population depends on the level of "cost", such as travel time, travel expenses, entrance fees, crowding and area quality (Gosse, 1970). Without such "costs" or "benefits" values, it is not possible to obtain the estimation of a value of the recreation area. Some models do take into account the "cost" factor but the derivation is complicated and, more often than not, based on inconsistent assumptions, giving rise to the problem of noncomparability (Beardsley, 1971). For example, Sinden (1974) specified extra hours of travel as willingness to pay. To derive this he used a photo-choice technique to determine the intensity of presence where the willingness to pay to go to a recreation environment was measured over the preference to visit a base environment.

The ideal model for estimating recreation demand should provide the decision maker with an exact prediction of the amount and type of recreation use an area is likely to receive at a particular level of facility development and price. The method should be dynamic so that changes in management policy, recreation supply, price, etc, can be incorporated into the model to determine their potential impact on predicted consumption. It should thus provide a framework for planning and management decisions and reflect the consumer decision processes that underlie recreation behaviour. From a practical stand point, it should be easy to understand, have minimum data input requirements, and require a minimum of personal judgement. It should be added that destination and origin zones used in modelling recreation consumption should be small enough to provide realistic planning guidelines.

However, the search for an ideal model is difficult and quite elusive. The problems with some of the models mentioned earlier are common and are inherited by practically every known model for estimating recreational use. Even if the elements that determine recreation behaviour are better understood, the problem is in gathering and generating useful data. Such data could be very difficult and expensive to collect. Restricitve assumptions are often necessary to develop recreation use models. The relationship between future demand and recreation supply is often assumed to remain constant. Management and policy decisions are often assumed to be unchanging, as are other factors that underlie recreation behaviour. Yet imaginative approaches, that attempt to incorporate recreation supply variables, user behaviour, management procedures and qualitative values, have been undertaken to overcome the problems inherent in recreation demand estimation. The use of socio-economic methods dependent on the survey of recreation consumers and the subsequent application of the information obtained to an economic model has proven to provide relatively consistent and acceptable results based on some theoretical reasonable a priori assumptions. Economic models are also simple and perhaps the most versatile. They can be used not only for projections but also for analysing personal benefits, economic impact of a recreation area and changes in participation due to increased costs (Clawson and Knetsch, 1966).

Area-specific Economic Models

Economic models may hence be taken to be the most suitable kind for this study. A discussion of what it involves follows.

The term "demand" as used by economists refers to the schedule of quantities that the community would desire at all possible prices. 'Use' or 'consumption is the realisation of such demand and supply considerations, that is, the quantity of recreational services chosen by the community (Cicchetti, Smith, Knetsch and Patton, 1972). At a given "price" a certain number of visits are made to a given recreation area. It should be noted that the unit of volume is the total number of visits, not visitors, that is, if an individual visits an area twice he is double-counted. The number of visits to a specific recreation area is plotted against the costs undergone by the visitor in using that recreation opportunity. The shape of the demand curve would vary for different socio-economic sectors of a given population and different recreation areas. For any given area a demand schedule can be constructed for each population group and the demand schedules for all groups can than be summed up to yield an aggregate demand schedule for the recreational resource (Pearse, 1968).

Figure 5 shows the construction of a demand curve from an economic demand schedule, which in the diagram expresses one aspect of recreational demand. The typical feature of a demand curve is the inverse relationship shown between visit rate (consumption volume) and cost (which may be a function of a price, time and distance). This is the typical Marshallian demand curve of elementary economic theory (Clawson, 1959). The curve can show both total consumption (the area under the curve) and the price elasticity of demand (the rate of change of demand in response to price change)(Countryside Commission, 1970).

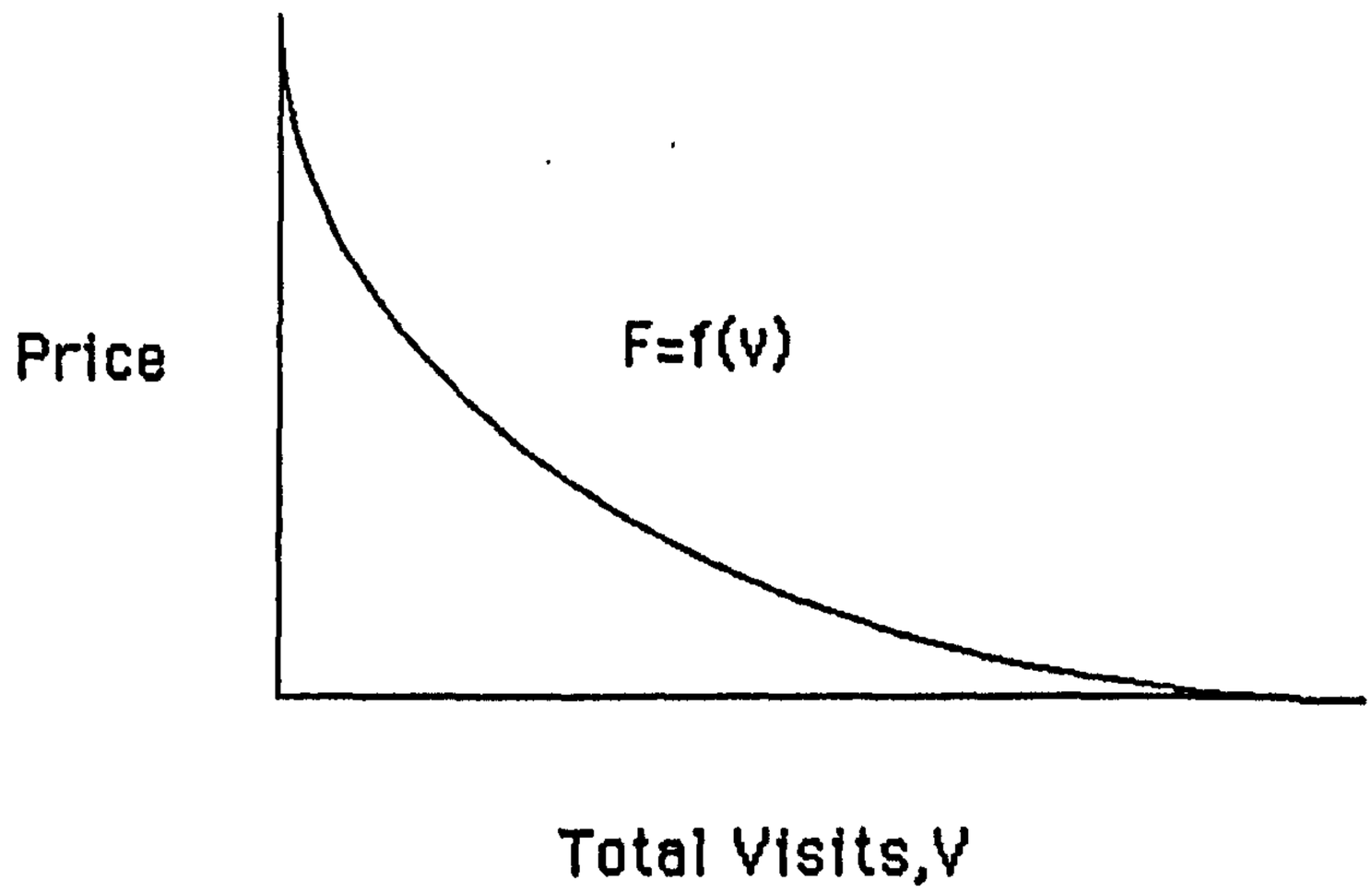

Figure 5 : Demand Curve.

Clawson and Knetsch (1966) suggest that demand curve analysis can be used in the following ways:

(i) to suggest the number of visits to a given resource from a population area of given size;

(ii) to determine the effect of imposing/raising entrance fees;

(iii) to assess the effect of the development of new facilities in an area;

(iv) to determine how much resources are worth when developed for recreation rather than for other purposes;

(v) to assess the benefits of the recreation experience to the user.

Any decision-making process undergoes continuous change over time. Economists refer to such processes as dynamic, but in the course of constructing models they have frequently examined the mechanism at a single

point in time. We can then refer to the model as a static depiction of the process. Such an economic model is a description, usually in mathematical terms, of both the factors that are determinants of behaviour and the jointly observed outcomes of such behaviour at a given point in time.

The primary concern of recreation planners for area-specific recreation is the individual consumer's decisions concerning the amount and use of his leisure time, in this case, reflected in the number of visits (or other units of measurement) to the specific area. Accordingly, economic models for area-specific recreation focus attention on the segment of an even more general economic model that deals with the outcomes of the decision to use leisure time. In focusing on one segment, a number of the behaviorial outcomes from the segments of the more general model are taken to be given and are presumed to be explained independently. For example, it may be useful as well as realistic to assume that family income, educational level, residential location, and many other consumption decisions are given and are therefore independent of the recreation segment of the model. On the other hand, variables relating directly to the visits are considered to be determined jointly or simultaneously. For example, variables or measures of the outcomes, such as whether to make a recreation trip, how often to make a trip, and where to go may usefully be considered interdependent when such decisions are made "jointly". Their outcomes and therefore the variables measuring them are endogenously determined.

Equation 1 is a general statement of the factors that affect leisure time decisions concerning the participation of individual i, at site j, in one activity P at a point in time t.

$$P_{ij} = f(E_{1i}, E_{2i}, \ldots E_{ni}; S_{1j}, S_{2j}, \ldots S_{mj}) \qquad (1)$$

where:

P_{ij} is the participation of individual i at area j in a given activity for period t.

$E_{1i}, E_{2i}, \ldots, E_{ni}$ are the socio-economic characteristics of individual i.

$S_{1j}, S_{2j}, \ldots, S_{mj}$ are the supply characteristics of area j and its relevant substitutes.

This equation states that each decision P_{ij} is a function of the ith individuals's n socio-economic characteristics E_{ki} where k = 1,n. These characteristics are given in the other segment of the completely general model (e.g., annual income) or are in part descriptive parameters (e.g., age). In addition to having individual or population-specific variables, several area-specific variables, such as the availability of recreation alternatives and the qualities and characteristics of a particular jth area, are also important considerations. If both types of area-specific variables are measured for each jth area and there are m such determinants, then S_{sj}, where S = 1, m, can be used to represent these variables in equation (1).

The outcome of an individual's recreation decisions is P_{ij}. It is our measure of the quantity of recreational services that the individual will choose in each time period. However, the actual measurement of P_{ij} is by no means an easily resolved issue. For the present, let us designate it as days of recreation by individual i at area j, recognizing that the estimation of the time interval and the activity itself may introduce reasons for alternative dimensioning. Equation (1) clearly shows that the

individual's dimensions are the result of both his own characteristics (his individual demand schedule) and the characteristics of the supply available to him. When we construct models of such a nature, the extent to which we must depart from this fairly general framework is determined by the data available to us and our purpose. More importantly, the assumptions underlying the schedule, curve or formula must be spelt out carefully and identified explicitly , and the effect of changes in any of these factors upon the nature of the schedule, curve or formula, specified if at all possible (Clawson, 1959).

3.3 METHODS FOR ESTIMATING RECREATIONAL BENEFITS

The need for monetary estimation of recreational benefits has been justified on a number of grounds. Most common is that recreation is often available at zero or nominal entrance charges. Another reason may be the idea that even where charges are more substantial there may still be a large untapped consumers' surplus in the use of facilities. In fact the methods discussed in the last section are aimed at estimating the demand curve, and there are many possible interpretations of potential benefits, given knowledge of the demand curve (Smith, 1975).

Various techniques have been advanced which not only measure benefits in an ex post sense but which also are capable of predicting benefits. It is perhaps appropriate to use such methods to quantify ex post benefits and to recognise yet another windfall gain, of the resulting predictive power. Techniques for quantifying consumers' surplus are assessed with reference to their capacity to yield ex post estimates.

3.3.1 An Overview of Techniques for Estimating Recreational Benefits

Lerner (1962) reviewed various methods of measuring recreational values for outdoor nonurban recreation, including sport fishing and wildlife. He also reviewed seven techniques that have been advanced to permit evaluation of investment which justifiably may be made to provide resources and facilities for public recreation and permit economic comparison with other uses of the resources concerned. Clawson and Knetsch (1966) described six methods to measure user benefits from public outdoor recreation areas. Gundermann (1976) summarised the methods of assessing the economic value of recreation and classified them as empirical methods, normative methods and methods based on auxiliary and substitute values. Stabler (1982) identified eight techniques that have been advanced as being suitable for activity or site based studies. Some of the techniques are presented very briefly below and are assessed with reference to both their theoretical acceptability and their suitability in the context of area-specific forest recreation.

Gross Expenditure Method. This method attempts to measure the value of recreation to the recreationist in terms of the total amount of expenditure spent on recreation by the recreationist. It assumes that, to the recreationist, recreation is worth at least as much as he or she is willing to pay for it. This includes at least travel expenses, equipment expenses and expenses incurred while in the recreation area. The limitations of this method lie in the fact that expenditure reflects only part of gross benefit and does not capture the value of the area over and above the costs involved. Indeed, properly identified expenditures are no more than a proxy measure of the opportunity costs of the recreationist.

Market Value Method. This method is probably the most common and has often been used by the federal agencies in the United States. It consists of attributing certain predetermined values per visit or per recreation day. Then, the attributed value multiplied by the attendance can be used as an estimate for the value of the site. The chosen value is normally related to prices charged in privately owned recreation areas. This method takes no account of the satisfaction gained by some recreationists over and above the market value at which a private owner might want to optimise profit. On the other hand, some users of a publicly owned area would not use the area if they were charged the fee of the private area. The revenue obtainable from the private operation of a different area may be assumed to offer a different quality of recreation than the public area since lands have often been reserved for public purposes precisely because it is considered that the private enterprise could not adequately enhance their recreational value. Stabler (1982) pointed out that market prices do not necessarily represent the willingness to pay for recreation. Specifically they do not measure actual consumers' surplus associated with an area's services.

Cost Method. This method assumes that the value of outdoor recreation resources is equal to the cost of generating it or, in some extreme applications, to a multiple of that cost (Clawson and Knetsch, 1966). The "opportunity cost method" is most often used in Scandinavia as reported by Christensen (1983). Any recreation project which is contemplated can therefore be automatically justified on the grounds of "intangible considerations". However, this method offers no guide to evaluating a contemplated loss of recreation opportunities, and it allows very little discrimination between the relative values of alternative investment

opportunities (Crutchfield, 1962; Lerner, 1962).

Property Value Studies. Studies employing this approach exploit the relationship between private goods and public goods and use the information generated by the related private market to draw conclusions about public goods demands and benefits (see Freeman, 1979 for a review). For example, an attempt is made to relate property value as a function of distances from the recreation area (Knetsch, 1964). Obviously such an approach is not warranted, if one is to equate between the private market goods in the urban area and the public goods in a remote rural setting.

Household Production Functions. The household production function approach as suggested by Bockstael and McConnell (1980) and McConnell and Sutinen (1979) for recreational fishing combines both the production and consumption activity into household utility maximisation. Following on the work of Becker (1965) and Lancaster (1966) this approach concentrates on the objective of market purchases rather than on the goods themselves, that is, the enjoyment of the recreational trips rather than the recreational opportunities at the area. Instead of the traditional model, where subject to a budget constraint, goods enter the utility function directly, the household production function assumes that households produce utility from activities that require time and goods inputs. In the case of recreational fishing, anglers are seen as consumers in that they purchase or avail themselves of inputs such as the opportunity to fish, that is area services, and producers in that they seek to minimise costs for a given level of utility produced and to maximise utility production within their income constraints.

Unfortunately while potentially appropriate, the household production function approach has not yet progressed far beyond the stage of tentative formulation of concepts and relationships. For recreational fishing, this approach has been found to be generally relevant and is particularly so in the context of privately owned salmon fisheries (Radford, 1985). In the case of general outdoor recreation activity, for example picnicking or nature walks, there are no practical or conceptual reasons to reasonably regard the participants as producers rather than consumers. Where this particular study is concerned, attention needs to be focused on the supply of and demand for the services of the area rather than on the specific activities which occur at the area. In short, despite the intuitive appeal of the household production function approach, it is reasonable to regard the visitors as predominantly consumers, and that the product should be described in terms of identifiable time periods or one that can be identified by the users.

Consumers' Surplus Methods. These methods are sometimes referred to as socio-economic methods as they attempt to measure the benefits to society, that is, the changes in welfare, as a result of a given project. The most common and widely used methods are the "survey" or "direct evaluation" and the "travel cost" methods. Both have a measure of consumers' surplus as a base. The direct evaluation techniques are based on a questionnaire or an interview where individuals are asked to reveal their preferences directly, either in the form of their willingness to pay for given qualities and quantities, or, the qualities and quantities they would demand at given prices. The travel cost method, on the other hand, derives what the consumers have paid or would pay through their recreational behaviour in the process of visiting an area. The result from both methods is a demand

curve from which the consumers' surplus can be calculated.

Among all the methods described above, the consumers' surplus methods appear to be the most appropriate for this study. The concept of consumers' surplus and the techniques to derive its value are further discussed in the following sections.

3.3.2 Consumers' Surplus

Recreational economics, to a greater or lesser extent, has been largely concerned with recreational areas where property rights are ill-defined or non-existent, which allows for free access. Given this, the interpretation and estimation of consumers' surplus has received a lot of attention. Despite the now general acceptance of the relevance of consumers' surplus, at least within a cost-benefit analysis (e.g. Pearce and Nash, 1981) and because "for all except marginal changes in the amount of a good, the market price prevailing in a perfectly competitive setting is an inadequate index for the value of a good" (Mishan, 1975, p.24), there is still some debate as to the appropriate measure of consumers' surplus.

Consumers' surplus can be described as the difference between what people are willing to pay for a good and what they actually do pay (Marshall, 1930). Figure 6 shows the demand curve for a good, X_i. For a given price, P_1, people will buy a quantity q_1 for good X_i. The shaded area in the figure is equal to the consumers' surplus and can be interpreted as the contribution to increase in social welfare by introducing that good.

There is, however, a very important qualification for an accurate measure of consumers'surplus as stated above, that is, it requires the marginal utility of income to be constant. Hicks (1946, p. 40) stated that

".... the best way of looking at consumers' surplus is to regard it as a means of expressing, in terms of income, the gain which accrues to the consumer as a result of a fall in price. Or better, it is the compensating variation in income, whose loss would just offset the fall in price and leave the consumer no better off than before."

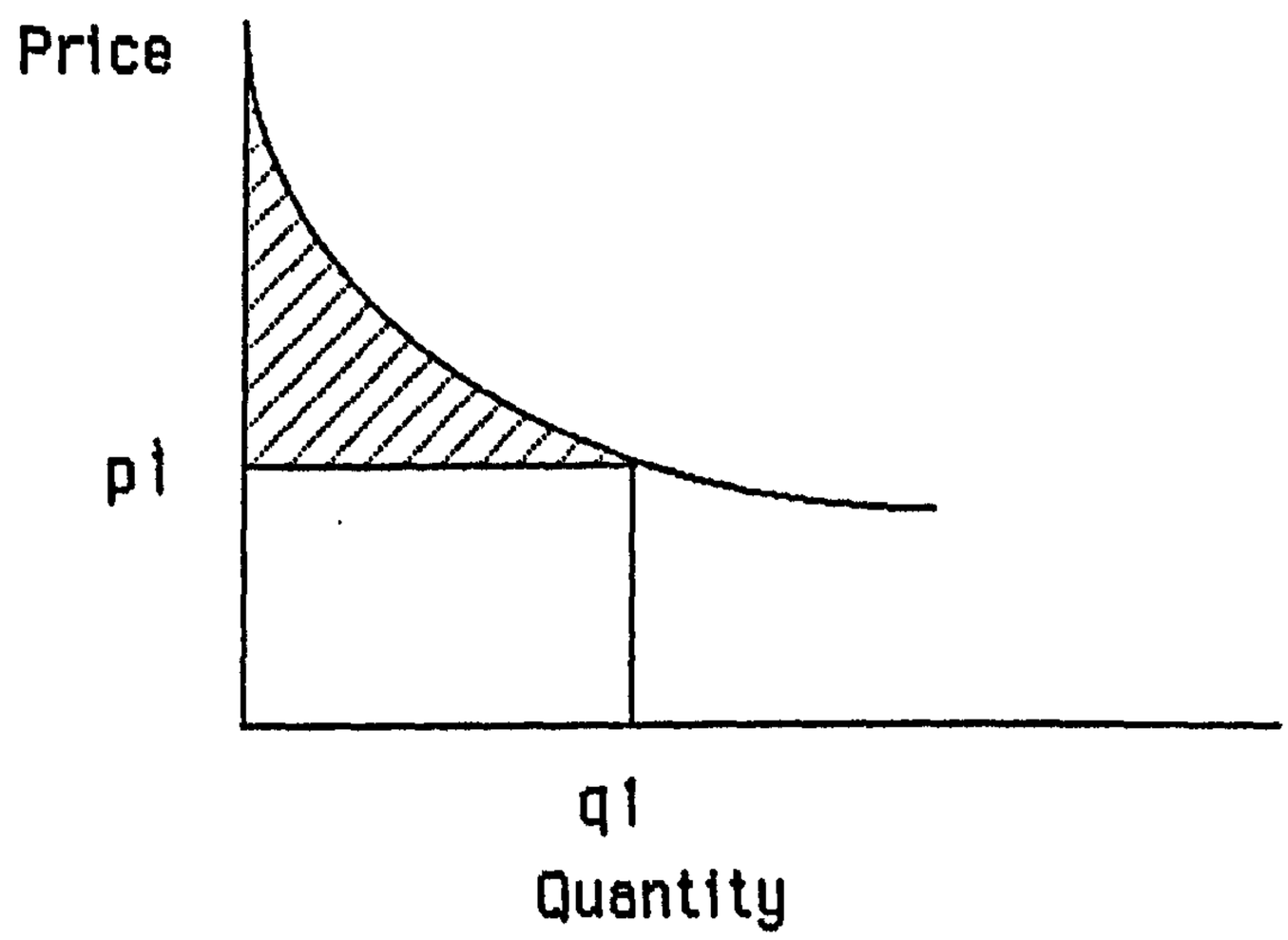

Figure 6: Demand Curve for Good X_i

The approach to consumer surplus has been replaced by the more satisfactory ordinal approach and was refined by Henderson (1941) and Hicks (1943, 1946, 1956) which has led to four measures of consumers' surpluses. These four measures are essentially alternative ways of measuring the "distance" between the two indifference curves that are relevant to the price change under consideration. Specifically the four measures are defined by Currie, Murphy and Schmitz, (1971, pg 746) as follows:

Compensating Variation: The amount of compensation paid or received that will leave the consumer in his initial welfare position folowing the change in price if he is free to buy any quantity of the commodity at the new price.

Equivalent Variation: The amount of compensation paid or received that will leave the consumer in his subsequent welfare position in the absence of the price change if he is free to buy any quantity of the commodity at the old price.

Compensating Surplus: The amount of compensation paid or received that will leave the consumer in his initial welfare position following the changes in price if he is constrained to buy at the new price the quantity he would have bought at that price in the absence of compensation.

Equivalent Surplus: The amount of compensation paid or received that will leave him in his subsequent welfare position in the absence of the price change, if he is constrained to buy at the old price the quantity he would have bought at that price in the absence of compensation.

What Hicks (1943) has shown is that a fall in price implies that equivalent surplus > equivalent variation > compensating variation > compensating surplus. Two basic and somewhat interrelated problems arise, namely, the appropriate measure of consumers' surplus to use and the confidence with which it would be estimated. With respect to the choice of measure, compensating surplus and equivalent surplus are usually dismissed. Mishan (1948) argues that compensating surplus and equivalent surplus should not be considered under any plausible circumstances. The two measures are unjustified as they force people to consume at an other than optimal level. Freeman (1979) believes compensating surplus and equivalent

surplus are too unnecessarily restrictive to be of any value. Bockstael and McConnell (1980) state that only compensating variation (C.V) and equivalent variation (E.V) are appropriate when price changes are being considered. There is apparent consensus for using C.V. and E.V. or simply the area under the Marshallian demand curve which has been shown to lie between these two measures (Dwyer et al., 1977; Gordon and Knetsch 1979 and Bockstael and Mc Connell, 1980).

The approach adopted by most researchers is to derive consumers' surplus estimates from uncompensated demand curves that is, to estimate Marshallian consumers' surplus. The problem of choosing between E.V. and C.V. is either ignored or assumed too insignificant at least when compared with the measurement error in estimating Marshallian consumers' surplus. The latter justification is based on the view of Hicks (1956, p. 177) or some variation of it: "in order that the Marshall measure of consumers' surplus should be a good measure, one thing alone is needed - that the income effect should be small". Such justification can be found in Cesario and Knetsch (1976), Dwyer et al. (1977) and Seller et al. (1985).

Willig (1976) derived precise upper and lower bounds on the percentage errors of approximating the compensating and equivalent variations with consumers' surplus estimated from an ordinary demand curve. An interpretation of Willig's results is that C.V. and E.V. approximate to each other and to the area under the ordinary demand curve. As Freeman (1979, p. 49) states, "Willig's analysis provides a strong justification for using the empirically observed consumers' surplus measure of welfare change as a valid approximation for either of the theoretical measures, E.V. or C.V.". Mishan (1981 p. 183) is supportive but cautious :

"It is plausible to believe that for the usual order of price change, the statistical errors in estimating the demand curve, and therefore m (area under an ordinary demand curve) will tend to swamp the divergence between the true m measure and the true C.V. and E.V. measures".

Bockstael and McConnell (1980, p.59) argue that although "Willig's results are unquestionably correct, they are not a panacea for applied resource economist for a number of reasons". They argue that one difficulty is that the large price changes associated with provision or elimination of a resource may often invalidate Willig's rule of thumb, so that the area under the curve cannot be considered a good approximation of willingness to pay. Furthermore, in order to derive the bounds, it requires the estimation of a Marshallian demand curve from observable data, but the calculation of such bounds is difficult for some demand estimation functional forms because it was shown that often Willig's bounds are non-existent. It has also been shown that C.V. and E.V. could differ substantially. For example, Hammack and Brown (1974) in a study of duck hunting found C.V. and E.V. differing by a factor almost 5.

It appears that not much comfort can be gained from Willig's formulation. But if there is a redeeming feature of consumers' surplus, estimated as the area under an ordinary demand function, it is possible that it is bounded by C.V. and E.V. On the other hand, one should not be preoccupied with placing a lower or upper limit of a welfare change when using consumers' surplus for a social judgement. Consumers' surplus is just that and not an upper or lower limit.

Methods of Estimating Consumers' Surplus

Much attention has been focused upon the development of non-market

methods, especially that of welfare change measurement, to estimate the value of recreational uses. In the 1940's the groundwork for the travel cost method was established by Hotelling (Prewitt, 1949). Following this, in the 1960's Davis initiated the basic foundation for bidding methods (Davis, 1963), which were later to be subsumed under the heading of the contingent valuation methods (Brookshire, Randall and Stoll, 1980; Schulze, d'Arge and Brookshire, 1981 and Thayer, 1981). The travel cost method is to determine the economic worth of a recreation area by looking at the relationship between prices and number of visits. The travel cost method being the more favoured method, we hence first examine the contingent valuation methods to note their drawbacks.

The direct evaluation technique, of which contingent valuation is one, is defined as any approach to valuation of a commodity which relies upon individual responses to contingent circumstances posited in an artificially structured market (Seller et al., 1985). Bidding approaches are by far the most widely recognised form of contingent valuation. Studies which use personal interview administration of bidding questions have been most commonly reported in the economic literature (Hammack and Brown, 1974; Brookshire, Ives and Schulze, 1976; Bishop and Heberlein, 1980 and Thayer, 1981) . Bishop and Heberlein (1980) examined the value of Canadian goose hunting in the central United States using a mail questionnaire to collect data and compared three methods of measuring recreation demand: simulated markets, hypothetical markets and travel cost analysis. When compared with their simulated markets results they found that the hypothetical approach underestimated the 'true' willingness to pay as measured by the simulated results ($21 as compared to $63). Using the traditional zonal variant of the travel cost method, they found willingness to pay estimates which

underestimated the 'true' willingness to pay (estimated ranged from $8 to $32 depending whether travel time and time at the site were included). Their research findings suggest that further comparisons of the travel cost and bidding approaches to valuation are needed.

Brookshire et al. (1976) used a bidding game technique and found that the technique was impressively consistent. They concluded that when carefully designed and applied, the bidding game technique is feasible for valuation of consumers' preferences. However, Hammack and Brown (1974) found considerable differences when asking people about their willingness to pay and willingness to sell, that is the price they would demand to give up their right to an area ($247 and $1044 per person). Christensen (1983) also reported that it is difficult to reveal people's preferences without them behaving strategically, whereby those interviewed appeared to be responding to the interviewer's prompt. There are, therefore, many problems encountered when using the bidding approach to valuation which centred upon the existence of biases claimed to be inherent to the technique. The most obvious of these has been termed hypothetical bias and is most pointedly described by the statement "ask a hypothetical question and you get a hypothetical answer". Other types of purported biases include vehicle bias, strategic bias, information bias and starting point bias. These have all been discussed at length in previously published literature (Brookshire, Ives and Schulze, 1976 and Thayer, 1981).

Although there are problems associated with the direct evaluation methods, some researchers disagree. For example Thayer (1981) who examined the environmental impacts of geothermal energy development in New Mexico through a personal interview administration of an iterative bidding survey instrument, and concluded that the estimates of willingness to pay provide

evidence that hypothetical bias from the contingent valuation method was not a problem. He also rejected the existence of both starting point and information bias.

Seller et al. (1985) attempted a study in order to provide some degree of "validity by comparison" for the bidding approach to contingent evaluation. In a study of recreational boating in Texas they concluded that the close-ended form (where there is a range of boating permit values to purchase in order to continue to use the lake) of the contingent valuation method and the travel cost method provided comparable estimates of consumers' surplus for all the three lakes under study.

In comparing the results of travel cost method and the contingent valuation methods, there are two points which should be noted. Firstly, the travel cost method provides estimates of the Marshallian consumers' surplus, whereas the contingent valuation methods used provided estimates of Hicksian equivalent measures of welfare change. However, when the income effect is small, the difference should be small (Willig, 1976). In the study by Seller et al., the income effect is small since recreational boating takes only a small part of the boater's total income (Seller, Stoll and Chavas, 1985). Secondly, the travel cost method gives estimates of consumers' surplus for the total recreation experience, whereas the contingent valuation methods provide estimates of consumers' surplus, as for example in the case given above, for just the boating aspects of the experience.

Perhaps the most problematic feature of the direct evaluation technique is that they are labour intensive and very time consuming. As such many examples in the literature are frequently based on the interviews

of only 20 to 40 respondents. Given that this study is an effort to describe the characteristics of the total recreational experience of the visitors to three specific areas and that the evaluation of the economic benefits is such as that of Marshallian surplus, the travel cost method would be more appropriate. If there is a redeeming feature of the direct evaluation technique, it is that this approach could well serve as a validity check on the orders of magnitude of consumers' surplus as calculated by other means.

3.4 THE TRAVEL COST METHOD

It appears that the most useful approach to the estimation of recreation demand and values is that based on travel and related cost considerations used as a proxy for market transactions, following the suggestions by Professor Hotelling (as reported in the Prewitt Report 1949) and later re-instated by Clawson (1959). This methodology concerns itself with the use of data on the numbers and places of origin of recreation area visitors to construct a demand curve for that recreation area which relates prices to the number of visits, and uses this relationship to determine the economic worth of the recreation area. Cost data are used as an indirect means of determining appropriate prices.

Clawson's methodology would represent the most appropriate means of calculating ex post consumers' surplus. In the first instance the variation in travel costs does allow the identification of an inverse relationship between price and quantity. Further, as is seen later, the procedure by which an area demand function is estimated subtracts consumers' costs automatically so that a measure of consumers' surplus is readily obtained as the entire area under the recreation area demand

function. More importantly, the first of two steps for the estimation of an outdoor recreation demand function follows that of Clawson's "demand for the total recreational experience". This total experience includes all of the interpersonal decisions that are made concerning the recreational experience. The gains that the total family obtains from the recreational activity will depend on their personal anticipation concerning the trip, their enjoyment of the experience, and their recollection of the activity.

The estimation of the demand function in the light of a total recreational experience and in essence, a package deal that encompasses the planning of, participation in, and recollection of the whole activity has given a useful structure in examining further the factors that affect the propensity for a group or an individual to visit an area. Given that this is the technique adopted for this study, it is appropriate to outline the method in some detail. The intention here is not to present a comprehensive review of the method and the application of it by numerous researchers. Rather, the aim is to present an overview of the main features and problems of the method with an emphasis on those issues that have direct bearing on the type of data required by the method.

According to Clawson, the estimation of an outdoor recreation demand function proceeds in two distinct steps. These steps may perhaps best be shown by using a simple hypothetical example. Assume that we have a free recreation area located at varying distances from three centres of population which are of different sizes and contain all the potential recreation area visitors. The cost of visiting the area is of major concern, and would include such items as transportation, lodging and food costs above those incurred if the trip were not made. These costs would vary with the distances from the recreation area to the population centres

involved. Consequently, the number of visits, or rather the rate of visits per unit of total population of each population centre, would also vary. Such figures reflecting this dependence might take the following form:

Population centre	Population	Visits made to Recretion area	Visits per per 1000 population	Cost of a visit (in M$)
A	1000	400	400	1
B	2000	400	200	3
C	4000	400	100	4

The data above show the expected relationship that visits per unit of total population decrease with increase in costs. These data are plotted and a line drawn through the three points in Figure 7.

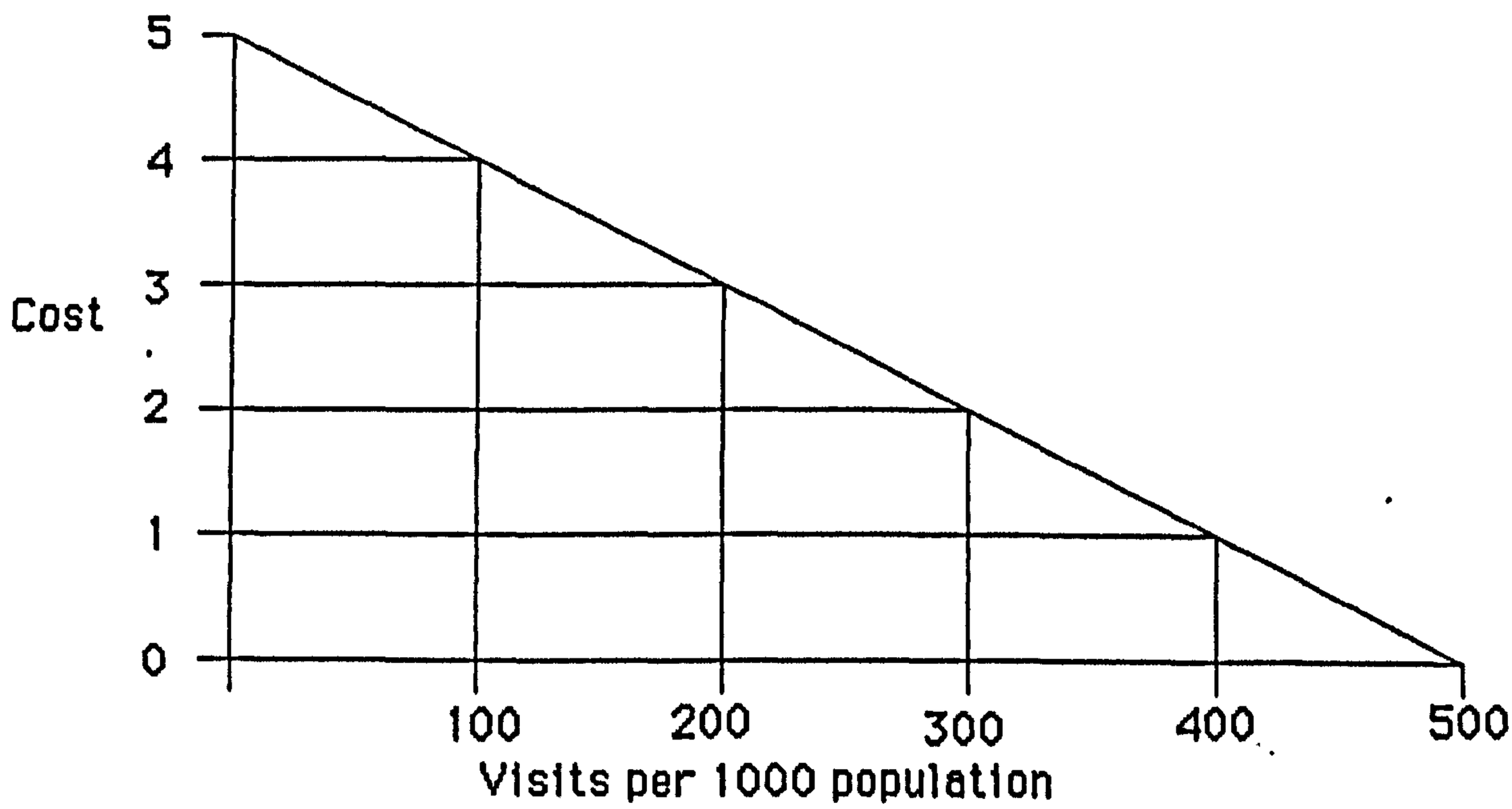

Figure 7. Hypothetical Relation Between Cost and Visit rate

The relationship may also be given in equation form, which in this case is

$$C = S - V \qquad (2)$$

or perhaps more conveniently

$$V = S - C \qquad (3)$$

where C is the cost of a visit and V is the rate of visits in hundreds per thousand population.

This information is taken directly from the tabulation of consumer behaviour. The linear relationship assumed here is for convenience. Actual data may very likely show, for example, that a dollar change in costs would have but a slight effect on visit rates for the already high-cost visits, and a large effect on low cost visits.

The construction of a demand curve for the recreation area itself, which relates how many visits would be made to the area if varying costs of the resource were imposed, involves a second step.

First it may be noted that the present total of 1200 visits are made with what may be considered as no increase in costs or a zero user charge. This is one point on a demand curve, quantity or number of units at zero price. If a greater than zero charge were made for the area, the number of visits would be expected to decrease. It is precisely this relationship that we are seeking to determine - the quantity response to different prices for the recreation visit. The initial tabulation showing how visits to an area are related to costs provides the needed information for determining this reaction. The estimate of the demand relationship is made by postulating an imposed price for the enjoyment of the recreation area in

the form of an addition to the costs of the visit from each population centre. The number of visits which would occur from each cost group under the higher costs is determined by examining the relationship of visit rates and total costs.

Thus, we might assume a price of one dollar. This is then an added cost of one dollar for visits to the area for each of the three population centres. This would have the expected result of reducing the number of visitors coming from each of these centres. The expected reduction is estimated from the visit-cost relationship (Figure 7 or equation 3).

The present cost for visits from population centre A is one dollar, and the visit rate is 400 per thousand. An added dollar cost would make the total two dollars. The expected visit rate with the new cost is estimated to be 300 per thousand, reading from Figure 7 or substituting in equation 3. Similarly, the visit rate of population centre B drops to 100 per thousand, and the visits from centre C reduce to zero, indicating that no visits would be expected from this area when there is a fee of one dollar or more for the recreation area.

The total visits that are then indicated for a price of one dollar, and another point on the demand curve, is then the sum of each population centre's new rate of use multiplied by the corresponding population. Thus, in the case of a one-dollar charge or added cost, the result is a total of 500. Corresponding calculations for additions to costs or prices of two, three, and four dollars indicate that the total visits to the area are thereby reduced to 200, 100 and 0 respectively. These results may form a demand schedule as follows:

Price (added cost in M$)	Visitors from population centres			Quantity (total visits)
	A	B	C	
0	400	400	400	1200
1	300	200	-	500
2	200	-	-	200
3	100	-	-	100
4	-	-	-	0

The results of the demand schedule may be plotted as a demand curve, sometimes known as the aggregate demand curve (Figure 8). This, under the assumption of the procedure, gives an economically meaningful demand relationship. It indicates the reactions of people to changes in price in terms of how many visits would be made to the area at different cost levels. It has little to do with an entrance fee as such but imputes the cost reaction from general expenditure behaviour.

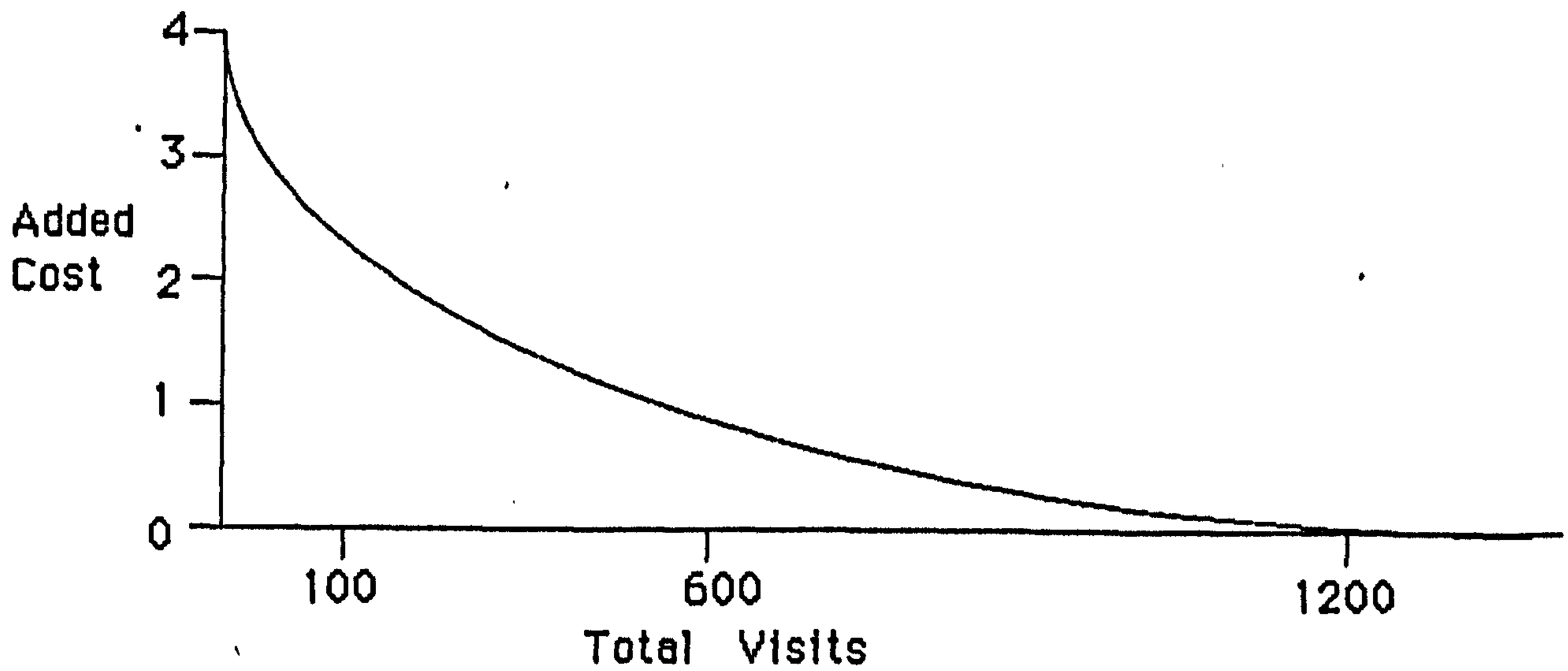

Figure 8. Hypothetical Aggregate Demand Curve

The area under this curve is consumers' surplus, for the relationship illustrates how visits decline as charges are hypothetically increased.

More formally, following Gibson (1978), using a simple linear form, we can represent the demand for the whole recreational experience as

$$V_{ij}/P_i = a - bc_{ij} \qquad (4)$$

where

V_{ij} = number of trips from origin i to recreation area j

C_{ij} = the mean cost of a trips from origin i to recreation area j

a and b are parameters to be estimated given observation on V_{ij}, C_{ij} and zonal population P_i.

Assuming that there are only three zones, the present number of trips from existing charges is known from survey data (ie. $i \sum_1^3 V_{ij}$) and can be estimated by

$$V_j = P_1 (a-bC_{1j}) + P_2(a-bC_{2j}) + P_3(a-bC_{3j}) \qquad (5)$$

The observed and estimated total visits should not substantially differ. The point where the area demand function crosses the x-axis is given by the present number of trips. At an addition to area access charges of ΔC_1, visits will be

$$V_j \Delta C_1 = P_i (a-b(C_{ij} + \Delta C_1)) + P_2(a-b(C_{2j} + \Delta C_1)) + P_3(a-b(C_{3j} + \Delta C_1)) \qquad (6)$$

This process is repeated until V_j is less than 1 and a complete Clawson area demand schedule is estimated, the area under which is consumers' surplus. Alternatively, if it is not desirable to estimate the

area demand function, consumers' surplus can be calculated for each zone and aggregate consumers' surplus obtained by summing across zones. In the above linear example consumers' surplus for any zone is given by

$$P_i \left[\frac{V_{ij}}{P_i} (C_{max} - C_{ij})^{1/2} \right] \qquad (7)$$

where C_{max} is the costs at which visits becomes zero.

In deriving the value of the recreation resource, Clawson, dealing with the case of no user charge, suggested use of maximum revenue attainable by a non-price-discriminating monopolist as the value of recreation. Others who follow his suggestion include Castle and Brown (1964), Brown, Singh, and Castle (1964) and Stevens (1966). It was felt that such a method would yield a value most comparable to the value the site would have if it were privately owned. Knetsch (1964) however, clearly emphasized that the value or benefit, in an economic sense which is derived from a given use of resources, is simply the value it has for the consumer and is measured by his willingness to pay for it. Subsequently, Clawson (Clawson and Knetsch, 1966) advocated consumers' surplus rather than monopoly revenue as the appropriate measure of value under conditions of no entry fee.

The Clawson method of interpreting the trip generation equation has dominated work as the economics of recreation over the past twenty years. There has been the occasional advocacy or testing of other methods (as described in the previous sections). Also there have been advocates of other interpretations of trip-making behaviour for purposes of estimation of monetary benefits, such as Wood (1961), Pearse (1968) and Norton (1970). These latter efforts have all been found to be unsound. Norton and Wood

confused travel expenditure with benefits, rather than treating them as costs, and Pearse transferred the Hotelling assumption of equally valued visits to all visitors within each income classification. Empirical studies using the Clawson approach have been carried out by numerous researchers. Some of the studies were concerned to make refinements or widen the application of the Clawson approach. More recently there have been a number of articles criticising either the earlier empirical studies (for example: Common 1973; Flegg, 1976; Wetzstein and McNeely, 1980; Allen, Stevens and Barret, 1981 and Ward, 1984) and/or making advances in the application of the basic Clawson interpretation to more complex situations (for example: Cheshire and Stabler, 1976 and Christensen, 1983).

We can identify three broad categories of problems related to the travel-cost method. Firstly, like any other empirical techniques the travel cost method is based on several crucial assumptions and thus experiences some constraints in its application. Secondly, the advancement of the knowledge, both theoretically or through empirical work, of the factors that affect recreation participation has given rise to the problems concerning data requirement and data gathering. Finally, due to the second category mentioned above, the derivation of the demand function has encountered several statistical and econometric problems. The rest of this section will discuss the first two categories of problems.

3.4.1 Problems of Travel Cost Technique and Data Requirements

A number of assumptions have been either implicitly or explicitly made in the travel cost literature (Dwyer, Kelly and Bowes, 1977). The three major assumptions are listed below. These must be satisfied in order for the method to provide useful estimates of use and benefits.

1) It is assumed that an individual would react to an increase in entry fees in the same manner as he or she would to increase in travel costs.

2) The assumption is made that all relevant and statistically significant variables which affect trip making behaviour are properly specified in the travel cost model. Under this assumption, unbiased estimates of the slope of the area demand curve may be found.

3) It is assumed that the data points used to estimate the original model are true demand points, that is there is no unobserved demand which is unsatisfied due to capacity restrictions.

These three assumptions have been challenged both through theoretical and empirical work and the results have either advanced the travel cost method or have created yet more unresolved issues and problems. As mentioned earlier, the aim here is not to give an exhaustive review of the method and problems associated to it but the purpose is to emphasize issues that have a direct bearing on the type of data required by the method..

Monetary Cost of Travel

Monetary travel cost has been used as a proxy for price. The change in monetary travel cost has been related to the change in quantity of recreational visits. In some cases quantity of use may be related not to monetary travel costs but to travel distance. Sinden (1974) found that travel costs were not a statistically significant variable in explaining recreation use but that use did vary with distance. Distance may sometimes act as a rationing device for outdoor recreation in the same way that price does in a competitive market. When the monetary costs of travel are small,

distance may be a logical proxy for price in the travel-cost method. Merewitz (1966) and Mansfield (1971) used distance in their studies of recreation benefits in the same way that most used travel cost.

A problem with distance as a proxy for price lies in the meaning of the resulting value estimate. The unit must be something like miles per visitor day, which cannot be compared directly with monetary values. Some researchers have converted distance units to monetary units by a cost per mile multiplier. Smith and Kavanagh (1969) used 3 - 8 old pence per mile in a study of trout fishing in England. Such a procedure assumes that the marginal disutility (or utility) of time is constant and that all users incur the same monetary costs (or benefits) per mile. This matter will be further expanded in the discussion of travel time.

A more pressing issue here, however, is the derivation of the travel cost itself. The monetary cost of travel varies with the use of different modes of transport in order to reach an area. Most journeys for recreational purposes are undertaken by car; however it is possible that the distribution of types of transport will vary between zones. Mazlan (1982) in a survey of visitors to Kancing Recreation Forest reported that about 45 per cent of the visitors travelled to the area by public buses, 36 per cent by their own car, 9 per cent by motorcycles, 8 per cent by tour buses, 1 per cent by private taxi and another 1 per cent by walking or on bicycle. This was reiterated by Abas (1983) who surveyed the visitors to the same area and reported that 51 per cent travelled by public buses, 25 per cent by private cars, 20 per cent by motorcycles and 4 per cent by tour buses and taxis. Both also reported that the distribution of types of transport varies between zones of travel. Although the proportion of those

who walked or cycled to the area was small and could be ignored in the travel cost calculation without introducing appreciable bias in the estimation of benefits, the calculation of travel cost for different types of vehicle, that is, cars, buses and taxis will differ.

Generally, researchers have assumed that visitors travelled by car and then calculate running cost using published data from motoring organisations adjusted for car occupancy, e.g. Merewitz (1966); Flegg (1976) and Shucksmith (1979). In effect, these researchers are using calculated costs rather than perceived costs. One conceptual advantage of perceived costs is that they do reflect willingness to pay. Economic theory tells us that the appropriate measure is the marginal cost of a visit, that is, the extra cost that is attributable to the journey under consideration - not cost of petrol alone. So, if the willingness to pay answer includes a full share of description to their trip, that is, the "running costs" (which includes petrol, oil, tyres, servicing, repairs and maintenance), then using the perceived costs could approach the marginal cost of travel. Neuberger (1971, p.374) has theoretically postulated that "clearly if the cost were fully perceived, the price of the input would be the same as the price of travel itself". The problem of choosing between perceived and calculated values is by no means solved. The ability to estimate cost is related to the experience of using that mode of travel and a larger proportion of travellers are expected to be able to estimate cost when that mode is a car rather than rail or bus (Collings, 1974).

Mansfield (1971) has also drawn attention to the lack of travel studies that consider the effects of party size and composition. The size of the party should be taken into account for leisure travel, especially for those travelling by their own car, since this is frequently a group

activity. It would also lead to the problems of allocating travel costs between the individual members of the travel groups. There are several advantages in treating the travel group as the basic unit rather than the individual traveller. Firstly, it is easier to get group cost by each mode. Secondly, it is much easier to define a group's income than it is to define the relevant income of the individual travellers, particularly non-earners. Finally, it is likely that in many leisure travel situations the group approach will be more realistic than considering each traveller as an independent decision maker.It is also considered more realistic, particularly if the travel expenditure is derived from a single household budget. In such a situation the larger the travel group, the greater would be the impact of travel cost on the household budget. However, it seems at least as likely that the effect of relative costs in a constant per capita cost situation would be broadly similar regardless of party size (Collings, 1974). If this is so, then the appropriate travel cost for each mode would be some form of cost per head. Thus using a group approach may also involve problems of determining perceived costs, similar to those when individual travellers have to perceive the costs of travelling by public buses or bicycle. For those who travel by public or tour buses, although the decision to visit an area could be made at a group level, the payment for the fare to travel is on a per-person basis.

There are, therefore, equal merits in using either the perceived cost or the actual cost. For pragmatic reasons it would be easier to use the survey of visitors to ascertain costs rather than to calculate costs for each individual or zone. But for practical reasons it may be much more appropriate to use calculated costs because it would give consistent values for individuals or groups who travel by different modes of transport.

Common (1973) argues that actual costs should be used since the price mechanism and public resource allocation centres around actual rather than perceived costs. In this study, the values of both the actual and perceived costs will be sought. Comparisons will then be made to ascertain the variation between them.

Travel Time

Arguably the most serious problem of the travel cost method as it has been applied in the past is a consistent bias in the derived demand curve (Knetsch, 1963; Cesario and Knetsch, 1970, 1976 and Cesario, 1976). This problem arises from the assumption that distance costs are the only monetary costs. When travel time costs are not included there will be an underestimate of response to increase in price and consequently the magnitude of consumers' surplus. The estimate of the visit reduction is based on the observed relationship of decreasing visit rates of population centres at varying distances from a recreation area. When an increased monetary cost is assumed, the visit rate from any population centre is then assumed to fall to that of centres further removed. However, the lower travel frequencies of the centres at greater distances is not only due to the greater monetary costs of making the longer journeys but also to the greater time that would be involved. Consequently, reductions in visits would be overstated because an increase in monetary cost does not change the time necessary for travel. This is particularly true for the population of visitors who reside in close proximity to the recreation area. In short, if travel time values are not included, the Clawson analysis would underestimate consumers' surplus.

The effect of time is likely to be a limiting factor in the case of day use and for weekend trips (Knetsch, 1963) but there are problems in deriving the value of travel time. The most obvious difficulty of including travel time values explicitly in the benefit analysis is that time consumption has no market value, that is, whereas the variable cost of vehicle travel may be reasonably estimated from market prices for petrol, oil, tyres, etc., the valuation placed on travel time is highly subjective, varying from individual to individual and from situation to situation. Attempts have been made to include the cost of time in travel methods empirically but the results are disappointing. The fundamental problem is that travel time and travel distance are usually so highly correlated that it is impossible to distinguish empirically between their separate effects (Brown and Nawas, 1973; Gum and Martin, 1975 and Allen, Stevens and Barret, 1981).

The major issues associated with the treatment of travel costs can best be identified through the consideration of a naive cost variable (modified from Cesario, 1976).

$$C_{ij} = \lambda_1 M_{ij} + \lambda_2 T_{ij}$$

where:

C_{ij} = mean cost of travel from i to j

λ_1 = monetary cost per unit distance travel

M_{ij} = travel distance from i to j

λ_2 = travel time cost per unit time travel

T_{ij} = travel time from i to j

leading to:

$$V_{ij} = a - b(\lambda_1 M_{ij} + \lambda_2 T_{ij})$$

where:

V_{ij} = number of trips per capita from origin i to recreation area j and a and b are parameters to be estimated from observations on V_{ij} and C_{ij}.

Many researchers would face difficulties in estimating the value of travel time by not having sample observations on T_{ij}. As outlined by Baxter (1979) there are three options which can be pursued.

(i) Travel time cost can be ignored or assumed to be zero leading to an underestimation of consumers' surplus. This is the approach adopted by many researchers.

(ii) T_{ij} can be assumed to be a linear function of the observed distance travelled by area users and estimated through average speed assumptions based on results from transport studies. Given this, if we know λ_1 and λ_2 we can estimate b. Unfortunately, λ_1 and λ_2 will need to be assumed, for the near-perfect linear relationship between T_{ij} and M_{ij} prevents identification of b if only λ_1 or λ_2 is known. λ_1 in Malaysia can be obtained from the Ministry of Transport. λ_2 is taken from transport studies (e.g. Mansfield, 1971; Cesario, 1976) and is valued at between one-fourth and one-half the wage rate. Clearly the results will be sensitive to the assumed values for T_{ij}, λ_1 and λ_2. Unfortunately values obtained for general transport studies may have little relevance for leisure travel (Collings, 1974).

(iii) T_{ij} can be assumed or calculated from data other than the sample data on distance. Provided that T_{ij} shows no marked linear relationship with M_{ij} (Ward, 1984) then λ_1 or λ_2, but not both,

can be treated as a parameter to be estimated along with b. This has the advantage that λ_2 or λ_1 can be estimated from sample data; however this is so only because extra-sample data on travel time has been introduced (McConnell and Strand, 1981).

With observations on travel time it is possible to use an approach suggested by Common (1973). This is similar in spirit to the later approach of McConnell and Strand (1981). Given sample data on travel time , and provided that it is not highly correlated with M_{ij} or $\lambda_1 M_{ij}$, then the value of travel time can be estimated through an iterative procedure. By performing a whole series of regressions for different values of λ_2 and finally choosing the estimates of a and b which correspond to the regression having the smallest mean residual sum of squares, a value of λ_2 is obtained from the sample data. The prime advantages of this technique are three fold (De Serpa, 1971):-

(1) The estimated demand equation reflects, at least theoretically, the preferences of individuals as a whole. The important 'non-economic' factors, such as comfort and conveniences are therefore explicitly considered.

(2) The validity of the aggregation technique implicit in the estimation of demand functions does not depend on any arbitrary assumptions about the individuals comprising the group.

(3) Most importantly, the measure itself is compatible with the hypothesis of utility maximisation. No other measure can make that claim.

The visitor survey can specifically address itself to the question of travel time and attempt to provide adequate data for this

approach to be employed.

Journey Utility

In our previous description, it is assumed that the journey has a cost and this cost is individualy reflected by monetary and time costs. The inclusion of travel time as a cost in the demand function leads to a related and unresolved issue of how utility associated with the journey itself affects the demand function. The fundamental problem is when the journey itself yields utility directly. Such cases might, for example, arise when the visitors' motives for the journey is "pleasure motoring" (Cheshire and Stabler, 1976). Various studies have pointed to the fact that utility may not only be dependent on a particular area visit but also on the journey itself (Burton, 1966; Colenutt, 1969; Mansfield, 1971 and Lewis and Whitby, 1972). Some authors have suggested that if the visitors derived utility from the journey itself, the area demand function may be biased (Flegg, 1976 and Cheshire and Stabler, 1976). To identify the direction of bias the cost variable may be amended to

$$C_{ij} = \lambda_1 M_{ij} + \lambda_2 T_{ij} - \lambda_3 M_{ij}$$

where

λ_3 = utility per unit distance.

If λ_3 is positive and constant (ie. the journey is pleasant and total journey utility is a linear function of distance) the travel cost technique will overestimate benefits for much the same reasons that the failure to incorporate $\lambda_2 T_{ij}$ underestimates benefits. If λ_3 declines with M_{ij} the extent of the inherent overestimation is reduced. If λ_3 is negative benefits are underestimated.

Unfortunately, the state of the art prevents the assignment of a monetary value to λ_3. In any event the issues are more complex than the above expedient of incorporating $\lambda_3 M_{ij}$ into the cost variable. Gibson (1978, p.79) concludes that "such features will need a large investment of research effort if they are to be successfuly incorporated into the distance decay framework for estimating monetary benefits". For the purpose of this study, the utility from the journey itself cannot be treated in a quantitative manner. Nonetheless, the survey of visitors will still attempt to obtain descriptive data on the utility of the journey.

Multi-Stop or Purpose Trips

Costs can only be assigned to a recreational area when the journey is made solely for the purposes of enjoying the attributes of the area. But many trips involve stops at several recreation or non-recreation areas. This manifests itself not only in the fact that many journeys do not take the shortest routes, but also that many visitors do not plan to visit a specific area or place. A simple determination of total trip expenses of each group would produce a large overestimate of willingness to pay (Beardsley, 1969). If an area which is visited is only one of a number visited on one trip, or if the journey is for other purposes, for example holiday or business, then costs cannot be legitimately assigned to the area.

This problem is pervasive for some activities. Cheshire and Stabler (1976) did a relevant case study of visitors to Uffington White Horse in Berkshire. They defined visitors as being in one of three categories (a) "pure" visitors who were site-oriented and whose journey was pure cost, (b) "meanderers" who derived utility from the journey and (c) "transit

visitors" whose journey was made for another purpose but who called in at the site, at presumably lower incremental time and money costs than implied by consideration of their origins. Cheshire and Stabler applied a conventional Clawson analysis to their entire visitor data and then, as a second exercise, applied it only to visit data for the "pure" visitors. Forty-five per cent of their sample were classified as pure visitors, but the surplus estimates were only 27 per cent of that estimated for all visitors, using a log-linear trip generation function.

Cheshire and Stabler's particular concern is just one aspect of a large class of behaviour which most threatens the basic foundations of the travel cost method. However, no researcher has comprehensively dealt with the full range of possible cases. Firstly, visitors may not only visit several areas on the way to another area but may also visit other areas on their way back. This is a case of multistop and multipurpose trips.

Secondly, visitors may be staying nearby on holiday or they may be visiting friends and then decide to visit a recreation area in that locality. The multiple destination problems are especially critical for national recreation sites such as national parks (Haspel and Johnson, 1982). Christensen (1983) has found that using the traditional Clawson method would overestimate consumers' surplus. The proportion of those on holiday may be large, as in the case studied by Christensen, where 75 per cent of the visitors to Gwydyr Forest (Snowdonia National Park) in North Wales interviewed were on holiday at the time of their forest visit. The revised Clawson method takes this into consideration by basing the visitor group's travel cost (willingness to pay) on a formula based on the mileage cost, home distance, holiday length, and length of stay in the forest.

This results in smaller travel cost than the traditional method and, thus, a smaller consumers' surplus.

Thirdly, the visitor may stop at several places, for example, on transit or to pick up a friend, and then travel to the already chosen recreational area. In this instance the trip is multi-stop but single purpose, that is, a planned visit to a recreation area.

The principal problem for the cases mentioned above is the way, need be, to apportion visit costs (travel, time and others) to the area under investigation. Visitor questionnaires can investigate the proportion of multi-stop trips to the total trips to gain an insight as to why the stops are made.

Time Spent at the Area

There are two aspects of time spent at the area. One is that of opportunity cost of time spent at the recreation area and the other is the effect of length of visit on the estimation of recreational use.

Pearse (1968), McConnell (1975), Milam and Pasour (1970) and others prescribe that in addition to travel time costs, we should also consider the opportunity cost of time spent at the recreation area. This time would have been used to earn income or to pursue other recreational activities. The opportunity cost of time for visitors is their forgone income on the value of alternative recreation. It is of course conceivable that opportunity costs are zero when visitors have fixed working hours and would not have participated in other recreational activities. Milam and Pasour (1970) ignored the recreation forgone element of the opportunity cost of time and used a dummy variable to handle income forgone. Opportunity cost

was found to be significant at the 0.01 level.

Cesario and Knetsch (1976) argue that when people decide to spend time at a recreation area, they first decide on the activity to be pursued during their leisure time and then allocate a fixed amount of leisure time to it. The decision on precisely where to visit is determined by the relative attractiveness of areas and the travel costs of reaching them. Given this, time spent at any one area does not determine the demand for the area. This argument is acceptable in the case where the visit is conducted on a weekend or on public holidays where there is no income loss (Keith and Workman, 1975). Moreover it is paid leisure time. In fact, even if the visitor could have decided to work on those days instead of visiting an area, the benefits obtained through the time spent at the area would be cancelled by the envisaged cost. As regards on-site expenditure, Mendelson and Brown (1983) argue that expenses incurred at the site, including on-site time, should not be included as costs to estimate the value of a site because those expenditures are not related to the individual's marginal cost of visiting the site.

Clearly, there are other issues which might also be considered, such as where constraints vary between individuals over time zones and how the nature of the area and its access influences the possible trade-off between time costs (both on-site and travel) and money costs. In addition to these conventional issues there is the significant problem of attaching a monetary value to the scarcity value of on-site time, should this be warranted.

There is, however, a relevant substitution between average travel costs and the length of the visit. The problem here is that the travel

cost method assumes that the length of visit does not vary between zones, thus allowing us to impute values to low cost visits from higher cost visits. If the length of stay varies appreciably, then we are not dealing with homogeneous entities.

There is also the problem of bias due to the length of visit. This could be shown from a random sampling of visitors, whereby the visitors who stay for a longer time period have a higher probability of being sampled than the ones who stay for a shorter period. This problem has been mentioned by Lucas (1963) who described the implications of calculating an average length of stay. He points out that it is neccessary to weight by

$$1/L_j$$

Where: L_j = the length of stay for visitor j.

In the estimation of consumers' surplus by the travel cost method problems arise if stay time is related to travel distance. If a positive correlation is found, that is, people from further away stayed in the forest longer, it would lead to an overestimation of the number of visitors from the further distances, thereby pushing the trip demand curve upwards.

Given the unlikely relevance for the inclusion of the opportunity cost of time on-site and on-site expenditures, these aspects will be ignored in this study. The survey of visitors will address itself to the quantification of the length of stay merely in order to show its relationship with distances travelled.

Congestion

It is shown that crowding costs imposed by joint users imply significant changes in resource valuation. When congestion exists the

travel cost technique may need modification. The issue and those related to other aspects of congestion has been explored by Fisher and Krutilla (1972), Anderson and Bonsor (1974), Wetzel (1977, 1981), McConnell (1977, 1980), Cesario (1980), Smith (1981), Cicchetti and Smith (1973), Price (1979, 1981, 1983), Shelby (1980) and Chambers and Price (1986).

It has been argued that demand price is a function of the number of visits and degree of crowding. Anderson and Bonsor (1974) explains this by the use of several diagrams. The expansion of total visits leads to a displacement of constant-crowding demand curves in the downward direction (Figure 9). Each constant-crowding demand curve Dc Dc denotes the demand price for alternative numbers of visits on the fiction that crowding is constant. As crowding increases there is a move to a lower Dc Dc curve and, since crowding is measured by the number of visits, increasing visits trace out the demand curve DD consisting of a series of points on the unobservable Dc Dc curves. In the absence of crowding, DD is the only relevant function and the optimum price occurs at b, the intercept of DD and M_c (marginal congestion cost), where the joint consumer-purchaser surplus (equal to the area abc) is a maximum. With the introduction of crowding effects, the observed demand curve DD loses its allocational significance. The consumers' surplus must be measured under the Dc Dc curves since the intra-marginal visitors' willingness to pay for consumption units depends, with crowding, on the actual total number of visits to the resource.

The above description is similar in spirit to that of earlier work by Fisher and Krutilla (1972) on the theory of optimal capacity of resource-based recreation facilities. They have shown that there exists a discrete

but continuous system of demand and supply curves yielding the demand function, similar to that of DD as shown in Figure 9 as a result of different levels of crowding.

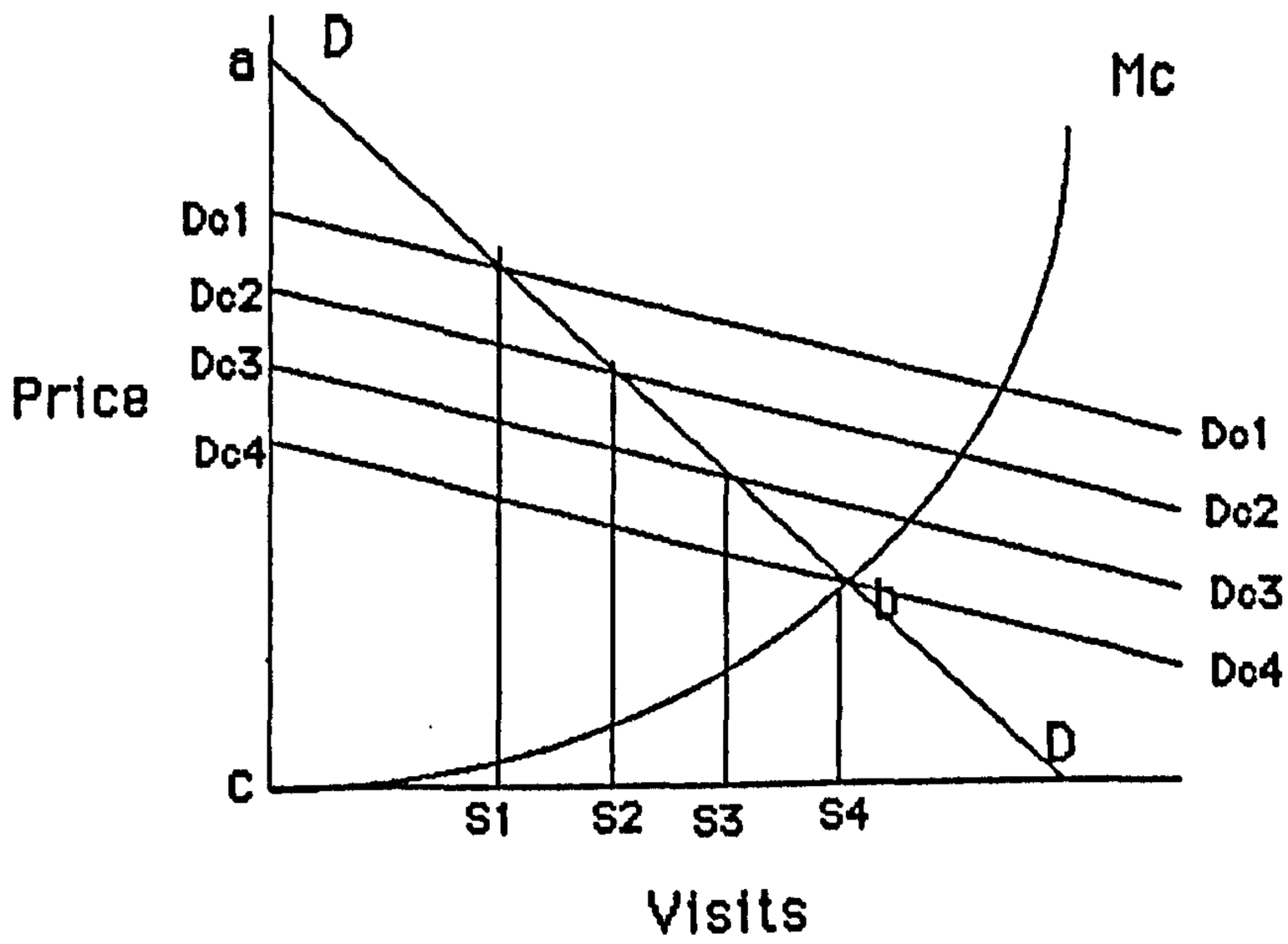

Figure 9. Demand Curves Under Different Levels of Congestion

McConnell and Duff (1976) extend the explanation of congestion and show that the Clawson zone method underestimates the total benefits of a recreation facility when there is an excess of demand at the site. They postulate that by the inclusion of a function of the visitor's perceived probability of admission, the response to price changes will be different from the response to travel and transfer costs under conditions of excess demand and that this will underestimate consumers' surplus.

Wetzel (1977) argues that when congestion does not result in entry exclusion, the travel cost method will always underestimate the benefits

provided by the recreational resource. Wetzel's (1977) argument may be summarised as follows: "the demand curve ST in Figure 10 represents the aggregate recreation demand at a given site for a given level of congestion A^*. If the entrance fee is increased from P(0) to P(1), a purely theoretical demand curve will shift outward to S'T~, because the increased fee reduces the level of congestion. The curve traced through points $A^*B^{\sim}$ represents a congestion corrected demand curve, which is more inelastic than the demand curve derived by the normal application of the travel cost method - and the total value figures calculated from the consumer surplus under it will always be greater than the consumer surplus figure calculated from the pure Clawson curve" (Wetzel, 1977, p. 244).

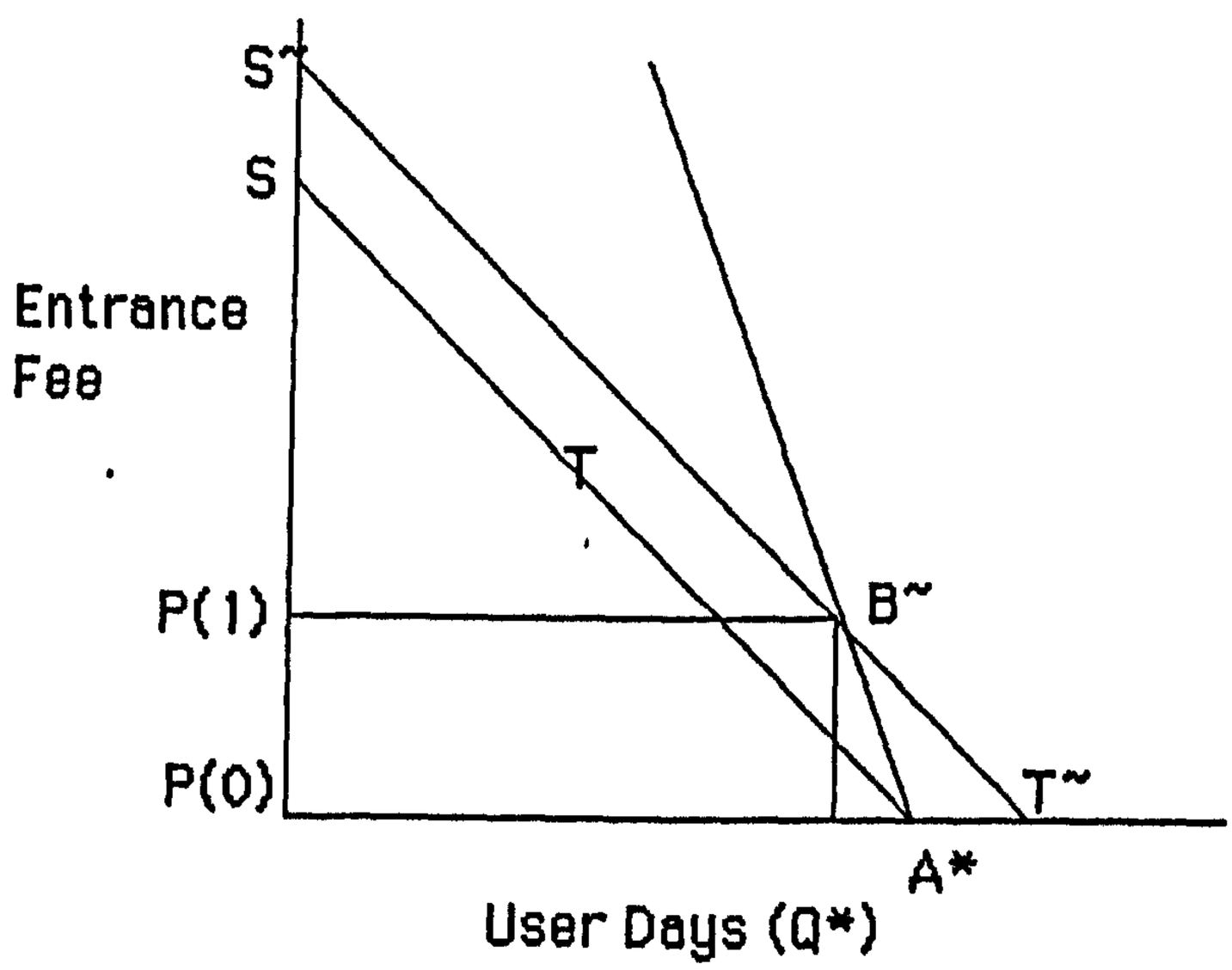

Figure 10. Aggregate Recreation Demand Given a Level of Congestion

McConnell (1980) argues, however, that the consumers' surplus under the congestion-corrected demand curve exceeds the maximum amount that a discriminating monopolist could extract from the consumers. Consequently, the area under A^*B' overestimates the benefits of the recreation area. This is because "each individual's surplus is calculated with congestion assumed, whereas each point on A^*B^* represents a different level of congestion. In order to estimate the benefits of the site, it is necessary to hold congestion constant" (McConnell, 1980, p.7).

The problem that remains is how to measure the value attached to the effect of crowding. Congestion in the context of intensive recreation may be defined as a situation where additional visitors impose a cost on others. This cost consists of the reduced quality that will be experienced by the earlier visitors to the area in so far as each additional visitor will add to overcrowding and possibly a reduction in the availability of space in the area. Vaux and Williams (1977) are the earliest proponents of the use of indirect methods, such as inferring the willingness to pay, to measure the extent of cost. They claim that conclusions based upon influences made from observed economic behaviour are likely to be more defensible than those based on direct methods. Price (1979) also makes the point that in this kind of study, the instinct of the recreationist is to use the Clawson method of analysis. However, Price (1979) contends that such a use is inappropriate, for the problems of applying Clawson's techniques to evaluating congestion are even greater than for other phases of the recreation analysis. Price (1979) argues that if comparison is made between "willingness to pay" for two sites of contrasting levels of crowding at a certain season, differences in other site characteristics may contribute to the observed variation in the visitors' "willingness to pay".

If the comparison is on one site (as in the case in Vaux and William's 1977 study), at different times of the week or year, seasonal characteristics or visitor populations with a variety of leisure opportunities or tastes may account for the observed difference. In either case, groups of different socio-economic status may be the predominant visitors in crowded or uncrowded conditions.

Another problem with the Clawson methods identified by Price is that if the Clawson method attributes a greater "willingness to pay" to visits made in uncrowded conditions, the distribution of origins for off-peak visits must shift towards more distant population catchments. But there may in fact be a spatial limit where the Clawson method would produce questionable results. In many cases, as the distance from the site increases, the origin zones represented become diffused with visits recorded from some quite distant sites, and no visits are observed from units in intermediate distance zones (Smith and Kopp, 1980). This weakness of the travel cost method leads to a smaller willingness to pay being recorded than might otherwise be expected. Price (1979) feels that, considering the weakness inherent in Clawson's ideas and thus in those of Vaux and Williams, doubt must be cast on the conclusion of Vaux and Williams (1977) that congestion costs may not be very significant.

The weaknesses in the methods could easily cause a masking of the genuine extra 'willingness to pay' that may exist for uncrowded conditions. Price (1983) makes the further point that, 'the demand for recreation, if it is has been derived by Clawson or questionnaire methods eliciting willingness to pay, is likely to increased cost due to substitute sites'. Because demand is thus truncated, substitution being the major contributing

factor, 'it fails to state the maximum willingness to pay, and hence does not give a true guide to what may happen when sites become more restricted or expensive'.

Price (1979), among others, argues strongly for the use of direct questionnaires to elicit willingness to pay at different congestion levels. This method, as previously described, is not without its faults and poses immense difficulties in its application in the field, especially if it is to be considered for this study. The broader scope of this study deems the direct method as inappropriate. It should also be appreciated that the case for amending the simple travel cost method to take into account the effect of congestion at different levels has not been fully established. In particular Anderson (1980, p. 405) argues convincingly that the Clawson technique is the appropriate means of estimating ex post benefits. "The Clawson demand curve is one of the family of KK demand curves; specifically it is the one for that level of congestion that existed when the travel cost and attendance data were collected (that is the individuals choosing to visit the site presumably knew the travel costs, travel time, and existing level of congestion when they made their decision to utilize the site)".

In the light of the above discussion, it is recognised that congestion does have some effect on the use of the recreation areas. It is also accepted that the cost of congestion is reflected in the decision to visit the area. The questionnaire survey adopted for this study will try to assess the perception of crowding by the visitors in the effort to determine whether there exist any differences or similarities of this perception among the varying natural characteristics of the recreation areas under study and those of the other competing forest recreation

resources. Therefore there is a possibility to include the revealed perception of crowding in an index of attractiveness for the areas under study and those of competing areas.

Competing Areas

It is one of the main assumptions of the travel cost method that all relevant and statistically significant variables which affect trip making behaviour are properly specified. Related to this, errors in estimation of monetary benefits for single-site studies may arise from two main sources: (i) the absence of significant further independent variables which shift the demand curve for the whole recreation experience for individual zones, and (ii) bias in estimates of the parameter of costs caused when significant independent variables are excluded, which are themselves intercorrelated with travel cost (Johnston, 1984).

Two variables which we would expect to have important effects a priori are income and some measure of competing recreation opportunities (Gibson, 1978). Reduction in the number of visits to a particular area at various travel distances is due to: (i) an increase in costs, and (ii) availability of subsitute sites. Concerning the latter, largely because of the difficulties of collecting information on the supply of other facilities, their costs and relative attractiveness, consideration of substitute sites has largely been ignored in single site demand estimation models. The implicit assumption is made in such studies that the availability of alternative sites or activities has no significant influence on the relative visitation rates from different zones. The few studies that have included alternative sites have found their influence not to be significant, for example Smith (1971).

The failure to account for the influence of substitutes has been a major source of criticism of the Clawson techniques as applied to single sites. The most obvious influence is that the further away an individual lives from a given recreational area, the greater is the probability that there exist other areas of similar quality and accessibility. The availability of alternative sites will therefore affect relative visitation rates. Omission of variables to indicate the substitution effects will lead to either an over- or under-estimation of the number of visits. The bias would depend on the degree of correlation between the omitted and retained variables. If there is a positive correlation between substitutes and distance (for distant and closely located visitors), the slope of the estimated demand curve will be steeper. In that case, the observed demand curve may well be more elastic than the true demand curve.

On this point, Gibson (1978, p.82) is relatively optimistic. He says, "the dangers from excluding variables for income and competiting opportunities are minimal providing the data are not highly aggregated. This is because there will in most cases be little collinearity between travel cost and excluded variables using disaggregated data". This is also similar to the conclusion of Brown and Nawas (1973) and Gum and Martin (1975). However, Allen et al. (1981, p.179) caution that " it would be exceedingly difficult in any study to obtain a sufficiently rich set of data where collinearity will not be a severe problem, even when we resort to individual observations".

Therefore, with respect to the problem of variable omission or admission, each case and situation should be treated on its own merits. With respect to this study, the visitations to forest recreation areas

originate from a region with dispersed population centres of varying population sizes to forest recreation areas that are equally well dispersed in terms of location within or outside the chosen region. It is obvious that there are several recreation areas that a group of visitors would choose to go to. This should have some effect on relative visitation rates for areas under study and it could well be correlated with distance, if not travel cost. The combination of this effect and the relative attractiveness of different forest recreation areas would suggest that it is prudent to investigate the alternatives open to visitors in the region. The survey of the visitors at the chosen recreation areas will attempt to identify other recreation areas that the visitors are aware of and have visited and to assign a travel cost to the alternative sites.

The next issue to be discussed is the importance of the quality of an area in attracting visitors.

Quality of an Area

The main component of a recreation area system is the recreation area itself. An area is characterized by certain physical characteristics, service facilities and a range of recreational activities allowed by those characteristics and facilities, all of which determine the park's attractiveness to potential recreationists. The emphasis on site or supply factors as determinants of usage follows from the belief that outdoor activities are the primary focus of outdoor recreation experience. Perloff and Wingo (1962) have succinctly stated the relationship between activities and site characteristics.

A forest recreation area situated near an urban setting may be viewed as a recreation centre that offers not only a range of outdoor activities

for the population surrounding it but perhaps also as the only place for the visitors to experience such a setting, due to its closeness. For visitors who are truly activity-orientated, a recreation area's attractiveness will partially depend on the activities that can be undertaken. The development of a measure reflecting a park's attractiveness is a major and important portion of this study.

The recreation experience and activities participation are related to the recreation area or setting. The area is considered favourable if it can satisfy the visiting public's various recreation preferences. The existence of recreation opportunities and the degree to which they can satisfy preferences are assumed to be dependent upon the characteristics of the recreation setting. Recreation settings are defined as the combination of physical-biological, social and managerial conditions that gives value to a place (Clark and Stankey, 1979). The physical-biological setting involves features such as the vegetation or topography of an area. The social setting refers to such things as the number of other people present and the kinds of recreational activities that occur. The management setting refers to the level of development in an area or to the rules and regulations that are in effect.

Mansfield (1969) states that the most important factors influencing the number of trips to a beauty spot or holiday area made from a particular town are:

(a) the relative attractiveness of the resort compared with other resorts accessible from the same town;

(b) the money cost of travel to it and other resorts;

(c) the journey time expended in reaching it and other resorts;

(d) the population of the town; and

(e) the level of car ownership in the town.

He indicated that factors (a), (b) and (c) were interrelated. In another study he also found that thirty-six per cent of visitors to the Lake District placed the highest priority on the natural attractiveness of their journey, with less emphasis on the speed of the trip. That natural beauty is important is indicated by the efforts made by researchers to take this factor into consideration by development of an attraction index (Van Doren, 1967; Tidemann and Milstein, 1966; Cesario, 1969 and Ellis, 1967) to overcome the difficulties inherent in measuring the qualities of a recreation area.

The importance of the quality of an area, the attractiveness of the recreation setting and the overall value of the visit to an area are well documented. However, the concept of quality or attractiveness of an area are looked at in various ways.Perhaps a conceptual framework relating these almost synonymous words together will help to explain how these variables are measured.

The term "suitability" in the landscape planning literature is often used to connote a quality dimension usually accompanied by a specification of minimum conditions deemed essential for the relevant recreation activities. These characteristics or quality components include incompatible land uses, environmental factors, opportunities for users to experience challenge and excitement, a variety of opportunities for primitive and unconfined types of recreation or abundant and varied wildlife and so on. Again this concept of suitability is fraught with problems of how one should look at it and also on how one should measure it. One way of looking at it is to consider an elementary focus of

suitability for a simple activity (Shechter, Enis, Reiner and Tzamir, 1981). Suitability could be related to a specific recreation activity or cluster of related activities or a basket with a given mix of activities. It could not constitute a general, overall quality measure of the site which, of course, would be meaningless in the context of recreation. For example, in the case of picnicking, families tend to seek absolute levels of privacy more than they do in the case of hiking - up to a point, of course (Shechter et al., 1981).

This suitability-quality concept that a good or a service is valued for the attributes or characteristics it imparts in consumption (Lancaster, 1971) cannot be similar for all socio-cultural-economic backgrounds. It has been recognised that, within a given recreation context, users differ in the evaluation of the landscape resource base. They differ in their final evaluation of the relevant recreation context, as well as in the mental processes which induce the evaluation (Edwards, 1966; Craik, 1968, 1972; Driver, 1972; Appleton, 1975; Groves and Kahalas, 1976; Laurie et al., 1976). Although the attractiveness of a site can be interpreted in many ways and poses a great difficulty in measuring the elements that are considered to constitute attractiveness there is very little doubt that it is an important criterion affecting the consumption of an area. This has been expressed by many researchers in their search to portray a more meaningful expression of the consumers' preference for a visit to a particular site. Baron and Shechter (1973) state that the choice among competing recreation areas depends on, among other factors, the interacting influences of distance and attractiveness. Recreation areas having similar facilities but not equidistant from a population centre attract people in an inverse relation to their distance. However dissimilar recreation

areas, equidistant from the population centre attract recreationists in direct relation to their relative attractiveness.

Although the opinions of the visitors are determined by their own personal backgrounds, recreation areas' characteristics should also enter into the demand schedule, since they influence the quality of the recreational product. This specifically applies to areas of unique natural or scenic merits, as well as to the number and scale of the various facilities provided at any recreation area (Hill and Shechter, 1971). In the context of the Malaysian recreation forests, this point is particularly relevant since most of the existing recreation forests are developed because of their relatively outstanding natural characteristics. Moreover, recreation forests near urban centres are relatively scarce in supply so that their mere presence can be considered unique. Therefore it is not surprising that the attractiveness of a site is often considered to be a quantifiable variable that can be included in a visit model. That is, attractiveness and price are seen as interacting to encourage or discourage visits, thereby making the number of visits a function of two variables (Glover and Rogozinski, 1982). Seen in this manner, attractiveness means 'drawing power' and can be described as the interface of user preference and utility functions with existing recreation facilities and quality (Cesario, 1969). We imagine two kinds of preferences - one for natural features, such as waterfalls and hot springs, another for man-made facilities such as roads and swimming pools. Total attractiveness is some complex combination of the two types.

Methodologies of measuring attractiveness have been devised that depend largely on the physical site characteristics of a particular

recreation area - such as lake size, size of swimming area, miles of hiking trails, number of campsites, number of parking places or distances from population centres - to determine the amount of recreation use to expect at a specific recreation area. The collection of data on variables which reflect a choice of aesthetic conditions was traditionally a task of either a landscape architect or recreation planner. Price (1978, p.39), argues that this tradition is based on the assumption that "the profession knew better than consumers the satisfaction that arises from aesthetic experience". This attitude is prevalent in the field of landscape planning (Fines, 1968; Betters and Rubingh, 1978). In the field of outdoor recreation, various researchers have made the effort to develop an attractiveness index. Such an index is based on the premise that all trips emanating from a residential area are attracted or 'pulled' to various land uses in accordance with certain empirical values (Voorhees, 1955). A conventional approach would have been to employ some size-related variable such as total acreage which research has shown to be a measurable surrogate for attractiveness (Cesario 1975). Cesario and Knetsch (1976) collected data on several related variables (called "proxies") which were used to derive an index of attraction. The two main variables were the apparent utility of having a particular activity available and the quality of the facilities for an activity which was subjectively rated by a team of researchers on a scale ranging from 1 to 10, and the sum was taken over all activities considered.

Van Doren (1967) developed his index by factor analysis of 55 variables independent of distance to yield a measure of attractiveness of parks used by campers in Michigan (based on the extent and quality of a combination of natural and man-made resources). The index took into

account activity preferences and was succesfully synthesized into a travel model to analyze camping spatial structure. The Michigan outdoor recreation study (Tiedemann and Milstein, 1966) incorporated a capacity multiplier for each facility into a model which included indices of availability and quality for various recreational facilities. The sum of the variables and their coefficients yielded an overall index of park attraction. Another formulation of the attractiveness index (Cesario, Goldstone, and Knetsch, 1970) simply considered the type, quantity, and quality of facilities offered and was defined as a sum of products. The "utility" of having an activity and the quality of the activity were multiplied and this product was added for a set of activities.

The methods employed to assess attractiveness of an area described so far are rather straightforward and conventional. They originate from the physical characteristics of the area, natural or man-made, and are assessed by the researcher concerned. There is, however, another method to estimate or measure the quality of outdoor recreation for an area, which involves the public in the planning process in an active role, and not merely in the passive role of being asked to react to the complete, final product of this process. This approach recognises the perceptive, cognitive and other mental processes of the consumers who integrate and translate these resource attributes into an explicit preference expression. The final outcome of this process is a statement by the subject (whether elicited by a questionnaire, or implied by his overt behaviour in actual situations), reflecting the total experience and stating the degree of perceived "suitability" of the site for a specific recreational activity (Shechter et al., (1981).

Baron and Shechter (1973) used a simple score-sheet approach in arriving at an attractiveness value for the parks, where a park's score was taken as the weighted average of individual scores, based on ordinal scales, for each of the various factors contributing to the park's attractiveness : landscape, shade, availability of parking space, picnic spots facilities, water faucets, national and historical importance, etc. The index was then taken as the park score divided by the total score for all the parks. There remain, however, the problems of deciding variables to be included and weighting such factors as park size, aesthetic qualities, distance, type of facilities, crowding and alternative recreational opportunities (O'Rourke, 1974). Although it has been stated earlier that the users differ in their evaluation of the resources, the recreationists' subjective measure of quality characteristics is still an important input in the planning of the recreation area.

The concept of "attractiveness" involves elements of recreational travel and participation such as distance (perceived or actual distance travelled), satisfaction with facilities and services, satisfaction with overall trip and travel, accessibility, levels of crowding and natural resources availabile for selected activities. It would be interesting to see how these elements fit into the concept of "attractiveness". It would be equally gratifying to assess how the quality of an area plays its roles in drawing the users, either existing or potential, to the area concerned. Attractiveness is supply-related as well as being perceived by the visitor. A combination of the supply elements and the perception of the users of these elements could perhaps provide an adequate measure of the quality of an area.

This study will attempt, in a modest way, to assess the quality of the forest recreation areas under study and that of the other competing areas. An attractiveness index is sought based on the perception of the visitors of the facilities available at the site and other related attributes as they relate to trip and travel. This is achieved through rating on a scale that assigns popularity weights to the various attributes of travel, facilities and activities.

Income Effects

The effects of other socio-economic variables on demand could be indicated by the income variable. Seckler (1966) points out that the slope and position of demand curves are affected by the incomes of the consumers as well as by the utility they obtain from a recreation experience. The points obtained from different zones might be on different demand curves representing users of different income classes. Differences between demand curves (and consumers' surplus) for various recreation areas might result more from differences in incomes of the users than from differences in utility. Stoevener and Brown (1967, 1968) show how demand curves from this method could be adjusted to correct for income effects. Wyckoff (1974) concluded from the study of the effects of quality trade-off on existing budgets that income level not only influenced the choice patterns, but also the value of one variable relative to another; with increasing income, "time" or "convenience" factors became less attractive and "beauty" or "serenity" became more attractive. Sinden (1974) found that income affected some recreation activities but not others.

There are, however, other single site studies that seem to have had much difficulty in successfully including the income variables. Meretwitz (1966) did not find mean income of zones consistently "useful" in

explaining visit rates at Lake of Ozarks in Missouri. Also, for most of the cases reported by Flegg (1976), the mean income of households in zones was not significant, and in all cases mean income of the visitor was not significant. Beardsley (1969) used an average visitor income for each residence zone in the demand regression equation and showed the income variable to be statistically not significant as a determinant of use rates. He concluded that the evidence suggests that the "marginal utility of the recreation experience" was the main determinant of use rates at the area and that the "marginal utility of income" was not significant.

There are problems in trying to isolate the effect of income on recreation participation and this could be a result of over-aggregation of the data set and multicollinearity that exists between variables. Brown and Nawas (1973) noted that the aggregation of data by zones masks individual differences in behaviour. This effect is beneficial for prediction or projection of aggregates, because the coefficient of determination figures are higher and the models behave more predictably. But individual unaggregated data are preferable for investigation of the effects on behaviour of variables like income or a quality characteristic. However, as cautioned earlier by Allen et al. (1981), resorting to individual observations to overcome the problem of multicollinearity requires the existence of a rich set of data.

Because of the divided opinions and differing conclusions on the inclusion of socio-economic variables, particularly income, in the demand model, "an analyst must therefore consider the kind of thing being valued and determine whether income may have a significant effect on his results or not" (Sinden, 1979,p.373). The decision to include socio-economic

variables in the demand analysis for this study is prompted by the evidence of earlier site visitor surveys on the recreation area under study, which indicated that a predominant number of visitors were from the lower income groups (Mazlan, 1983 and Abbas, 1982). It would be interesting to see whether the use of forest recreation areas in the region under study is a phenomenon restricted to and favoured only by the lower income groups. This questionnaire survey would seek data on the socio-economic characteristics of the visitors. Besides the data on income, other variables like sex, education, age, ethnic groups and family composition could be used to reflect the effects of tastes and preferences in the use of forest recreation areas.

3.5 CONCLUSIONS

The main objective of this study is the quantification of existing level of use of three forest recreation areas within a region. To achieve this, information on the nature of travel and use of the areas needs to be obtained. Such descriptive data can only be appropriately gathered through an on-site survey questionnaire. The flow of visitors emanating from the regional population who visit these areas needs to be identified and specified in a structurally sound demand function. The demand function should take into account a priori considerations of factors or elements that could contribute to the propensity to visit the areas.

Given the wide consensus that visits to the recreation areas are an embodiment of both economic and non-economic reasons, a windfall gain could be obtained if the analysis of the recreational use encompasses the elements of cost and benefits. This prompted the search for a method to achieve both the estimation of use and the economic value attributable to the recreation area concerned. The travel cost method is felt to be the

most appropriate means of quantifying both area use and consumers' surplus. Attention is focused on those issues that have a bearing on the data requirements of the method (computational and procedural issues which are dealt with in chapter 7). In particular, the problems of monetary cost of travel, travel time value, journey utility, multi-stop or purpose trips, on-site time, congestion, competing sites, quality of an area and income of the visitors are identified and briefly described. It is felt that the issues of monetary cost of travel, travel time value, journey utility, multi-stop/purpose trips, competing sites and the quality of the areas could be addressed by the on-site survey of the visitors. On-site time value and expenditure are not viewed as being relevant in the context of area-specific recreation, especially where the visitation pattern is more prominent on a weekend. Congestion, on the other hand, is felt to affect visitation to an area but the estimation of congestion cost is beyond the scope of this study. The treatment of congestion is hence confined to its contribution towards the attractiveness of a particular area.

The use of a structural demand function to explain and estimate recreation use is widely accepted. It is only when the demand function is used to estimate the economic benefits of an area, as in the case of the travel cost method, that many researchers have been very dismissive of the technique. However, this tends to be in circumstances where estimates obtained from single site studies are used to make prescriptive judgements as to the specific effects of change in resource use or management (Vickerman, 1974). Scepticism also arises when the demand function is not properly specified based on theoretically sound concepts or inadequate consideration is given to all probable variables that affect recreation use. This is, however, common to most empirical work and is a difficulty

that needs to be overcome. A priori expectations of the nature of forest recreation visits in the context of this study would suggest that some of these constraints on the use of the travel cost method are not operative or can be obviated by the use of appropriate sample data obtained through a well conceived and administered questionnaire survey.

CHAPTER 4

THE AREA UNDER STUDY AND QUESTIONNAIRE SURVEY

4.1 Introduction

4.2 Description of the Region and Recreation Areas

4.2.1 The Region

4.2.2 The Recreation Forests

4.3 The Visitor Survey

4.3.1 Questionnaire Design and Survey Organisation

Field Reconnaisance and Pilot Survey
The Interview Survey

4.3.2 The Interview Response

4.4 Data Preparation and Analysis

4.5 Conclusions

4.1 INTRODUCTION

This study is intended to satisfy several objectives stated in the first chapter. It is mainly the current absence of a good set of comprehensive, compiled information on forest recreational use patterns, user attitudes and behaviour and recreational value that prompted this study. It is felt that the kind of information which this study aims to produce would have a valuable role to play in recreation policy-making, recreation planning and site management in Malaysia.

The success of this study depends to a large extent on the information gathered from the visitor survey. Given the nature of the study, it was decided that the survey should be conducted on more than one existing recreation area, all areas being in the same region. It is hoped that in this way the information gathered will satisfactorily reflect the various patterns of use emerging from the particular region chosen. Also, the recreational attitudes of the visitors to the different areas surveyed could provide a more comprehensive data base for further analysis. The importance of the selection of the region for this study and the ensuing field survey cannot be overemphasised, as it is intended that the results will be an indication of the features of forest recreational use prevailing around a major urban area. In this case, the author is quite fortunate because there exists a relatively accessible region which reasonably satisfies the necessary conditions for this study. This region encompasses the most developed and heavily populated states in Peninsular Malaysia, where, consequently, there is substantial pressure on the use of recreation forests on its periphery.

This chapter consists of several parts. Firstly, some description will be given of the geographical setting and population characteristics of

the region in question. Features directly related to recreational travel will also be described in order to justify the choice of the region. Secondly, a description of each of the recreation forests chosen for the study will be given in terms of size, location, demographic characteristics of the population surrounding it, and the presence of natural features and man-made facilities which reflect the area's present and future recreational use potential. Thirdly, the on-site questionnaire survey will be described, taking into consideration the practical difficulties met in attempting to ensure both the optimum use of the financial and manpower resources available and the gathering of appropriate and reliable information. Lastly, this chapter will briefly report on the number of interviews obtained and on how the gathered information was prepared for analysis.

4.2 DESCRIPTION OF THE REGION AND RECREATION AREAS UNDER STUDY

4.2.1 The Region

The region chosen for this study encompasses two of the most heavily populated states in Peninsular Malaysia, the state of Selangor and the Federal Territory (Figure 11). Whilst the Federal Territory is predominantly an urban setting, the state of Selangor is more diverse in terms of its geographical setting and human settlement. In general, the region is most heavily populated at its centre (i.e. the capital city, Kuala Lumpur) and the population decreases as the distance from the centre increases.

An important feature of the region is the presence of the Kelang Valley which starts from the south-west edge of Kuala Lumpur and stretches to the town of Kelang near the coastline. The Kelang Valley is the most

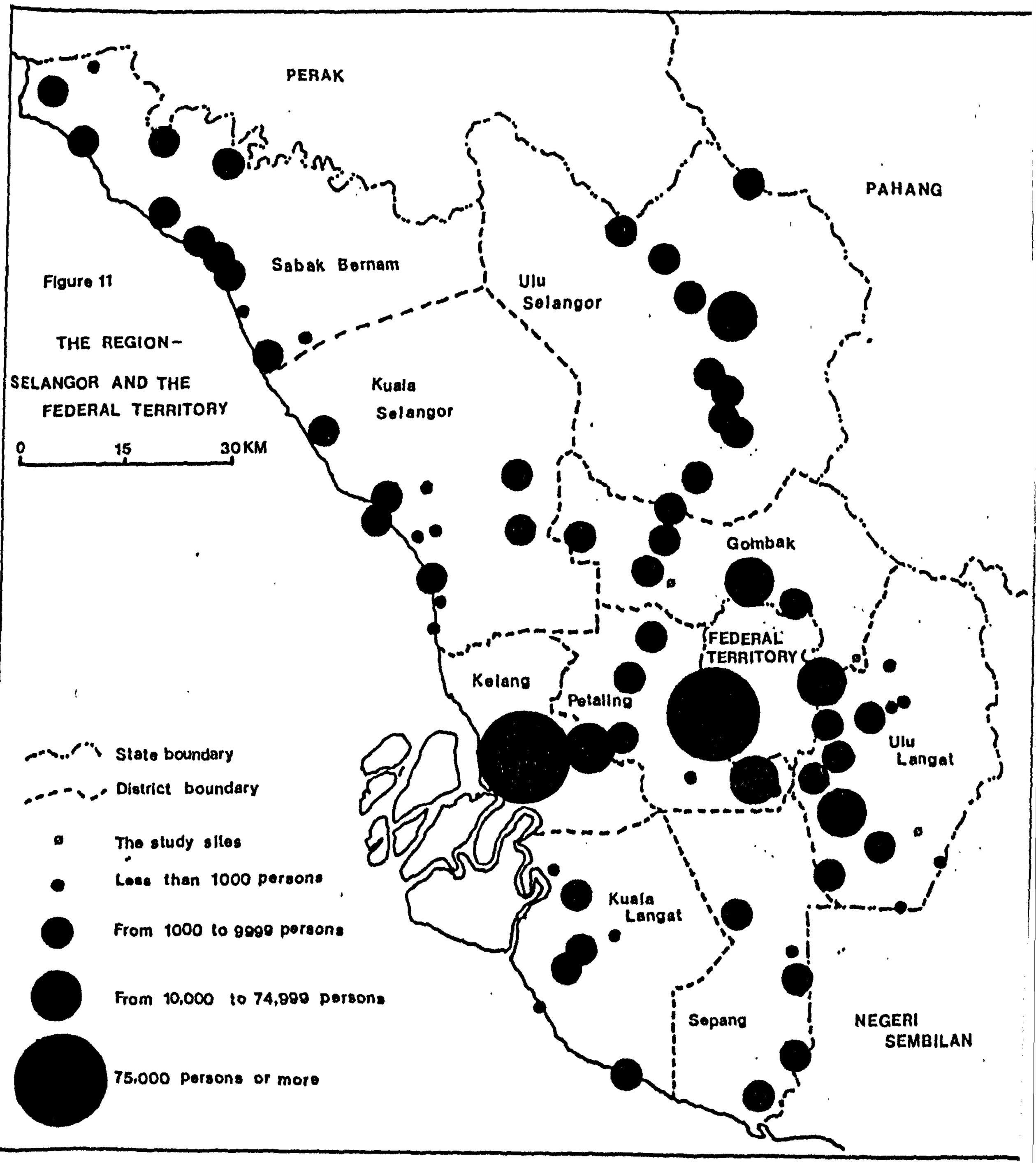

Figure 11

THE REGION– SELANGOR AND THE FEDERAL TERRITORY

populated area in the region. While the Federal Territory is the centre of government, trade, business and industry, the state of Selangor exhibits a mixture of industrial areas, tin mines, rubber plantations and mixed-crop farms.

Selangor is divided administratively into nine districts, with a variable number of sub-districts (mukims) in each district. For purposes of analysis, this study will treat the region as being sub-divided into population units based on the existing administrative districts and sub-districts. Hence, taking all the sub-districts in Selangor and treating the Federal Territory as one individual unit, the total number of population units in the region under study is 55 (see Appendix 1).

Due to the nature of its economic growth, the region's population varies from one district to another (see Appendix 1). The most densely populated districts are Petaling, Kelang and the Federal Territory. These three districts are located in the Kelang industrial valley. Some parts of Ulu Langat and Gombak are urban conurbations bordering the Federal Territory; such conurbations are also heavily populated. The other population units are characterised by their own district centres, usually a town, beyond which conditions are rather rural. Overall, the region has a total population (all ages) of about 2.4 million. Malaysia's multi-ethnic society is well reflected by the ethnic composition of the population of the region under study. Most of the 43.54 per cent Chinese in the region live in the urban areas. The Malays form 39.76 per cent of the region's population and the Indians and other ethnic groups, 16.70 per cent (the population figures given here are for those of age 15 years and above, unless otherwise stated). The population is predominantly represented by

those of age 15-24 years (36.94%) and 25-44 years (43.22%). The older age group of 45 years and above makes up 19.84 per cent of the total composition. The male group (50.60%) is slightly more than the female (49.40%). More than half of the population aged 15 years and above are married.

One necessary and important population variable where this study is concerned is the distribution of the income of people within the region. Income is known to be related to a person's level of educational qualification and the type of employment. More than 80 per cent of the people in the region have had at least primary school level education.

The total number of people of known employment in the region in 1983 is estimated to be about 836,700. The tertiary sector forms the largest component in the employment structure accounting for 27.03 per cent of the total. About 18 per cent are employed in the secondary sector and 6.76 per cent in the primary sector[3]. An estimated 47.76 per cent of the population (10 years and above) are outside the known labour force. For a more detail description of the socio-economic profile of the region, refer to Appendix 2.

Based on a socio-economic survey in 1982 (Socio-economic Unit, Prime Minister's Department, 1982), it is estimated that the mean household income for the population is M$ 769.24 for the state of Selangor and M$ 1432.54 for the Federal Territory. The difference is probably due to the fact that the Federal Territory is the centre for administration, business and trade for the whole country and thus has a larger tertiary employment

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3 The economic activities are classified into three major sectors : primary (agriculture, animal husbandry, mining, etc.), secondary (production, transport equipment operators and manual workers, etc.) and tertiary (professional, administrative, services, etc.).

sector. An important feature to note from Table 7 is that there are major differences in mean household income among the districts in Selangor. The two highest mean household income levels are in the districts of Petaling and Gombak, which, incidently, are districts adjacent to the Federal Territory (A clear picture of the income and mean household income distribution for the region is shown in Table 7).

The region chosen for the study is relatively more prosperous than the other parts of the country. Selangor and the Federal Territory are endowed with social and economic benefits because of their historical background: for many years the region has been regarded as the example of the nation's developmental achievements. The benefits are apparent not only in the form of employment opportunities but also in the form of social and physical services. Travelling within the region is easy due to the presence of a good and well distributed network of roads. The capital city, Kuala Lumpur, is easily accessible from all directions within the region. The road system has resulted in the relatively easy accessibility to the recreation forests. Any differences of mobility would be due to the distance and the time needed by different groups to travel to a particular recreation forest.

The ease of movement throughout the region was considered during the inception of this study. The importance of this factor becomes especially apparent when considering the effect that alternative outdoor recreation areas have on the visitation to the recreation forests under study. This study will only concentrate on the substitution effects of other forest recreation areas within the region, based on the information given by visitors to the three areas under study.

Table 7. Percentage and Mean Household Income Distribution by Districts in Selangor and Federal Territory

Districts and Federal Territory	Income Categories					
	<$300	$300-$599	$600-$999	$1000-$1999	>$2000	Mean Income
1. Federal Territory	17.4	37.4	14.4	19.6	11.2	1432.54
2. Petaling	5.1	22.1	23.7	28.2	21.0	1329.40
3. Gombak	7.7	32.4	25.5	21.0	13.4	1016.93
4. Ulu Langat	7.8	38.6	25.7	19.2	8.7	937.84
5. Kelang	11.6	32.5	26.6	20.3	9.0	877.94
6. Sepang	16.1	43.7	23.0	12.1	5.2	735.41
7. Kuala Langat	27.9	41.8	16.1	9.3	4.9	626.28
8. Ulu Selangor	25.4	49.3	16.4	6.1	2.9	611.39
9. Sabak Bernam	51.8	31.4	10.3	4.8	1.8	395.44
10. Kuala Selangor	44.4	42.5	7.0	5.6	0.5	392.57

Source : Socio-economic Research Unit, Prime Minister's Department, 1982 (unpublished).

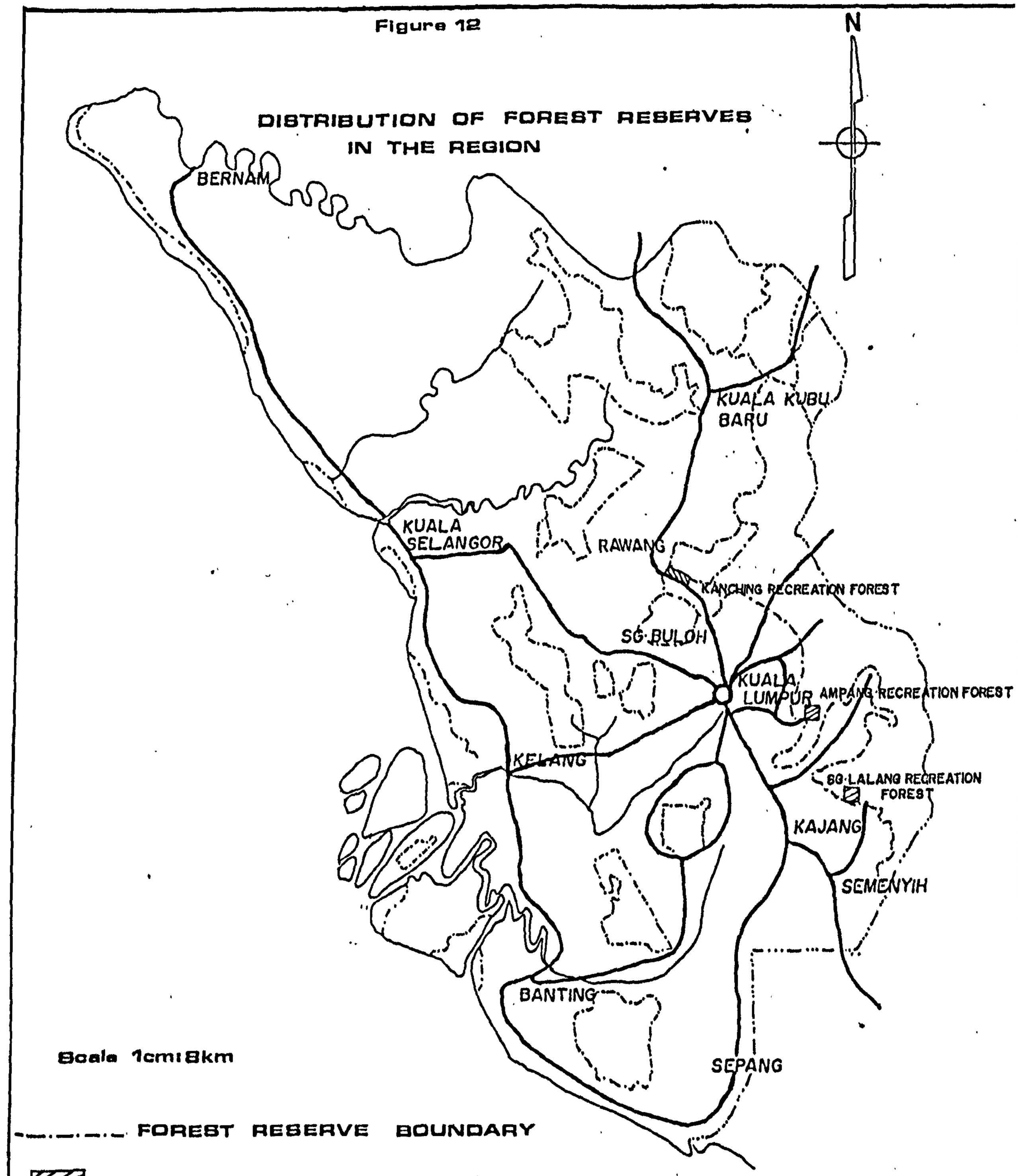
4.2.2. The Recreation Forests

The recreation forests chosen for study collectively represent as broad a cross-section as possible of the various forest recreation resources available surrounding the large urban area within the region. In addition, since the consumption of forest recreation areas varies according to the distance of the areas from population centres and the nature of the trip involved, differences in distance are also taken as a criterion of selection of the areas for study. Also, the areas are chosen for their differences in natural and man-made qualities.

Apart from those above, there are other criteria that were taken into account before a selection of the study areas could be made. The region has a total of 183,329 hectares of inland forest in the state of Selangor (see Figure 12). This represents 23 per cent of the total land area of the state. Out of this, 82 per cent (149,854 ha.) are classified as productive forest, that is, forest of commercial timber value. About 18 per cent (33,475 ha.) of the total forest reserves are earmarked as protective and amenity forest, of which a major portion is protective forest. The fringes of most of the forest reserves are accessible by road. Although there are noticeable recreational visits to several parts of the forest, the choice of the areas for this study is confined to the areas that are regarded as popular or which are known to be experiencing a regular visitation rate. This is considered important in order to ensure the collection of as many usable questionnaire responses as possible.

Another equally important criterion is the accessibility into an area. To enable proper estimation of the level of use , it is considered helpful and appropriate that the entrance into and exit out of an area be one

Figure 12


DISTRIBUTION OF FOREST RESERVES
IN THE REGION
N
BERNAM
KUALA KUBU
BARU
KUALA
SELANGOR
RAWANG
KANCHING RECREATION FOREST
SG BULOH
KUALA
LUMPUR
AMPANG RECREATION FOREST
KELANG
SG LALANG RECREATION
FOREST
KAJANG
SEMENYIH
BANTING
SEPANG
Scale 1cm:8km
FOREST RESERVE BOUNDARY
STUDY SITE
MAIN ROAD

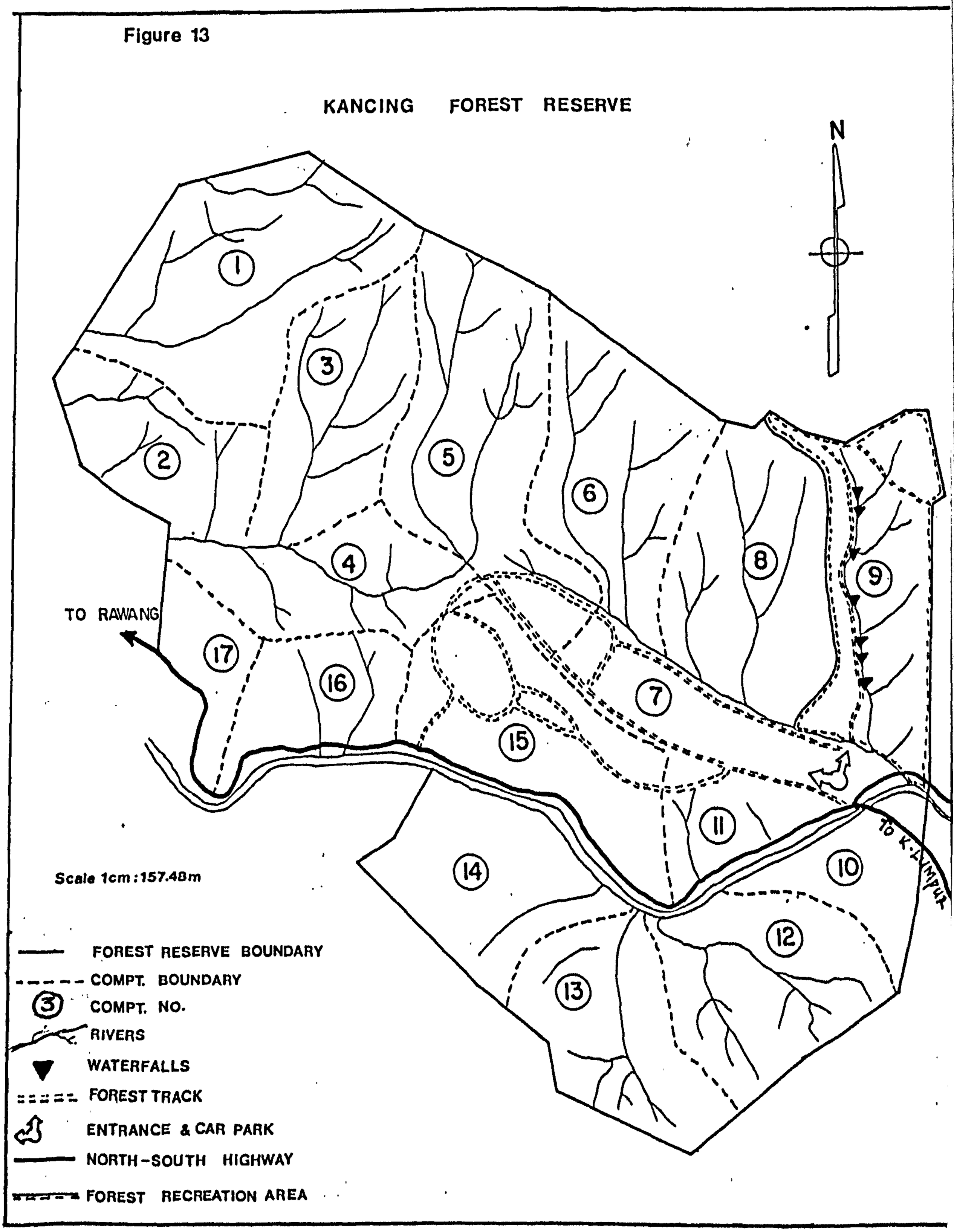
common place. The author visited several forest areas and, bearing in mind all the criteria mentioned above, three suitable forest recreation areas were chosen, namely Kancing, Ampang and Sungai Lalang. These areas are forest reserve land that are delineated as 'amenity forests', and are suitable for a number of recreational pursuits. The areas are located at various distances from Kuala Lumpur and are within two to three hours' drive from the furthest point in the region. In addition, each area is situated within several kilometres of at least one major town and, consequently, is frequented by a considerable number of visitors. The areas are therefore significant elements within the overall pattern of forest recreation in the region. Moreover, the author considers that each area has the potential to accommodate further recreational developments.

Kancing Recreation Forest

The area is situated in the sub-district of Rawang, 20 kilometres north of Kuala Lumpur and 6 kilometres south of Rawang town (see Figure 12). The sub-district of Rawang has a population of approximately 36,500. Well over one million people live within 48 kilometres (30 miles) radius of the recreation area, which includes the population of the Federal Territory and Petaling Jaya town. Further, since the area is situated adjacent to the north-south highway and is also very well-known, the potential 'catchment area' is of considerable extent.

Although Kancing Forest Reserve covers a total area of 477.93 hectares (1180 acres), the most frequently visited part of the area, that which is under study, is in compartment 9 (Refer to Figure 13). The compartment's eastern and western boundaries are Templer Park and the Serendah Forest Reserve, respectively. The relief is very steep and hilly and the difference between the highest and lowest altitudes is about 240 metres. A

Figure 13


KANCING FOREST RESERVE
N
TO RAWANG
TO K.LUMPUR
Scale 1cm : 157.48m
FOREST RESERVE BOUNDARY
COMPT. BOUNDARY
COMPT. NO.
RIVERS
WATERFALLS
FOREST TRACK
ENTRANCE & CAR PARK
NORTH-SOUTH HIGHWAY
FOREST RECREATION AREA

quarter of the 34 hectares compartment was logged in the 1930's and 1950's, mainly for kapur (Dryobalanops aromatica), a gregarious stand of a tall and stately timber species. This forest is thus considered unique because of the presence of such species in this part of the country.

Compartment 9 is easily accessible from a car park and the entrance into the area is by two footpaths which start at the same point and which meet again after 400 metres (see Figure 13). The car park can accommodate about 150 cars and surrounding the car park are stalls selling food and drinks at the weekends. This compartment has excellent natural features in the form of a river that flows through its steep terrain and the presence of seven waterfalls. The base of the waterfalls are popular bathing spots for visitors.

The waterfalls can only be reached by walking along footpaths that wind through the forest. Here is an instance where visitors have to walk into an area in order to enjoy the scenic beauty. Even though the distance to the forest is not far, a walk through the forest could perhaps create greater awareness of its presence within a forest setting. The sites most used within this area are the ones on the levels of the waterfalls, where the small spaces on the more levelled ground provide good camping and picnicking sites. Most of the visitors to the area tend to confine themselves within these sites and there are evident signs of overuse.

To cater for the convenience of the visitors the Forest Department has provided certain facilities. They have erected 13 shelter huts, 3 changing rooms, a wooden bridge, 10 benches, 13 rubbish bins and about 100 tree identification tags to name the prominent trees along the footpaths (Silviculture Unit, Forestry Headquarters, Kuala Lumpur, 1981). This

developmental effort started in 1978 and to date several more similar facilities have gradually been added according to an area development plan that was fashioned by a German volunteer officer at the Forestry Headquarters then. The development of Kancing Forest Reserve as a forest recreation 'park' was eminent due to its popularity and because the potential for increase in its use is evitable (Wohlfarth, 1978).

The area is experiencing a very heavy visitation rate. Although it has excellent natural features, the steepness of the terrain has caused a tremendous amount of erosion problems. Due to frequent use of the footpaths as well as a result of heavy rain, the top soil is washed away, the tree roots are uncovered and the herbaceous and shrub layers are affected. Deep furrows and grooves can be found mostly in the footpaths at or just alongside them at the lower levels. Another problem mainly attributed to the visitors is overflowing and damaged litter bins, empty bottles, plastic bags and food cans, sheets of newspaper and other rubbish that are spread all over the area.

The Forest Department which manages the area is naturally considered to be responsible for coping with many of the problems mentioned. However, although the input of financial resources has grown considerably through the years, there is still a drawback in terms of the department's management of the area, that is the lack of trained and experienced manpower. Only two forest labourers are assigned by the district office to look after the welfare of the area (Silviculture Unit, Forestry Headquarters, Kuala Lumpur, 1981). Their job includes the removal of the litter left over during the weekend, monitoring of the visitors and the general upkeep of the facilities within the area.

In comparison with the other two study areas, Kancing Recreation Forest is developed based on an area development plan. The design and actual siting of the facilities are determined by the district forest office. There is, however, no one within the office who is professionally trained to plan and manage a recreation area. The construction of the facilities is given to a private building contractor who is chosen through a tender-offering process. The privatisation of infrastructure development is indeed a welcomed procedure but the job still needs professional supervision by the management concerned.

Kancing Recreation Forest has a lot of potential to offer the people who use the area now and in the future. Even though at present compartment 9 is where most of the visitors tend to spend their time, with proper planning and management the other compartments within the forest reserve could become good alternative sites for the pursuit of a range of other recreational activities.

Ampang Recreation Forest

Situated in the sub-district of Ampang, the area is about 12 kilometres east of the capital city, Kuala Lumpur. This area is not only close to Kuala Lumpur but it is also located right at the fringe of a densely populated area. The population of Ampang is 75,501, larger than that of Rawang (where Kancing Recreation Forest is), but most of the people are concentrated in a smaller land area. A fairly large village shares a common boundary with the forest recreation area and the only access into the area is by a road that passes right through this village.

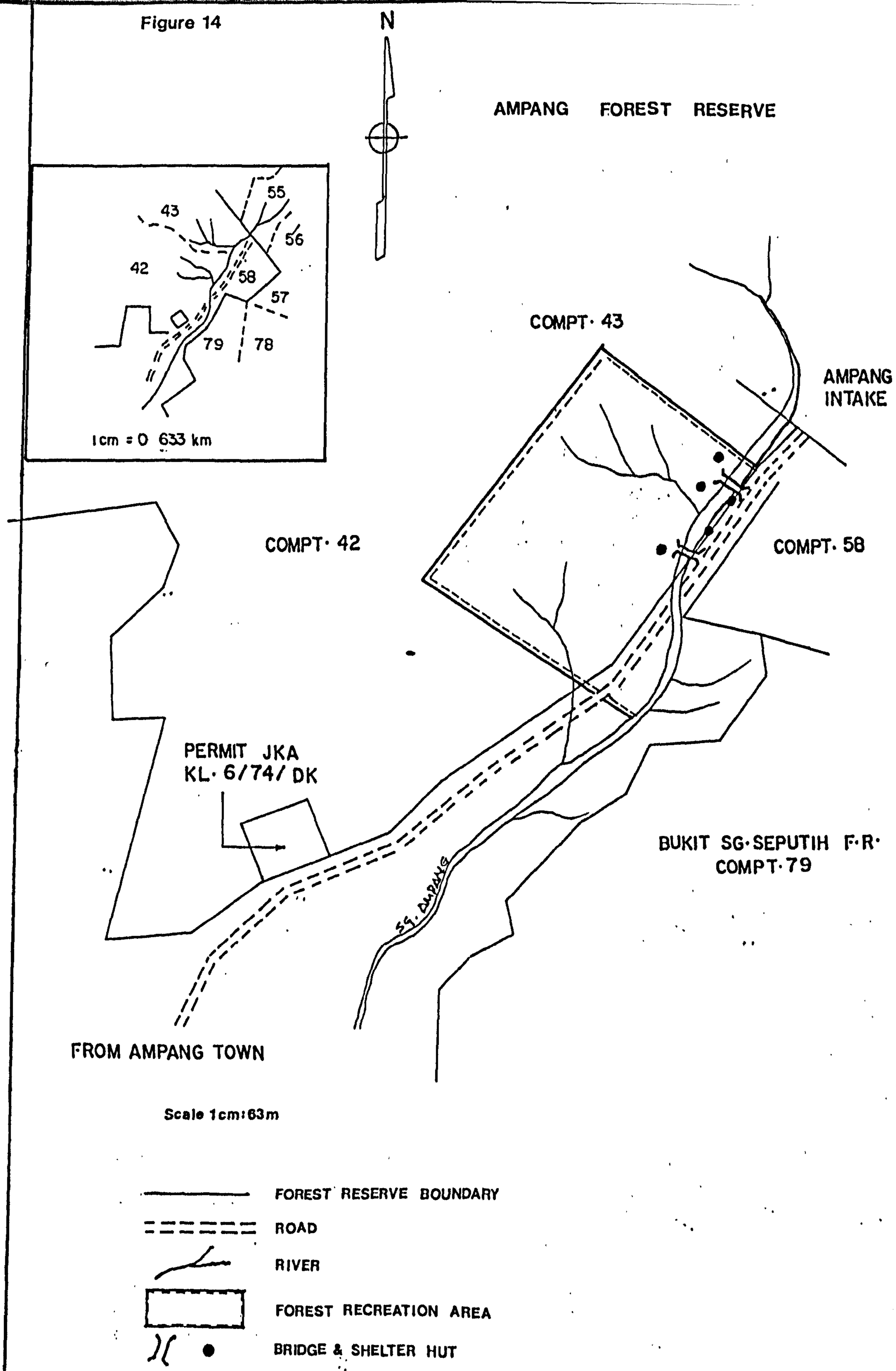
Thus, the present and potential 'catchment area' for this recreation forest is quite unlike that of Kancing. Although the population that

resides within 48 kilometres (30 miles) of the area is also over one million, this area is more accessible to the population surrounding it compared with the situation for Kancing. One can say that this recreation forest is situated right in the middle of an urban area. Morever, the metalled road leading to the area ends at the Ampang Intake (a water pumping station) (see Figure 14).

The recreation area under study is situated in parts of compartments 42 and 43. It makes up a total of about 76 hectares and, in contrast to Kancing, the terrain is rather flat. There is a clear and gentle flowing river that meanders through the area. The presence of the secondary forest type is mainly due to the logging activities that took place in the 1930's, 1960's and early 1970's. Since then the area has been considered as non-commercial and the subsequent management practice is towards its conservation. The area is well known among the people who live in the vicinity and some even treat it as a 'backhouse' garden. On most days, especially in the late afternoon and early mornings, some of the villagers would use the river for a bath or to wash their clothes.

Access into the area is easy with the presence of a metalled road that runs alongside the river. This road is managed by the Department of Public Waterworks, who also have been given the right to pump water from the river for the needs of the local population. Although the road was originally meant for the convenience of the Public Waterworks staff, the public has never been hindered from using it to gain access into the recreation area. As a result of this, the visitors who travel by their own car to the area could and would normally park their vehicles alongside the road. In contrast to Kancing, the visitors here do not have to walk a considerable

Figure 14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AMPANG FOREST RESERVE
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FROM AMPANG TOWN
Scale 1cm:63m
FOREST RESERVE BOUNDARY
ROAD
RIVER
FOREST RECREATION AREA
BRIDGE & SHELTER HUT

distance to reach the picnic sites or swimming spots. One would often find the visiting party sitting at or near the spots where their cars are parked.

Although the area has for a long time been well known to the people within its proximity, it was only recently that it was given a facelift by the Forest Department, that is in 1983, in conjunction with preparations to celebrate World Forestry Day. For that celebration a number of shelter huts and bridges were constructed to capture the attention of the invited dignitaries. Since then several similar facilities have been installed. As in the case of Kancing, the design, contruction of facilities and management of the area was and is left to the discretion of the district forest office. Unlike Kancing, however, this area has no planning document to ascertain its future development.

The main attractions of the area are its easy access and the presence of the river. Since the river is quite shallow and the water is clean it is considered safe for children to swim in it. It is observed that most of the visitors confine themselves to sites on both sides of the river. There is possible potential for further recreational development on the western side of the forest reserve. At present, there are a number of footpaths that lead to the upper reaches of the slope which ascends from the river. An attractive proposition would be to design and construct a network of footpaths going up from the river moving along the ridges towards a number of lookout points and descending towards the river on the way out.

Sungai Lalang Recreation Forest

Among the three recreation areas under study, this area is the furthest away from Kuala Lumpur. The area is located within the Sungai

Lalang Forest reserve in the sub-district of Ulu Semenyih. It is surrounded by a small population of about 1,500. The area is situated in a rural environment and the nearest urban population is in the town of Semenyih, 14 kilometres away. Since the major urban centres are more than 50 kilometres away, the population within a radius of 48 kilometres (30 miles) is only about 216,000. Even though it is in a relatively remote setting, the area is easily reached. The metalled road that leads to the area is in good condition and the drive from Kuala Lumpur should be an invigorating experience because it passes through a variety of land use features, from an urban area to the village atmosphere and ending in a rather isolated forest environment.

The recreation area covers about 27 hectares (68 acres) and is within compartments 1 and 17 of the forest reserve. Its terrain is not as steep as that of Kancing nor as flat as that of Ampang. The natural features of the area are most suitable for picnicking, camping and short walks. The river that flows through it is rather rocky at certain places, but the consequent presence of rapids and small waterfalls provides ideal spots for bathing. The vegetation is typical of a mixed lowland dipterocarp forest and thus a variety of timber species can be found within its composition. Although in the past some logging activities have been carried out, the forest seems to be quite intact except for the presence of an old logging road. Another attractive feature of this area is the cool and refreshing atmosphere under the shade of the forest canopy. The remoteness of the area has created an environment that is quiet and tranquil.

Since the main road passes along the eastern boundary of the forest reserve, those who travel to the area by motorised vehicles tend to park the vehicles within a small level space that is found between the road and

the eastern side of the forest nursery fence (see Figure 15). Access into the area is allowed only on foot through a metal gate along a path. A short length of the path immediately after the gate is widened to allow the forest department's lorries to load or unload planting material for the nursery. The metal gate remains locked unless it is necessary to allow the entry of any official forest department's vehicle.

This area has the best potential for further recreational development. The forest at the back of the present recreation area could offer a variety of recreational pursuits including a long forest walk and overnight camping. On several occasions youth movements, clubs, boy scouts and other organised parties have used the area for their outdoor activity programmes. The remoteness of the area, together with its accessibility by a good road, makes it an ideal place for such programmes. The Forest Department is aware of its potential as a recreation area but it would take a lot of professional input to turn it into reality.

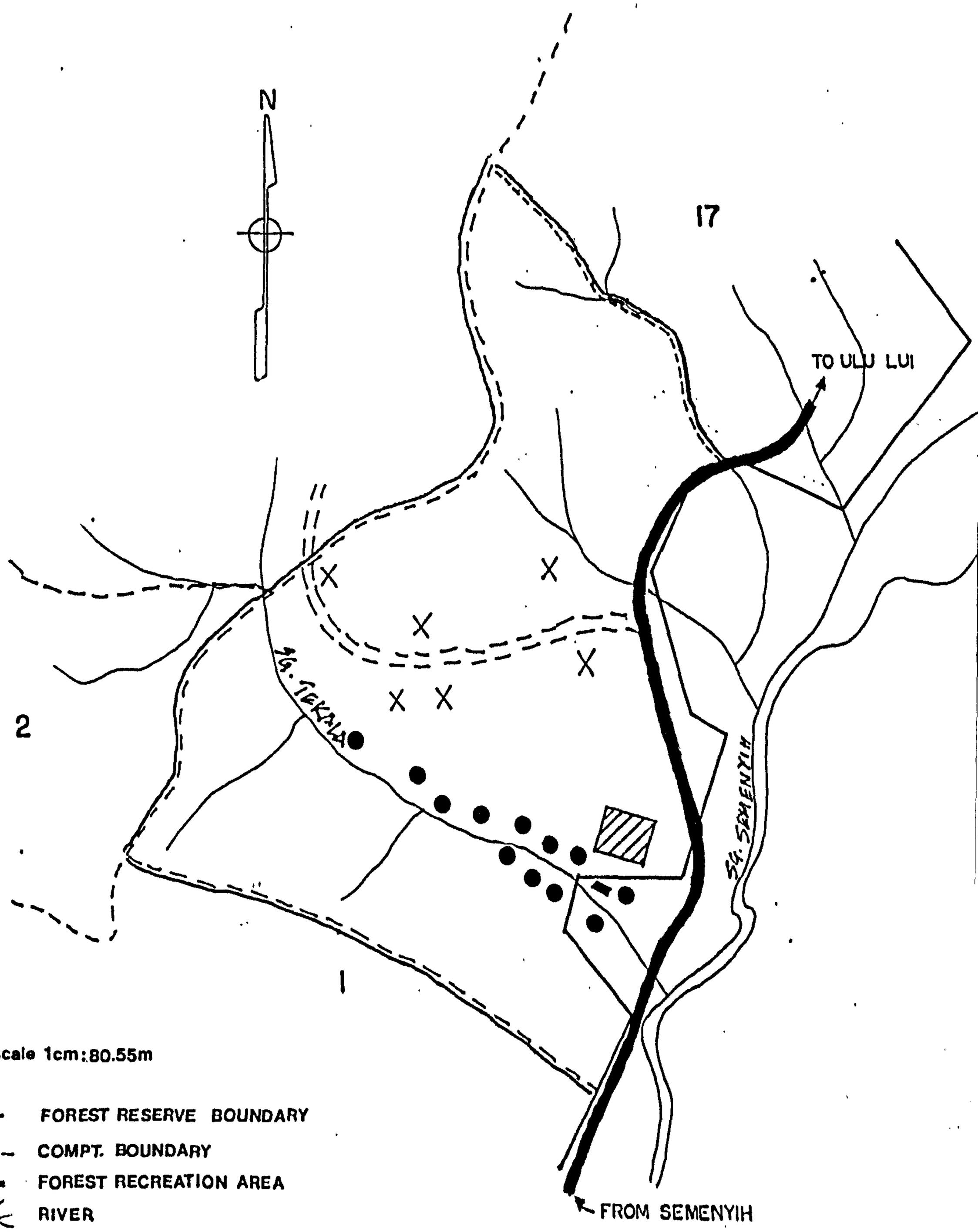
An Assessment

Thus it can be seen that the study areas possess a variety of features which have made them attractive for recreational use. Despite having some rather similar natural characteristics as forested areas, they differ in terms of distance from major urban centres, the immediate population and land use pattern that surrounds them, the degree of recreational development and the potential for further development.

The state forest department has allocated about 1.3 million Malaysian dollars for the development of forest recreation areas between 1986 and 1990. A major portion of it, M$ 600,000, is to go towards the development of Kancing Recreation Forest and M$ 57,000 each for the remaining two

Figure 15

SUNGAI LALANG FOREST RESERVE



Scale 1cm:80.55m

FOREST RESERVE BOUNDARY
COMPT. BOUNDARY
FOREST RECREATION AREA
RIVER
MAIN ROAD
NURSERY SITE
CHANGING ROOM
PICNIC SHELTER

areas. The rest of the money would be spent on the development of several other proposed recreational areas within the state. One could question on what basis the apportionment of the allocated money was made. An observation that might be made is that, it would seem that the reason why Kancing is given a major portion of the funds is its assumed relative popularity and its assumed ability to continue to attract visitors. If the decisions to develop recreation areas further are based purely on intuition and limited information, as in this case the subjective observation of visitor numbers, then the extent of improper planning is never so clearly exemplified.

It is here that a proper analysis of the recreational use patterns, user attitudes and behaviour and benefits valuation based on data obtained from the visitors could prove useful for recreation policy-making, planning and site management of the existing and the proposed future forest recreation areas. If the analysis is conducted in a regional context, the results could prove even more useful.

4.3. THE VISITOR SURVEY

The success of this study depends to a large extent on the information obtained from a survey of the visitors to the chosen study areas. Therefore, all aspects related to the survey, from the construction of the questionnaire to the eventual field work, should be carefully planned and implemented. Although the use of questionnaire surveys in recreation research has been widespread (Davidson, 1970) the use, in particular of on-site survey, has been the subject of considerable criticism (Burton, 1971; Shechter, 1977).

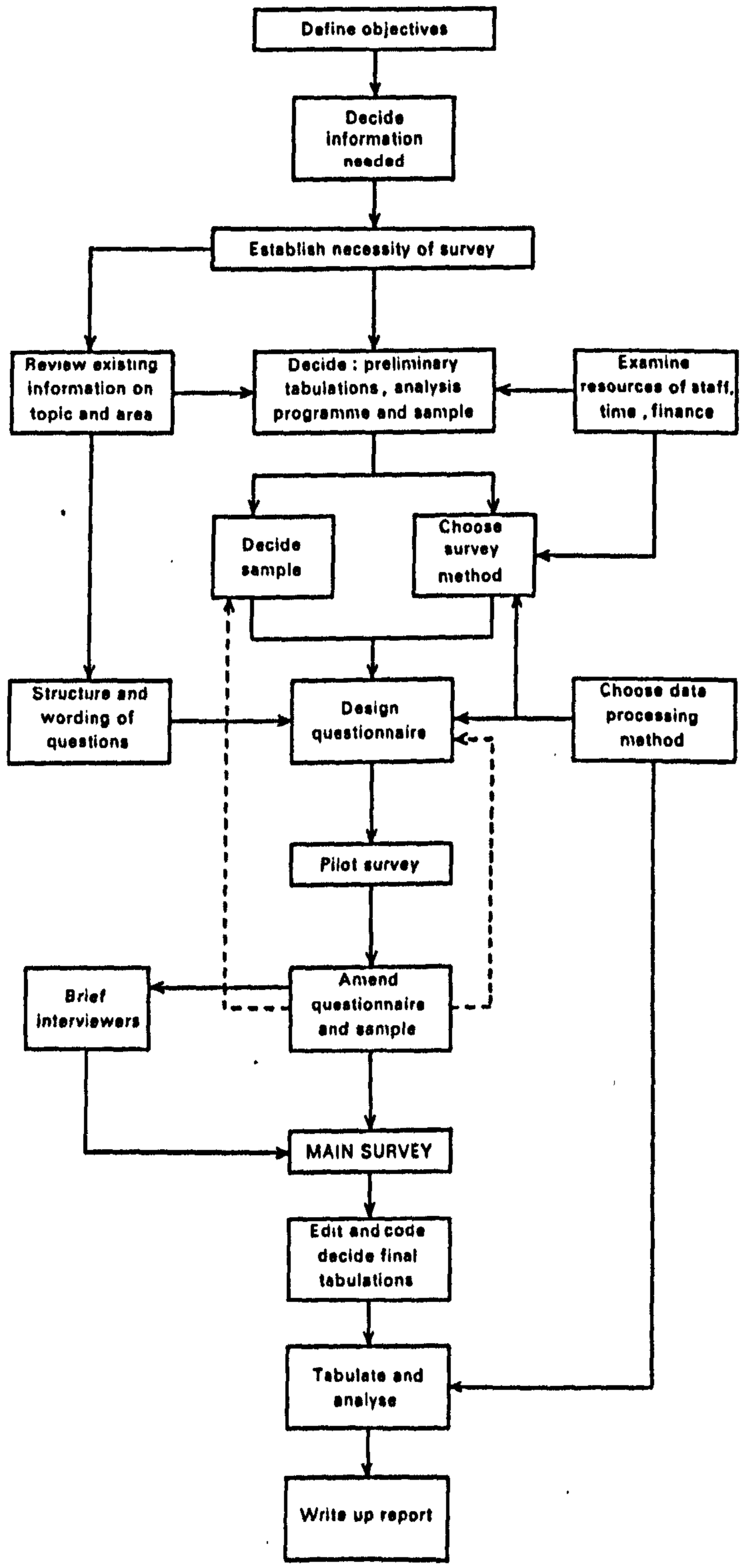
One of the major criticisms ofquestionnaire surveys and of their applicability to recreation research is the lack of adequate planning. Also often criticised is the methodology of some of the surveys. Davidson (1970), commented that 'at the survey planning stage, work often appears to be done with no clear definition of aims, so that confusion results on what data are needed, and when, where and how much data should be collected. These failures often lead to the collection of already established or useless information'. Whatever the size of the survey it should always be preceded by much thought and meticulous planning. Davidson (1970) has summarised, in diagrammatic form, the steps which should be followed in the planning and execution of on-site recreation questionnaire surveys (Figure 16).

In the effort to obtain a set of information whereby reliable conclusions could be inferred, most of the criticisms of past on-site surveys have been taken into account during the course of this exercise. Several documents are referred to, including Davidson (1970), Moser and Kalton (1971), Bardon (1978), Hoinville et al. (1978), Bardon and Harding (1981) and Tourism and Recreational Research Unit (1983).

The initial conceptions of the study and the planning for the visitor survey were carried out during the first year of the study at the Department of Forestry and Wood Science, University College of North Wales, Bangor. Following that, a draft questionnaire was constructed. Subsequently, and as a result of the proposal to conduct the study in Malaysia, financial support was provided by the Department of Forestry and Wood Science and the Agriculture University of Malaysia.

Figure 16. Survey Stages

(After Davidson, 1970)



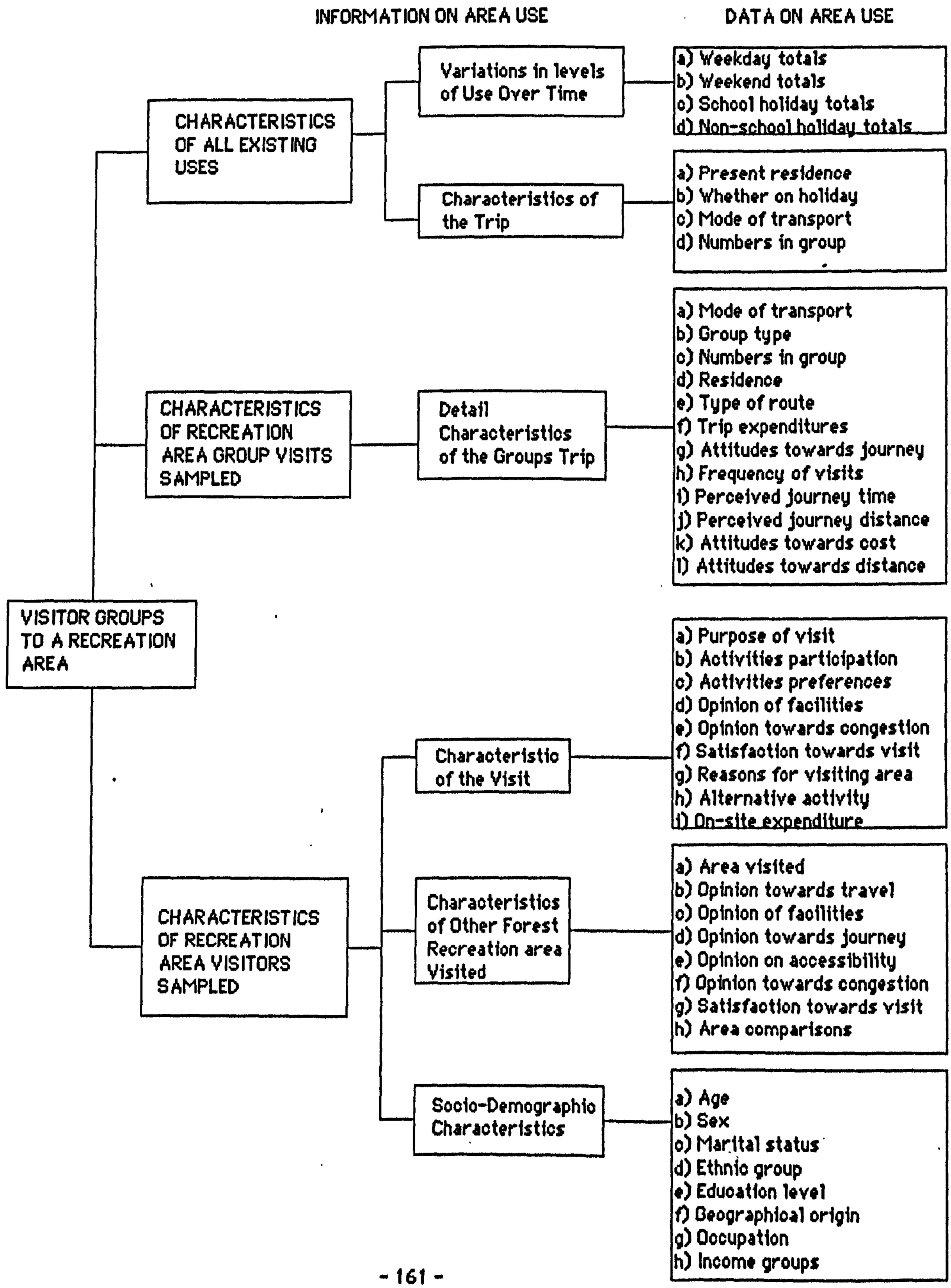
The principal aims of the survey were :

(i) To collect data on the existing visitation to the areas. The information recorded through the use of a short questionnaire includes the number of all visitor groups that enter the area, their origins and travel characteristics, that is, their present residence (town and district), whether they were on holiday in the region or not, their mode of transport and the number of people in the group (see Appendix 3).

(ii) Through the use of an extended questionnaire (Appendix 4) one member of the visitor group was interviewed to gather more detailed information on the travel features, activities participation and preferences, opinion about the area, opinion about the visits to alternative and competing forest recreation areas, as well as the visitors' socio-economic characteristics (see Figure 17).

At this point it is felt necessary to clarify the reasons for the choice of the group as a sampling unit for the short questionnaire and an individual from every second group as the sampling unit for the extended questionnaire. It has been postulated that the decision to visit a recreation area is usually made by a member of a group (Christensen, 1983). For a family, this is a reasonable assumption, for normally the monetary expenditure comes from the head of the family. As such, it is considered better to gather the trip-making characteristics for a group, by which a larger variability of the information can be obtained. As for the extended questionnaire, most of the questions are related to the opinion, attitude and undertakings of an individual, even though corporate answers from the group may be given to some questions.

Figure 17 THE VISITOR SURVEY-THE INFORMATION AND DATA COLLECTED



4.3.1. Questionnaire Design and Survey Organisation

The survey was carried out using interviewer administered questionnaires to maximise response. Interview surveys have the advantage of flexibility and, normally, a high response rate. Furthermore, the misunderstanding of questions, inherent in postal and to a certain extent in self-completion questionnaires is greatly reduced and the results are therefore much more likely to be accurate. This consideration is important especially when 'attitude' and 'open' questions are included in the questionnaire.

The questionnaires were especially designed to meet the principal aims of the survey and reference was made to published and non-published materials (Oppenheim (1966), Davidson (1970), Moser and Kalton (1971), Trakolis (1977), Bardon (1978), Kamaruzaman Yusof (1981), Humphreys (1981), Tourism and Recreation Research Unit (1983), Tucker (1983), Mazlan Mohd Saleh (1983), Bracken Tisen (1984), Rodgers (1984)). Two publications were instrumental in and particularly useful for the design of the questionnaire and the conduction of the field-survey, Davidson (1970) and Tourism and Recreation Research Unit, (1983).

The draft questionnaires were produced, and then assessed by the supervisors. Changes were then made to the draft questionnaire based upon the comments and criticisms received. Since it was anticipated that various ethnic groups would visit the study areas, the draft questionnaires were written in two languages, namely Malay (National Language of Malaysia) and English (English has been for many years a widely spoken and well understood second language for the Malaysians, especially for those living in urban areas).

Field Reconnaissance and Pilot Survey

Upon the author's return to Malaysia, a pilot survey was undertaken by the author with the help of a field assistant. A pilot survey is an important component in most stages of a survey (see Figure 16). Even though guidelines on survey designs are available, each individual survey is in some respects unique and contains its own particular problems which need to be indentified and solved before the actual main survey is carried out (Davidson, 1970).

The purposes of the field reconnaissance and pilot survey were:

1) to carry out a field reconnaissance of the study areas so as to determine how the on-site interviews would be conducted, and

2) to conduct the actual interviews using both types of questionnaires in order to detect deficiencies and problems with respect to the questionnaires and the interview process.

As such, the pilot survey was designed to show all or some of the following:

1) whether individual questions were carefully framed and ordered, and if not, what modifications were needed;

2) whether or not the questionnaire was of a suitable length and layout;

3) whether the sampling procedure (e.g., location of interviewers, selection of respondents, etc.) was adequate, and if not, what changes were needed;

4) variability within the population being sampled as a guide to deciding on the size of the main survey sample; and

5) the efficiency of the interviewers, adequacy of interviewer instructions and briefing.

During the reconnaissance survey, the main entrance into each of the three areas was identified. Since this was conducted during a weekend it was also possible to observe how the recreationists were distributed within the area. The most popular sites where the visitors congregated were identified and it was noted that the 'effective' sites where the visitors would settle down were clearly visible. Due to the type of questions asked, the short questionnaire could be administered as the visitor groups entered the recreation area. For this, very little problem was envisaged at two areas, Kancing and Sungai Lalang, because the visitors had to enter the area on foot. However, in the case of Ampang, the vehicles were usually brought right into the area, making it difficult to conduct the short interview at the main entrance. There would have been a long queue of vehicles if this was done! In order to overcome the problem at Ampang it was decided that the short questionnaire interview be carried out by an interviewer who moves from one visitor group to another until all possible number of groups have been interviewed. This was admittedly tedious but it helped to ensure that no visitor groups were missed out.

A critical problem arose with regard to administering the extended questionnaire interview at Ampang. Ideally, it would be better to conduct the extended interview after the site has been experienced. This would allow for better answers to questions concerning site characteristics and activity participation. However, conducting the extended interview as the visitors leave an area would create undue difficulties, especially at Ampang, where most of the visitors would by the then be in their cars or on motorcycle. Since it was not feasible to interview the visitors as they left , it was decided that the extended questionnaire be carried out, at all the three areas, by randomly selecting a repondent in every other

visitor group encountered as the interviewer moves within the area. This was considered an acceptable procedure, especially since there would be much less pressure to complete the interview compared with what may very likely be the case if it were to be conducted as the visitor groups were about to leave the area. Morever it was observed that most visitors tended to arrive and leave at about the same time. This would mean, therefore, that there would be several interviewers assigned to specific sampling allotments within each study area.

Accordingly, with prior considerations on how the interviews could be conducted as revealed by the field reconnaissance, the questionnaires were piloted. Although three recreation areas have been chosen for this study, it was considered adequate to conduct the pilot survey on two of the three areas. Ampang was chosen because of its peculiar movement of visitors into the area, that is, most visitors would normally enter with their vehicles right up to the place where they want to settle down for their day's outing. For Kancing and Sungai Lalang there is a similarity in the manner in which the visitors enter the areas. Between the two, Kancing was known to be more popularly visited, and thus chosen for the pilot survey in order to determine any problem associated with sampling a large visitor population. Two different days were chosen for the pilot survey for the two areas. The pilot survey at Kancing was conducted on a Sunday (weekend) and at Ampang, on a Wednesday, the day chosen for the weekday survey. In all, thirty short and thirty extended questionnaire were conducted. This was considered sufficient bearing in mind that the questionnaires were tested in actual field conditions.

As expected, very few problems were encountered with the

short questionnaire. One noticeable problem at Kancing was when a large number of visitors arrived at the same time. In such case, the interviewers had to proceed as fast as possible with the current interview and give an indication to the rest of the visiting groups to wait a while at the entrance before they moved into the recreation area. More often the leader of the group would stay behind while the rest of the group members proceeded slowly into the area. The same problem would be experienced if the short interview were to be conducted as the visitor groups left the area. Since the visitors appeared to be more anxious on leaving the area than on entering it, it was felt better to conduct the interview as they arrived. At Ampang, where the interviewers had to move from one visitor group to another, the only problem was the likelihood of sometimes approaching one who had already been interviewed. Since the questions were rather straightforward, the format of the short questionnaire was found to be acceptable and the questions asked were easily understood. Thus no changes to the questionnaire were found to be necessary.

The process of conducting the extended questionnaire was more time consuming. It took about twenty five minutes to complete one interview. This did not include the time spent on discussing other issues related to the recreation area and forestry in general whenever an interviewee showed genuine interest to know more. Conservatively it would take about half an hour to complete an interview when this occurred. A 'systematic' or 'regular' sampling system was achieved by selecting a respondent from every second visitor group that was encountered as the interviewer moved within the sample boundary. What is meant by a sampling boundary needs further clarification. As mentioned earlier, it was observed that there were distinct locations within each of the recreation areas where most vistors

seemed to congregate. This was particularly true for Kancing where most of the visitors tended to settle down at the levels of the seven waterfalls. These seven levels, therefore, formed ideal sampling boundaries. At Ampang and Sungai Lalang, the recreation area is rather flat and elongated and the popular picnic and bathing sites are situated along the sides of the river. The sample boundaries were arbitrarily set by dividing the length of the river in about equal proportions. The author then proceeded to test the extended questionnaire by selecting the respondents within these arbitrarily set boundaries.

This method of selecting the respondents proved convenient and could well account for the representativeness of the visitor population because a measure of 'stratification' was introduced. It was envisaged that there would be few problems in doing the same at Sungai Lalang, since the area is quite similar to that of Ampang. The prerequisite for this interview process was to employ the correct number of interviewers to cover each sampling area within the recreation site. It was found possible to assign one interviewer to cover one or two designated sampling area(s) for all the three study areas.

On the whole, it was feasible to use the extended questionnaire for the main survey. However, there were some minor but important changes that had to be made to the extended questionnaire after the pilot survey:

i) It was discovered that some questions were not arranged in a proper order. Therefore a thorough rearrangement was carried out. This was especially relevant when related questions were grouped together to ensure a smoother flow during the interviewing process.

ii) Sometimes questions were found to be unsuitable in terms of structure or choice of words when applied in the field. Some questions were changed

to accommodate this. Direct translation of a question written in a particular language to that of another is not always appropriate. What is important is that the translation must convey the meaning. Thus, questions were carefully reworded where necessary so as to make it easy for the interviewers to further explain the question if need be.

iii) Question 2.9 was piloted as 'open'. This was changed into a pre-coded question when it was found that most of the answers given during the pilot survey could be grouped into distinct responses.

iv) The number of 'show cards' was increased because some questions were found to be better answered with them. Cards were used where the respondent had to select his or her response from a list of alternatives. They were designed to aid recall and prevent time wasting repetition by the interviewer. Investigation showed that the use of the cards was a little cumbersome in the field, but they were considered to be worthwhile since they facilitated a more accurate and speedy response.Thus, where appropriate, additional 'answer cards' were designed for some questions and even though those questions were repeated in another section of the questionnaire, each question was given its own individual answer card (see Appendix 4). In this way, the interviewer would not have to flip over to look for an answer card when the same questions were asked in the latter section of the questionnaire (for example, questions 1.24 and 3.5; questions 1.26 and 3.6 and questions 2.5 and 3.7).

v) To allow the interviewer to read the questions with ease, the Bahasa Malaysia version of the questions were highlighted by a coloured pen to distinguish it from the questions and answers that were typed in English. This was done for both the questionnaire and the 'answer cards'.

vi) A major change was made in the way the answers to the questions were

recorded. Initially, the answers were directly recorded onto the questionnaire themselves. However, due to the length of the questionnaire, a separate answer form was devised (see Appendix 5). This answer form is short and concise, consisting only of the question number and a box to record the pre-coded answer and a larger space to answer the 'open' questions. Since each answer form consisted of only three pages, the interviewers could carry enough of them, rather than having to go back frequently to the entrance of the recreation area for more questionnaires. It was much more convenient for the interviewers to carry with them only one questionnaire and several answer forms. Also, the printing cost for the questionnaires was greatly reduced, for only a few copies needed to be printed, that is only enough to take into account wear and tear during the interview period.

The Interview Survey

As a result of the financial support provided by the Faculty of Forestry, University of Agriculture Malaysia, it was possible to employ five interviewers. The interviewers were students and technical staff of the Faculty. Before embarking on the actual survey, a thorough briefing was given to the interviewers, in which they were informed of the aims of the survey, the nature of the questionnaires and how the interview should proceed. They were later brought to the field to gain first-hand knowledge of the conditions in the field. The method of designating the sample boundaries was discussed by the use of the maps of the recreation areas which were later checked during the field trip.

The main survey was carried out during the months of November and December 1985 and January and February 1986. The survey was conducted on a rotational basis, starting first with a survey at Sungai Lalang on the

first week of November. Subsequently, the following weeks, Kancing and Ampang were surveyed respectively. For each week, Wednesday or Thursday, Saturday and Sunday were chosen as the survey days. The day's survey was divided into two periods, the first at 1000 h to 1300 h and the second, 1400 h to 1700 h. In total, each area was surveyed for four weeks and the survey period also took into account the difference between the visits during and outside the school holiday seasons. Thus each area was surveyed for two weeks during the school holidays and two weeks outside the school holidays, to reflect seasonal visit differences. Saturday and Sunday were observed to be the peak visitation days because they are weekend holidays and the survey on a weekday was chosen to account for the difference between the two. If a survey day was to fall on a public holiday, that day was replaced by another similar, non-public holiday, day.

During each daily period one interviewer was stationed at the entrance and every group that entered the recreation area was interviewed using the short questionnaire. One member of the group whose age was 15 years or over was interviewed and any refusal to answer the questions was recorded. For the extended questionnaire, the remaining four interviewers were each assigned a sampling area within which they were to move from one group of visitors to another to conduct the interview. They identified every second group they met as they moved within the area and one person within that group whose age was 15 years or over was interviewed. Any refusals were treated as 'lost' interviews and were recorded. The author, who acted as supervisor, was at the particular areas on the survey days and any queries by the interviewers were referred to him. Besides responding to any situations arising on-site and acting accordingly, the supervisor also performed quality checks on the work of the interviewers and on-site checks

of completed answer forms. Any incompleteness was immediately reported back to the interviewers for clarification.

4.3.2 The Interview Response

Each of the areas was surveyed for a total of twelve days but the number of interviews obtained was different for each area (see Table 8). The survey was satisfactorily conducted, assisted by the spirit of cooperation between the interviewers and the respondents. There were, for instance, very few who refused to be interviewed. Morever, during the interviews most respondents were willing to impart their answers, including answers to 'sensitive' questions related to socio-economic profiles. There were occasions when interviewers took more than half an hour for an interview because some respondents were rather inquisitive and wanted to know more about the purpose of the survey and forestry in general. This attitude is a welcomed sign for it showed that some visitors were at least aware, if not concerned, about the forest as a recreational resource.

Kancing recreation area

A total of 793 short interviews was obtained at Kancing. Of these, 443 (55.86%) were recorded during and 350 (44.14%) outside the school holiday period. More than 70 per cent of the interviews were recorded on Sundays for both seasonal periods. The number of extended interviews recorded was 212, those recorded during the school holiday period being 110 (51.89%) and outside that period, 102 (48.11%). More extended interviews were expected to be obtained at Kancing; the relatively smaller number obtained was due mainly to the difficulty in conducting the interviews. The main obstacle was the nature of the terrain which hampered the movement of the interviewers. They spent a lot of time locating the individuals for

Table 8. Number of Usable Interview Responses

Day of Survey	Short Interview: During school holiday	Short Interview: Outside school holiday	Extended Interview: During school holiday	Extended Interview: Outside school holiday
KANCING				
Wednesday and Thursday	36	22	16	18
Saturday	89	64	42	25
Sunday	318	264	52	59
Sub-total	443	350	110	102
Total	793		212	
AMPANG				
Wednesday and Thursday	34	12	15	8
Saturday	45	22	20	15
Sunday	114	135	60	56
Sub-total	193	169	95	79
Total	362		174	
SUNGAI LALANG				
Wednesday and Thursday	7	7	5	4
Saturday	31	17	16	16
Sunday	108	43	30	22
Sub-total	146	67	51	42
Total	213		93	
GRAND TOTAL	782	586	256	223
	1368		479	

an interview. Had there been more interviewers available, many more individual respondents could have been interviewed at Kancing.

Ampang recreation area

The total number of group visits was second highest in Ampang. A total of 362 visit groups were recorded. About 53 per cent (193) of these were recorded during the school holiday period and 46.69 per cent (169), outside the school holiday period. Consequently, more extended interviews (54.60%) were obtained during the school holiday period compared with those obtained outside the period (45.40%). For both periods, most visitors groups (more than 59%) visited the area on a Sunday. Since more visits were made on Sundays, more than 60 per cent of the extended interviews were obtained on that day. The number of extended interviews obtained was proportionately better than that at Kancing. Ampang is a relatively flat area and thus movement about the area is comparatively easier. At times, when a segment of the area is sparsely occupied, the interviewer who was supposed to cover only that sampling segment would cross the boundary and continue to interview visitors in another segment.

Sungai Lalang recreation area

This area recorded the smallest number of group visits during the survey period, a total of 213. A large proportion of the visits were made during the school holidays (68.54%). The visits made outside the school holidays were the smallest in proportion (31%) among the three areas. As with the other two areas, here also most of the visits were made on a Sunday. The proportion of the extended interviews obtained was smaller than anticipated. Sungai Lalang is characterised by a dense forest cover. Although the movements of the interviewers were not affected by this, the

spatial distribution of visitors within the area was so well spread out that locating them was a problem.Again, given more interviewers, more extended questionnaires could have been obtained.

Overall, it can be said that there were differences in the number of group visits made to the three areas. During the survey period, the largest number of total visits made was to Kancing (57.97%). The group visits made to Ampang (26.46%) and Sungai Lalang (15.57%) were fewer in comparison. As a result, the numbers of extended interviews that were obtained from the three areas were also different. However, to ensure representativeness the extended interviews were weighted by a common factor at the data preparation and analysis stage.

4.4 DATA PREPARATION AND ANALYSIS

Data Preparation

The process of data preparation involved transferring the data collected from the two questionnaires into a form which could be processed by computer. Several stages were carried out. The clerical editing was conducted immediately in the field itself, when the supervisor collected the answer sheets from the interviewers, after which a re-check was done immediately after a week's survey. The editing stage was easy to do because of the manner in which the information was recorded. The short interview consisted of a list of the group's trip characteristics and checks were made on the correct spelling of towns and districts named. For the extended questionnaire the editing was more tedious but had been made relatively simple and manageable because of the answer forms that were used to record the answers.

Most of the answers for the extended interviews were either already coded or are numerical data, except for answers to questions 1.8, 1.12, 3.10, 3.11, 3.12 and 4.1. Those answers were given a code after a thorough check by the use of a coding list of all the answers to the respective questions. The alphabetic answers for the short interviews were entered into the computer without assigning any codes. The coding was later undertaken by the use of computer programs available. Different raw data files for each survey area were created for both the short and the extended interviews. Data may be missing for several reasons. For this survey the source of missing data came from questions where the respondent was unable to give an answer. The missing data was assigned a code so that the computer could differentiate between this and blanks which arose because of coding or data entry errors.

Since the input of data was carried out by the use of data management programs (e.g. D Base III) available on a microcomputer, further editings and checks were conducted to ensure 'clean' raw data files. At this stage it was also possible to assign a variable name to each data item. It was then possible to produce frequency counts for each variable (using SNAP, a questionnaire survey analysis computer program). These frequency counts serve two purposes :-

a) to act as a further check on the data by highlighting any unusual or unexpected frequencies,

b) to provide preliminary insights into the structure of the data and so act as a guide to the analysis to be carried out later.

Besides using the data management programs for data input and editing and checking the raw data obtained, they were also used to perform various data manipulations. There were instances where new groupings for certain

variables were undertaken. Each grouping was assigned a new variable name and these were termed generated variables. Answers to some questions would need to be 'transformed' before values were obtained and a new variable was generated. For example, the origins of visitors to the areas were expressed in terms of perceived distance, perceived time and district or town of origin; the origin points were first mapped, and actual distances travelled were estimated from these. For some questions, more complicated calculations had to be undertaken before the derived data could be added as a new variable.

Weighting the Data

Weighting the data is essential and ensures that the results of analysis are representative of all those making visits during the survey period. The survey method that was adopted in this study resulted in different sampling fractions for different survey days. Weighting corrects for these differences and ensures that analysis is undertaken to represent accurately the correct number and type of visits (Tourism and Recreation Reasearçh Unit, 1983).

The differences in the proportion of the total number of actual visits sampled by the short questionnaire and the extended questionnaire is clearly evident from Table 8. For each area, an analysis of variance was carried out between the total number of short and extended interviews obtained on the different survey days. Results showed that the days of interview seem to affect significantly the number of interviews obtained ($p = 0.031$). This difference is expected because the number of visits are observed to vary between the weekdays and the weekends. In order to ensure that the extended questionnaire is representative of the short

questionnaire, weighting of the data from the extended questionnaire would have to be undertaken.

Hence, weighting the data was carried out on the basis of the number of interviews obtained on each survey day. To adjust for the differences in the sampling fractions, the number of extended interviews on each survey day is multiplied by the inverse of the sampling fraction, that is, the actual total number of short interviews divided by the number of extended interviews. The weightage for each extended interview per day of survey for the three study areas was estimated and it indicates the number of actual visits each extended interview represents.

Analysis

The analysis of the data was undertaken within a framework dictated by the appropriateness of the data available and the objectives of the study. Several types of analysis were carried out, and included both descriptive analysis and analysis derived from several statistical procedures. The advance of computer technology proved a great help in executing this task. There are, available on microcomputers, sophisticated statistical packages which enable the accomplishment of functions usually done on main-frame computers. For this work, the analytical stages were undertaken usihg both the statistical packages available on the microcomputers (for example, using SYSTAT - 'The System for Statistics', version 2.) and those on the mainframe (for example, SPSSX - 'Statistical Package for the Social-Sciences'). Details of a particular analysis are fully described in its respective chapters.

4.5. CONCLUSION

In an effort to observe the different types of recreational use patterns, user behaviour and recreational values, a region was identified as the 'market' or 'catchment' area. The chosen region is considered appropriate because it represents the most heavily populated and, possibly, the most affluent region in the country. The important recreational feature of the chosen region lies in the apparent use of its forest areas for recreational visits and pursuits. Three forest areas within this region were selected for the study. These areas differ in size, location and the presence of natural and man-made characteristics. Of interest to the study is the effects of different travel and area characteristics on the use of these areas in a regional context.

The use of on-site visitor surveys to gather the required information was necessitated not only because it was considered the most appropriate method for this study but also because 'the management of all such areas (existing and future) will require the kind of information that can only be gained in site surveys' (Davidson, 1970). In addition, the information obtained through questionnaire surveys concerning public attitudes and preferences provides useful 'public input' into the decision-making process (Swanson, 1971). O'Riordan (1971) states that public participation is necessary since 'without some committed public consensus as to what constitutes a desirable environment, it is impossible to develop the necessary guidelines against which to evaluate future strategy'. The incorporation of public preferences into all stages of the strategic recreation policy and decision-making process would seem to be both ethically and pragmatically desirable, leading to greater public endorsement and promotion of the selected strategies. It was also

desirable because the areas selected for this study are developed and maintained by public funds. The procedure for selecting a sample of visitors for the interviews was scheduled in such a way as to obtain a representative set of information on the visits. A pilot survey was first conducted and after some minor modifications the actual survey was undertaken. The availability of appropriate and effective computer programs for data input, editing and analysis helped tremendously in the task of data processing. Nevertheless, the efficient use of this tool would not have been possible had it not been complemented by a well planned method of data recording in the field, proper deployment and supervision of the interviewers and immediate checks of the completed interviews before the end of a day's survey.

It is hoped that the information generated by the visitor survey would prove sufficient in providing some of the answers to the questions addressed by the objectives of the study. A description of the results of the survey follows in the ensuing chapters.

CHAPTER 5

CHARACTERISTICS OF TRAVEL-USE PATTERN.

5.1 Introduction

5.2 The Recreational Visits

Number of Visit Groups
Period of Visit
Visitor Base
Origin of Visits
Means of Travel to An Area

5.3 Visitors' Reasons for Choosing to Visit an Area

5.4 The Features of Trip-Travel

5.4.1 Weekend Trips

Multi-stop Visits
Distance Travelled
Journey Utility
Time Spent Travelling

5.4.2 Weekday Trips

5.4.3 Monetary Cost of Travel

5.5 Length of Visit

5.6 Alternative and Competing Areas

5.7 Characteristics of the Areas

The Special Features of the Areas
The Quality of an Area

5.8 Conclusions

5.1. INTRODUCTION

This chapter summarises the main travel-use statistics from the surveys. Although description of the findings has merits in its own right, the emphasis here is on issues and characteristics with direct or indirect bearing on explaining the travel-use patterns for the three study areas chosen, and on the eventual use of these characteristics in economic evaluation of the areas. The travel-use features can be described either separately for each area or by highlighting the differences in each feature by turn for the different areas. Since the selection of the areas for this study was prompted on the basis that there exist possible differences rather than similarities in the visitors' travel-use features, the description attempted here is intended to show differences between the three areas. However, in addition there are instances when interrelationships between variables within one particular area are examined in order to explain certain variations that exist between the three areas. In this respect the following issues are explored :-

1. The recreational visits.
2. Reason for choosing to visit an area.
3. Features of trip and travel.
4. Length of the visit.
5. Alternatives and competing areas.
6. Characteristics of the areas.

5.2. THE RECREATIONAL VISITS

Survey of visitors' motivations indicates that recreation at a given area has many dimensions, of which satisfaction of visiting the area is only one. As a consequence, willingness to pay for the product is not easily quantified. It is due to this that many people consider outdoor

recreation as a valueless product, or a product with no cost, and benefits that cannot be quantified. Furthermore, willingness to pay for the product can depend on factors which potentially enhance or detract from the quality of the visit experience as perceived by the visitor. These factors could include the amenity characteristics of the surrounding environment or the degree of congestion. The product 'recreation' is extremely complex and at present little is known of the relative importance of the many factors that may determine the visitor's willingness to pay for it. It is thus difficult to assign units of measurement that will define and delimit the product in a manner that allows accurate comparisons between sites or even of the same site under alternative resource use levels. For example, if recreation managers were to improve the aesthetic appeal of an area then ideally we want this to be reflected in any description of the supply of recreation opportunities at that area. What is required is a measure that describes the area in terms of objective characteristics and their qualities.

There is no ideal answer to this problem. However, when analysing recreational visits as an independent activity the usual course of action is to measure the product in terms of discrete units of time, either visitor-days, user-hours or recreational visits (see McConnell, 1975, for a discussion of the relative merits of these measures). In the absence of alternative measures, for the purposes of this study perhaps the best indicator of the quantity of the product consumed is a visit, for it is generally enjoyed in identifiable units. Also, at the mundane level, if data for analysis is obtained by surveying users it is generally necessary to describe the product in terms which are meaningful to the user i.e., recreational visits.

As described in Chapter 4, the numbers of visits to the three areas are found to be different. The total number of short interviews obtained at each site is a reflection of the area's popularity. In this respect, Kancing is by far the most popular of the areas, whilst Sungai Lalang is the least visited area.

This initial observation of the differences in the number of visits prompted further comparisons to be made, to see if the differences could be explained by certain features of the visits. Since the information from the short questionnaire was obtained from all possible visitor groups that visited the areas, a description of the recreational visits based on this information could provide an overall pattern for the three areas. For this purpose, the short questionnaire included only certain pertinent questions on the nature of the visits; further description of the travel and use pattern of the visitors could be obtained by using the information gathered through the extended questionnaire (the sample). This section will only deal with the features of the recreational visits based upon the information obtained from the short questionnaire whereby obvious inter-area differences are identified and some tentative explanations for them are suggested. At this stage little can be offered by way of explanation of observed absolute values.

Number of Visit Groups

An important premise of this study is that different areas would attract different numbers of visitors. This is found indeed to be the case for the three areas selected for the study (Table 9). Although an analysis of variance of the different number of visitors to the three areas is significantly different ($p= 0.009$) the mean number of people per visitor

group does not vary that much from one area to another. There are many probable reasons why Kancing seems to attract more visitors. As related in Chapter 4, Kancing is a very well-known area and easily accessible from a major highway. As regards Sungai Lalang, its comparatively isolated position vis-a-vis major centres of population may partly explain its lower popularity.

Table 9. Number of Visitors

	Number of visitor groups	Number of visitors	Mean number of visitors	Standard deviation
Sungai Lalang	213	1394	6.545	7.631
Ampang	362	1937	5.362	3.988
Kancing	793	4152	5.236	5.825
Total	1368	7483	5.473	5.753

Periods of Visit

It is evident that more visits were made during rather than outside the school holiday seasons (Table 10). This is well documented in many recreational use surveys. The longer block of free time available during the school holidays has given more opportunity for the population to engage in outdoor recreational activities. As such, the visits to Sungai Lalang (a more remote area) are mostly in the holiday period. The number of group visits during these periods varies significantly among the areas ($p = 0.001$). Apart from the seasonal differences, it can also be seen that the weekly visitation number varies between the weekday and the weekend (Table 11). Saturday, although considered a weekend day, is only a half-day holiday for the government employees in Malaysia, thus fewer visits were

made on that day compared with those on a Sunday. The numbers of visits on different days to the different areas as shown in Table 11 are significantly different (p = 0.003).

Table 10. Seasonal Use Pattern

	Sg. Lalang	Ampang	Kancing
Outside school holiday period	67 (31.5%)	169 (46.7%)	350 (44.1%)
During school holiday period	146 (68.5%)	193 (53.3%)	443 (55.9%)

Table 11. Weekly Use Pattern

	Sg. Lalang	Ampang	Kancing
Wednesday	7 (3.3%)	28 (7.7%)	20 (2.5%)
Thursday	7 (3.3%)	18 (5.0%)	38 (4.8%)
Saturday	48 (22.5%)	67 (18.5%)	153 (19.3%)
Sunday	151 (70.9%)	249 (68.8%)	582 (73.4%)

Visitor Base

Another feature of the visits that is considered important is whether the visits originated from within the region or outside of it, or more precisely whether the visitors are local people or otherwise. Presumably there are visitors from outside the region who are on holiday within the region and have decided to make a visit to the recreation areas. If the proportion of the visitors on holiday who make a visit to the area are considerable in number, then the travel-cost method used in estimating the ex-post consumer surplus of the areas will have to be treated differently. The notion behind this is that the visitors on holiday within the region would incur different and higher costs for a visit as compared with the visitors that started off from their own residence for a day's trip to the recreation area. A question was included in the short questionnaire to

find this out and Table 12 indicates that the great majority of the visitor groups started off for the visit from their own residence.

Table 12. Base of Visits

	Sg. Lalang	Ampang	Kancing
Visits originated from place of holiday	9	12	42
Visits originated from own residence	204	350	751

Origin of Visits

In order to find out the precise origin of the visits, the visitor groups were asked to indicate the town and district from where travel to the recreation area began. If the visits were then grouped according to towns, it would produce a long list, which is considered unnecessary. Aggregation by sub-districts seems much more reasonable (see Table 13). In this case, although the resulting table is also quite long, the categorisation shows that most of the visits to the different recreation areas originate from sub-districts situated in close proximity to the recreation area concerned. This is especially true for the recreation areas Sungai Lalang and Ampang. About 54 per cent of the visits to Sungai Lalang are made from the sub-districts Kajang and Semenyih, which are population areas less than 32 kilometres from the recreation area. Similarly with Ampang, more than 80 per cent of the visits come from population areas within 15 kilometres of the recreation areas. Kancing, however, seems to attract visits from throughout the region : about 42 per cent of the visits originate from Kuala Lumpur, which is about 52 kilometres from the recreation area. In fact as can be seen, for all the

Table 13. Origin of Visits by Sub-districts

Sub-district	Sg. Lalang	Ampang	Kancing
Dengkil	2	0	1
Sepang	1	0	1
Ampang	4	132	8
Branang	3	0	0
Ceras	8	17	17
Kajang	72	1	10
Semenyih	45	0	0
Ulu Langat	8	0	3
Ulu Semenyih	3	0	0
Batang Kali	0	0	9
Kerling	0	0	4
Rasa	0	0	1
Serendah	0	0	2
Ulu Bernam	0	0	5
Batu	0	7	76
Rawang	1	0	61
Setapak	0	11	31
Ulu Kelang	0	11	5
Kapar	0	0	2
Kelang	2	10	54
Bandar Kelang	0	2	0
Bandar Jugra	0	0	2
Kelanang	5	0	0
Morib	1	0	1
Batang Berjuntai	0	0	5
Ijok	0	0	1
Jeram	0	0	1
Kuala Pasangan	0	0	9
Tanjung Karang	2	0	9
Bukit Raja	2	7	15
Petaling	4	7	29
Sungai Buluh	0	2	6
Bandar Petaling Jaya	4	12	55
Kuala Lumpur	39	138	339
Out of region and country	7	5	31

three areas, visits which originate from Kuala Lumpur are substantially represented.

Aggregation of visits could also be done by looking at the district of origin rather than the sub-districts. Aggregation to district level may be necessary if certain extra-sample district data are to be used for analysis, since certain population statistics are available at the district rather than the sub-district level, for example, the household income distribution and mean income figures. At this stage, aggregation of the origins by district is sufficient to reveal that there are representative visits from almost all districts in the region to all or at least one of the three recreation areas. The district of Sabak Bernam is the only exception (see Table 14).

Table 14. Origin of Visits by Districts

(% - row percentages).

	Sg. Lalang		Ampang		Kancing	
Districts	N	%	N	%	N	%
Sepang	3	60.0	0	0	2	40.0
Ulu Langat	143	43.2	150	45.3	38	11.5
Ulu Selangor	0	0	0	0	21	100.0
Gombak	1	0.5	29	14.3	173	85.2
Kelang	2	2.9	12	17.1	56	80.0
Kuala Langat	6	66.7	0	0	3	33.3
Kuala Selangor	2	7.4	0	0	25	92.6
Petaling	10	7.0	28	19.6	105	73.4
Sabak Bernam	0	0	0	0	0	0
Federal Territory	39	7.6	138	26.7	339	65.7
Out of region*	6	15.0	5	12.5	24	72.5
Out of Country*	1	33.3	0	0	2	66.7

* Taken as a district category

Several rather interesting origin-destination features have also emerged from the overall visits to the three recreation areas surveyed during the period of study :

i) Many of the visits that originate from a particular district seem to end up at the recreation area closest to or situated within that particular district. For example, 43.2 and 45.3 per cent of the visits that originate from the district of Ulu Langat are made to Sungai Lalang and Ampang and these recreation areas are located within that district (see row percentages of Table 14).

ii) It is also observed that visitor groups that originate from districts further away from the recreation areas, and are almost equidistant from each of the three areas seem to favour a visit to Kancing more than to the other two recreation areas.

iii) As mentioned earlier, there are no visits from the district of Sabak Bernam to any of the three recreation areas. There are at least one or more visits from all the other districts to Kancing, emphasising the 'regional' significance of Kancing. However, visits from only six out of twelve are made to Ampang and three of these districts are located near to it. This seems to indicate that Ampang is more of a 'local' based recreation area. As for Sungai Lalang, although it is located in a rather remote setting, there are representative visits from ten out of the twelve districts.

iv) Kancing receives more visitors from out of the region as compared with the other areas and most of the visitors are long-distance travellers that happen to stop by (in section 5.4.1). The out of region visits to Ampang are made by visitors who are temporarily on holiday and at that time staying in the districts near to the area. However, the out of region

visits to Sungai Lalang come from the neighbouring state of Negeri Sembilan or from visitors on holiday in or near the district where Sungai Lalang is located. For all the three areas, the 'out of region' visits are a small proportion of total visits; 3.3 per cent for Sungai Lalang, 1.4 per cent for Ampang and 3.9 per cent for Kancing.

Means of Travel to an Area

The distance to travel in order to reach a recreation area may indeed have some influence on the mode of transport chosen. However, certain general economic factors, which may or may not be constant among the visitor populations, could to a larger extent determine the means of travel. From Table 15, clearly a high proportion of visits are made by the use of motorised vehicles. A closer examination reveals that 99.0 per cent of the visits to Sungai Lalang and Kancing are made by motorised vehicles compared with 92.5 per cent for Ampang. There is also a considerable number of people who cycle (3.9%) and walk (3.6%) to Ampang. An important revelation is that there are about equal proportions of visitors who travel to Kancing by the use of either their own vehicles or the public buses.

Table 15. Means of Travel to the Recreation Area
(% of visitor groups)

	Sg. Lalang	Ampang	Kancing
Car/van	52.1	52.2	38.1
Motorcycle	24.9	22.1	24.5
Bicycle	1.0	3.9	0.5
Public bus	14.5	14.1	34.5
Chartered/tour bus	6.6	1.1	1.8
Walking	0	3.6	0.5
Taxi	0.9	3.0	0.1

The cost of travel is seen to play an important role in the visitors' choice of a particular area. One important component involved here is the

cost of running a vehicle. The running cost of a particular motorised vehicle is also determined by its type and size of engine. Also, the cost of travel itself is either the cost of running the vehicle or the cost of petrol only or what the consumer has to pay in the form of a fare. For example, if they travel by public and chartered buses or taxis, then the cost of travel would be the fare per person charged. The estimation of monetary travel cost becomes even more complex if it involves a need to estimate the cost for those who either cycle or walk to the area. A more detailed discussion on travel cost and related issues will be presented in a later section.

An Assessment

As expected, there are noticeable variations between recreation areas for most of the variables as described above. To confirm this, a number of Kolmogorov-Smirnov two-sample tests are carried out systematically for each area. The tests determine whether two independent samples have been drawn from the same population or from populations with the same distribution (Seigel, 1956). The recreation area in question is tested against the other two areas to determine whether there is a significant difference between the number of visitors from different sub-districts, districts and those outside the region visiting the areas. The tests indicate that there are significant differences between the three areas ($p = 0.000$).

The differences have been elaborated earlier. However, the real causes for these differences are difficult to explain. As pointed out, some possible reasons could be the distance-accessibility of the recreation areas, whether or not the areas are popularly known and the proximity of an area to certain districts. It was also explained in Chapter 3, for

example, that the distance travelled by the visitor groups to a given area, as well as being influenced by the use preferences of and constraints on the visitors, could also depend on area attributes and features such as the quality of an area, available alternatives and its distance from the population. Most of these probable factors of influence on the travel-use pattern of the visits will be examined in greater detail in the other sections of this chapter.

The information gathered from the short questionnaire has given an overall picture of the more crucial features of the trips made to the three recreation areas. There are, however, many more unanswered questions with respect to the details of the trip-travel patterns of the visits. As clearly explained in Chapter 4, it is the intention to answer such questions through the extended questionnaire. Since the extended questionnaire is rather long, it is only reasonable and appropriate to administer it to a selected number of individuals within visitor groups (that is, one individual per selected visitor group). The essential question at this stage is then whether the answers from the extended questionnaire based on sample data are representative of the overall total visits made to the three areas. The visitor survey was carefully conducted in order to ensure representativeness and results described in Chapter 4 have shown that this has been achieved, within statistical limits.

5.3 VISITORS' REASONS FOR CHOOSING TO VISIT AN AREA

It is well established that the purposes for visiting an area are numerous, varying from one individual visitor to another. Purposes could include 'sightseeing' or 'for a rest'; other motives such as 'escapism' or 'to enjoy the scenic beauty' feature strongly in the visitors' decisions to embark on a day trip to the countryside. Of interest to this study is the

visitors' decision as to which recreation area to visit once the primary decision for a trip outdoors (presumably) had been taken. Clearly the motivation for a visit and the eventual choice of area(s) are interrelated. For example, visitors who are motivated 'to enjoy the scenic beauty', given their constraints, will perhaps choose to visit an area where the surrounding environment is attractive to them, whereas visitors who are concerned with 'facilities' may visit a more developed area.

While the interrelationships that exist between the primary decision to visit and the ultimate choice of area(s) are worthy of some investigation, any conclusion from it could be dubious because a visit could be a 'package' where all purposes and motives are eventually included as one. However, with some knowledge of the factors that influence the visitor's decision to visit a given area we may be able to identify the services that are perceived by the visitor as being important, and also appraise the suitability and practicability of the adopted technique for evaluating the services offered by the area.

We can appreciate how the factors that influence the visitor in his choice of area might affect the estimation of benefits by considering the 'do not know of any other area to visit' response. As has been seen, one major criticism of the travel cost technique, as applied to single sites, is that, because of the absence of suitable independent variables, the method usually assumes that the availability and price of alternative sites have no significant effect on the number of visits made relative to the distance travelled. If 'do not know of any other area to visit' is a prime consideration in the visitors' decision to visit a given area, i.e., they have no alternative, then such an assumption may be justified and

simple site models can be used with more confidence. However, if 'do not know of any other area to visit' is not the principal reason for choosing to visit an area, this would suggest that there are generally some other alternative areas that the visitor could have chosen to visit and such a decision can have implications for consumers' surplus evaluation, especially if it affects relative visitation rates. Given this, and other potential difficulties, the visitors' reasons for choosing to visit a particular area merit at least some descriptive investigation.

Visitors are presented with six possible reasons and a residual 'other' category. The visitors are asked to indicate first, those reasons which influenced their decision to visit each area, and then to rank the five most important reasons by stating in order of priority, the first reason being the most important and so on. Out of the 'other' category two other answers are given by a number of respondents and ranked accordingly, making a total of eight possible reasons (see Tables 16 to 18). It can be seen that reasons (a), (c) and (e) reflect the distance and cost variable ; whether the 'cheapness' of the visit is due to cost of travel, cost of travel time or other trip expenditures is yet to be seen. However this variable will be accounted for by the cost variable in any travel cost demand functions. Reasons (d) and (g) describe area characteristics and selection of these will reflect visitors' tastes and preferences. A more detailed analysis of the areas' characteristics will be deliberated upon later. Reason (h) indicates car ownership and the mobility of the visitors and could well reflect the effects of socio-economic groupings on visitation rates. If this is the case, income earning of the individual or total income for the visiting group could be an important element in the demand functions. Reasons (b) and (f) indicate two important points.

Firstly, as described earlier, if reason (b) is not prominently represented then the effect of alternative or substitute areas is an important element in the demand function. Secondly, if very few visitors indicate that their visits are 'unplanned' it could mean that most of the other visits are a planned and deliberate decision.

As can be seen above, some of the reasons are conceptually similar to others and in the present context can be grouped together without any significant loss of insight. Collectively, reasons (a), (c) and (e) can be treated as at least part of the cost to visitors of visiting the area, whereas (d) and (g) reflect visitors' tastes and preferences for a particular area. Reason (b) reflects the availability and effect of alternative forest recreation areas, reason (h) the probable effect of income level on mobility and visitation rate among visitors, and reason (f) whether the visits are planned or otherwise. Intuitive inspection of Tables 16 to 18 is probably sufficient to assess the relative importance of each reason (or grouping of reasons) for each area. A more objective test is difficult since we only have ordinal ranking of these reasons. It is in fact unnecessary to perform any further or more complex analysis, since the intention is simply to make an informed judgement as to the suitability and practicability of travel cost demand analysis. It will suffice, then, to check that the important determinants of the visitors' decisions to visit a given area, as far as these can be assessed, conform roughly with the model specification. In this respect, it would be encouraging if 'cost' and 'area characteristics' considerations featured prominently.

Utilising the above grouping of reasons corresponding to 'costs', (a, c and e), 'site characteristics', (d and g), 'availability of other forest recreation areas', (b), 'unplanned visits', (f), and 'income category',

Table 16. Visitors' Reasons for Visiting the Survey Area - Sungai Lalang

	First reason	Second reason	Third reason	Fourth reason	Fifth reason	Total count
a) Closest area to visit	47	3	11	2	0	63
b) Do not know of other areas to visit	2	6	4	2	0	14
c) Cheapest place to visit	7	39	11	3	1	61
d) Satisfactory facilities available	4	13	14	5	3	39
e) Good public transportation and easy to come here	2	7	13	6	5	33
f) Unplanned visit	12	2	2	3	3	22
g) This is a well known area	11	6	10	8	2	37
h) I own a car	7	11	11	11	4	44
i) No answer	1	6	17	53	75	152

Table 17. Visitors' Reasons for Visiting the Survey Area - Ampang

	First reason	Second reason	Third reason	Fourth reason	Fifth reason	Total count
a) Closest area to visit	106	14	7	9	5	141
b) Do not know of other areas to visit	4	8	8	4	0	24
c) Cheapest place to visit	23	79	13	10	1	126
d) Satisfactory facilities available	2	4	13	5	2	26
e) Good public transportation and easy to come here	9	17	27	7	3	63
f) Unplanned visit	17	8	18	9	4	56
g) This is a well known area	3	16	18	16	9	62
h) I own a car	8	17	32	23	91	171
i) No answer	2	11	38	91	146	288

Table 18. Visitors' Reasons for Visiting the Survey Area - Kancing

	First reason	Second reason	Third reason	Fourth reason	Fifth reason	Total count
a) Closest area to visit	104	24	17	7	5	157
b) Do not know of other areas to visit	10	11	0	6	3	30
c) Cheapest place to visit	29	88	34	13	4	168
d) Satisfactory facilities available	10	14	31	9	6	70
e) Good public transportation and easy to come here	15	23	44	20	6	108
f) Unplanned visit	17	8	13	8	7	53
g) This is a well known area	19	20	27	37	15	118
h) I own a car	7	12	15	27	15	76
i) No answer	1	12	31	85	151	280

(h), we can reach some broad conclusions as regards each area.

The three areas exhibit some surprisingly similar patterns. Depending on criteria, the predominant grouping is either 'costs' or 'site characteristics'. For example, if we look at the first reason for visiting, for all the three areas, 'cost' is a stronger influence then 'site characteristics'. Even if we simply count the number of times each grouping is indicated as a reason for visiting an area, 'costs' still predominates. What is encouraging is that individually and jointly, 'costs' and 'site characteristics' are more significant than the rest of the reasons. Of the cost considerations, the 'closest area to visit', (a), is a stronger reason than direct monetary cost, (c), suggesting that travel time might be perceived as part of cost and should perhaps be incorporated into the specification of the demand function. Reason (e) reveals interesting insight about the use of different modes of transport and accessibility to the areas. The respondents feel that public transportation (principally buses) is best served at Kancing and least at Sungai Lalang. This is indeed true when, as earlier indicated, more people travel to Sungai Lalang by the use of their own private vehicles whereas about equal proportions of visitors travel to Kancing either by using their own vehicles or the public buses. More importantly, not only is mode of transport related to monetary cost but accessibility is also associated with utility or disutility of a journey.

Although 'site characteristics' is indicated as the second most important reason for a visit to all the three areas there are, however, differences in the specific reasons. For example, by simply counting the number of times each reason is indicated, at Sungai Lalang there are slight

differences between reasons (d) and (g).At Ampang the prominent 'site characteristic' is 'this is a well-known area'. At Kancing, however, there are more respondents who indicate that 'this is a well-known area'.

It was explained earlier why the reason 'do not know of other areas to visit' might be important. In terms of its choice as a reason, this is the least chosen reason for the three areas. This strongly indicates that the visitors are quite aware of other recreation areas. Perhaps, therefore, the availability and substitutability of other forest recreation areas is an important element and should figure in the area use function. Equally important is the 'income category'. For example, in the case of Ampang, the reason 'I own a car' is indicated as the most important third and fifth reason for visiting the area. If owning a car is an indication of purchasing power and if this is related to income earnings, then, the 'income category' of the visitor is also an important criterion in determining the visitation pattern.

5.4. THE FEATURES OF TRIP AND TRAVEL

The procedure for estimating the demand for and value of a recreation resource involves a two-step process of first estimating the statistical demand functions for the total outdoor recreation experience and then deriving the implied demand for and value of the resource itself.

The total or 'whole' recreation experience as defined here follows Clawson's interpretation of recreation experience, i.e., planning experience, travel to and from experience, on-site experience and reflection or recollection experience. We have to assume that the whole trip-making decision is based on a positive attitude towards self-satisfaction and thus the 'whole experience' is satisfying. From the

preceding section it has been shown that most of the visits to the three areas are 'planned' visits. There is a deliberate act on the part of the visitor groups to make a trip to the areas concerned. Whether the 'experience' is satisfying, in part or total, is yet to be seen. Furthermore it was also shown that the 'costs' factor is an important component in the decision-making process. Thus, the 'cost of travel' can be used to reflect the 'whole' recreation experience. This assumption is the basis of the travel-cost model. However when examining the visitors' decision-making we should try to look at all possible travel features that affect or that are components of the trip and thus the appropriate unit of measurement is the 'whole trip' or visit itself.

Given that the boundaries of description are often infinite and sometimes not worth pursuing, only those features of the trip-travel that have a direct or indirect bearing on the proposed evaluation procedure are discussed. Despite this emphasis, descriptive travel data that are presented in this chapter should be of some value to resource managers in the forest department and other public or private managing bodies. As stated in the objectives, an awareness of the character of the whole trip-travel features could aid in rational and informed planning.

From Table 19 it can be seen that more than one quarter of the visitors have visited the area before the survey period and from the sample data 276 visitors have indicated that they have visited the areas the year before the survey. Interestingly the frequency of visits per visitor for the current year ranges from more than five to seven times with a visits-per-visitor mean of about six for the three areas (see Table 20). Remarkably, the mean number of visits for those who visited the three areas

Table 19. Number of First-time Visitors

	Number of Observations	First visit	Not the first visit	Those who visited year before survey
Sungai Lalang	93	61	32	45
Ampang	174	117	57	114
Kancing	212	130	82	117
All areas	479	308	171	276

a year before is the same as that for those who visited during the current year. Although the increase in frequency of visits is very slight for areas Sungai Lalang and Kancing, there is a decrease in the number of visits to Ampang.

Table 20. Mean Number of Visits Already Made During the Survey Year and the Year Before.

	Those who visited during survey year	Mean visits per visitor	Those who visited year before survey	Mean visits per visitor
Sungai Lalang	32	5.3	45	4.5
Ampang	57	7.0	114	8.4
Kancing	82	5.7	117	4.5
All areas	171	6.1	276	6.1

To speculate on the reasons why there are differences in the mean number of visits for the areas or the increase and decline of the frequency of visits to the three areas between the years is rather premature at this

stage. There is, however, a slight indication of competitiveness in attracting the number of visitors. Proportionately, Ampang (67%) seems to attract more first-time visitors rather than Sungai Lalang (65%) or Kancing (61%) respectively. On the other hand, Sungai Lalang and Kancing have shown that more of the visitors have visited the area the year before, although for Ampang, there is indication of a slight decrease in the mean number of visits from that of the year before the survey year.

The forthcoming sections will summarise the main travel and other features of the trips. We can expect a noticeably larger variation of the mean values of certain variables among recreation areas. Those variables that are determined by the interaction of area and visitor characteristics will exhibit greater inter-area variance than those variables determined largely by visitor characteristics, behaviour and preferences. Related to this are the differences of values that could be exhibited if the data set is disaggregated according to those visits that originate from within and outside the region. The visitors who are on holiday within the region would be taken into account by the visits that originate outside the region because the number of groups on holiday, obtained from the sample data (extended questionnaire) is extremely small (1.67 % for all the recreation areas) and can be considered negligible.

Due to the reasons given above and the findings of Section 5.2. the description of the features of trip and travel would, in certain instances, only use results from within region visits or compare the values obtained from those visits that originate from within and outside the region. In addition it is considered necessary to describe separately the features of multi-stop visits, distance travelled, journey utility and time spent travelling by the weekend and weekday categories.

5.4.1. Weekend Trips

Multi-Stop Visits

Of importance and interest in the travel model is the possibility of multi-stop trips and, even more importantly, those which are multi-purpose in nature. One difficulty of the travel cost method, often highlighted in the literature, is that travel may not be single-purpose, and to assign all travel or similar costs to visits made to the recreation area would be fallacious. For example, visitors may visit some other parts of the region primarily for visiting friends and relatives or for a day's shopping in the town, and in such circumtances travel costs cannot be assigned solely to the visit to the recreation area under study.

The reasonable assumption was made that visitor groups who make day trips are engaged exclusively in recreational activities at a recreation area selected prior to the journey. In fact, from the sample data it was shown that very few visitors were making 'unplanned visits'. Even so there is still a possibility that some groups do stop at some other place before arriving at the recreation area.

From Table 21 it can be seen that multi-stop trips do occur. Not only did some visitors stop somewhere else on the way to a recreation area but some also planned to visit some other place after leaving the recreation area. The numbers of multi-stop group travellers vary but are quite high in all three areas. The higher proportion for Sungai Lalang (38.1%) could be as a result of its far distance, vis-a-vis population centres. More of the visitors to Ampang come from districts in close proximity to the area, hence the lower proportion of multi-stop travellers (19.9%). The reasonably high proportion of multi-stop travellers that visit the three

areas warrants a further investigation on the stopping places and the reasons for such stops.

Table 21. Multi-stop Visits

	Number of Observations	Number that stop somewhere on the way to.	Mean length of stop (mins.)	Number that stop somewhere on the way from	Mean length of stop (mins.)
Sungai Lalang	84	32 (38.1%)	28	23 (27.4%)	45
Ampang	151	30 (19.9%)	41	16 (10.6%)	76
Kancing	178	47 (26.4%)	59	32 (18.0%)	88

The basis for this investigation is to determine whether the stops form a primary purpose of the day's trip or are just a necessary part of the trip to the recreation areas. When asked the place where the stops are made, a majority of the travellers indicate that the stops are at towns or transit stations on the way to the recreation areas (see Tables 22 and 23).

Table 22. Features of Multi-stop Visits - Places of Stop

	Sg. Lalang		Ampang		Kancing	
Places of stop	To	From	To	From	To	From
Town	24	17	17	4	25	17
Transit station	5	2	4	3	16	10
Recreation area	1	1	2	7	6	4
Friend's place	2	3	7	0	0	3
Others	0	0	0	0	0	0

Table 23. Features of Multi-stop Visits - Reasons for Stop

	Sg. Lalang		Ampang		Kancing	
Reasons	To	From	To	From	To	From
To rest	3	1	3	0	1	2
For recreation	1	4	1	0	8	3
To shop	9	2	11	1	14	5
On business	1	0	0	0	2	1
To drink/eat	2	3	2	0	6	3
To visit friend	1	3	5	3	0	3
On transit	13	9	6	8	16	15
Unknown reasons	1	0	0	0	0	0

Some stops are planned on the way from recreating at the recreation areas and a majority planned to stop at either a town or a transit station. There is very little doubt that the main purpose of stopping on the way to the recreation areas is either to rest on a long journey, to shop (presumably for goods to bring to recreation area) or on transit (see Table 23). As indicated earlier, some visitors to all the recreation areas get there by the use of public transportation and there are instances where the visitors had to change several buses before arriving at the recreation area. There are, however, a number of visits made to other recreation areas, on the way to the survey areas. Since the number is small, the concern that this could add an appreciable bias to the estimation of the travel cost value to visiting the areas under study is unwarranted.

Furthermore, the mean length of time spent at the stop could not possibly indicate that the stop is a primary purpose for the day's outing (see Table 21). The mean length of time for a stop on the way to the recreation area is just 28 minutes for visitors to Sungai Lalang, 41 minutes for visitors to Ampang and just under an hour for visitors to Kancing. Although the mean length of stop that some visitors planned to

spend on the way from the recreation area is a little longer, we can confidently state that both types of stop constitute a small fraction of time spent against the primary objective of visiting the recreation area.

As regards the multi-stop visits, there is very little doubt that the stops on the way to and from the recreation area are essential stops and are unlikely to be a primary purpose of the 'short' recreational experience for the day.

Distance Travelled to Recreation Areas

In section 5.2 we have seen several features of the visits which originate from various categories of origins within and outside the region. There are strong indications that the larger number of visits seem to come from districts that are closer to the recreation area and that some recreation areas do attract a larger number of visitor groups from outside the region. In addition, the main reason given for visiting the recreation areas, in section 5.3, is overwhelmingly that of 'the closest area to visit'. This may imply that the distances between the origins of visit and the recreation areas could play an important role in the decision to travel to a recreation area.

From Table 9 it is apparent that more day trips are made to Ampang and Kancing than to Sungai Lalang. Sungai Lalang's comparatively isolated position from major centres of population would seem to explain at least part of this. The greater observed mean distance travelled by Sungai Lalang visitor groups may also reflect this feature (see Tables 24 and 25). The calculation of the distances travelled deserves some clarification. At the outset it was thought that 'distance' could be taken to mean the mean distance from the centre of the districts where the travel originated.

Table 24. Distance Travelled by Visit Group (Short Questionnaire)

	Visits from within country			Visits from within region		
	Number of visits	Mean calculated distance (one-way)	std. Dev.	Number of visits	Mean calculated distance (one-way)	Std. Dev.
Sungai Lalang	198	39.8 Km	34.8	192	36.2 Km	22.2
Ampang	316	18.8 Km	55.3	311	12.6 Km	10.5
Kancing	733	36.0 Km	60.0	706	25.9 Km	16.0

Table 25. Distance Travelled by Visit Group (Extended Questionnaire)

	Visits from within country			Visits from within region		
	Number of visits	Mean calculated distance (one-way)	std. Dev.	Number of visits	Mean calculated distance (one-way)	Std. Dev.
Sungai Lalang	84	52.7 Km	63.6	77	37.4 Km	20.8
Ampang	151	20.5 Km	49.7	149	15.0 Km	11.8
Kancing	176	34.6 Km	54.7	170	25.9 Km	15.0

However this assumption is not considered reasonable because some districts are larger in size and thus to calculate the distance from a central point in the district would give a misleading figure. Moreover there could be difficulty in choosing the centre of a district. More accurate calculation

could be derived from the town where the trip originated. This was in fact conducted and surprisingly it is found that the town actually represents the centre of a sub-district within a district. The towns are hence used as points of origin to estimate the distances travelled to the respective recreation areas.

It is also considered important to calculate the distance travelled from visitors' homes rather than from places where some visitors are staying while on holiday within the region. There are several reasons for doing this. Firstly, most of the visits from within the region originate from the present residence of the visitors. Secondly, even though some of the visits by those on holiday originate from their place of stay within the region, it is the total distance travelled from their residence to the recreation area that constitutes the actual distance travelled. If travel cost is the basis for the willingness to pay for a visit to a recreation area, then it is the total distance travelled that is most appropriate to be used in an estimation of travel cost. Lastly, a greater number of the visits from outside the region actually originate from respective residences, whereby the visitors come directly to the recreation area either for the sole purpose of recreating at the area or for a stop-over.

The next step is to determine the most likely chosen route of travel. As mentioned earlier, the region is well endowed with a vast network of roads. Any possible route could have been chosen to reach the recreation areas. Several researchers who used the travel-cost method have recommended the choice of the shortest route to the recreation areas as the one to use to calculate the distance travelled. This is most sensible since the assumption is that, more often than not, the traveller would want to save time and travel cost. This is particularly true for those who

travel by public buses, which are not only easily available on major routes but would also eliminate the problem of transferring from one bus route to another before reaching the area. Based on the above reasons, plus the author's own familiarity with the main travel route within the region, the shortest possible travel routes to the recreation areas are chosen to calculate the individual travel distance of each and every visitor group. The mean distances for the total visits are then calculated for the distances travelled to the individual recreation areas (see Tables 24 and 25) and from the individual travel origins to the recreation areas (see Tables 26 to 28).

Another distinction is also recorded, that between mean travel distances of those who travelled from within the region and of those from outside. This is felt necessary because, firstly, a majority of the trips originate from within the region, and secondly the difference in distances involved between the two categories of visits could produce a different value of travel cost.

Before discussing the differences in mean distances travelled between recreation areas, it is important to point out that the values given in Table 26 to 28 are those that are obtained from the short and extended questionnaires respectively. This is done in order to show that there are some very slight differences in mean travel distance values between those obtained from the short questionnaire and those from the extended questionnaire. These differences arise because the short questionnaire is an interview responded to by all visitor groups who enter the recreation area and the extended questionnaire is the interview on a sample of the visitor groups. Since the short interview uses all visits, the discussion

of travel distances will henceforth be based upon the values obtained from the short questionnaire.

The visitor groups to Ampang travel significantly shorter distances than those to other areas (refer to Table 24). From Table 26 it can be seen that the distances travelled to Ampang originate mostly from travel origins near to the recreation area. Except for the out of region visitors there are no visits beyond the distance of 53 kilometres from the area. The shortest mean distance travelled is from the district of Ulu Langat. Although the mean travel distance from Ulu Langat to Ampang recreation forest is longer than that from three other districts, the mean distance travelled by the visitors from it, 5.9 kilometres, is an outcome of the visits that originate from the subdistrict or towns within the district of Ulu Langat that are situated nearest to the recreation area.

The mean distances travelled to Sungai Lalang and Kancing are longer. The distances travelled are not only represented by visits from the people who resides nearer to areas but also by visits from origins that are considerably further from the recreation areas. Kancing received visits from all origins listed except from the district of Sabak Bernam. There are visits from within the region, from as far as 130 kilometres and 86 kilometres for Sungai Lalang and Kancing, respectively. As described in section 5.3, the predominant reason given for visiting the three recreation areas is that of 'the closest area to visit'. This is clearly substantiated by the result that 68 per cent of the trips to Sungai Lalang come from a distance of less than 26 kilometres from the recreation area. As for Ampang, 77 per cent of the trips originate from a distance of less than 17 kilometres and for Kancing, 64 per cent of the visits come from travel distance of less than 20 kilometres.

Table 26. Distance Travelled to Recreation Area - Ampang

Mean Distance in Kilometres (one-way)

Travel* origin	Mean travel distance from origin	Mean calculated distance (short questionnaire)	Mean calculated distance (extended questionnaire)	Mean perceived distance (extended questionnaire)
Federal Territory	12.0	12.0 (123)	12.0 (66)	16.2 (42)
Gombak	24.5	16.6 (28)	16.4 (14)	19.9 (12)
Petaling	30.4	23.7 (27)	24.0 (23)	31.6 (13)
Ulu Langat	36.6	5.9 (121)	5.5 (40)	7.4 (26)
Kelang	54.0	52.7 (12)	54.0 (6)	38.4 (4)
Sepang	66.7	-	-	-
Kuala Selangor	78.8	-	-	-
Kuala Langat	79.3	-	-	-
Ulu Selangor	81.2	-	-	-
Sabak Bernam	136.0	-	-	-
Out of Region	NA	400.4 (5)	432.0 (2)	8.8 (2)
Out of Country	NA	-	-	-

* Travel origins are listed corresponding to the ascending order of mean travel distance from the origin, from the nearest to the furthest from the recreation area.

\- No visitors from this region

NA Information not available

( ) Number of cases

Table 27. Distance Travelled to Recreation Area - Sungai Lalang

Mean Distance in Kilometres (one-way)

Travel* origin	Mean travel distance from origin	Mean calculated distance (short questionnaire)	Mean calculated distance (extended questionnaire)	Mean perceived distance (extended questionnaire)
Ulu Langat	29.4	25.7 (135)	26.6 (52)	18.9 (40)
Sepang	46.7	45.3 (3)	48.0 (2)	56.0 (1)
Federal Territory	52.0	52.0 (36)	52.0 (13)	46.4 (9)
Petaling	58.4	46.0 (7)	54.0 (4)	47.6 (4)
Gombak	59.3	74.0 (1)	51.5 (2)	44.8 (1)
Kelang	90.7	92.0 (2)	92.0 (1)	NA
Kuala Langat	101.0	105.0 (6)	106.0 (3)	52.8 (2)
Ulu Selangor	107.7	-	-	-
Kuala Selangor	115.5	130.0 (2)	NA	NA
Sabak Bernam	169.2	-	-	-
Out of Region	NA	155.7 (6)	220.3 (7)	19.9 (7)
Out of Country	NA	-	-	-

* Travel origins are listed corresponding to the ascending order of mean travel distance from the origin, from the nearest to the furthest from the recreation area.

\- No visitors from this region

NA Information not available

( ) Number of cases

Table 28. Distance Travelled to Recreation Area - Kancing

Mean Distance in Kilometres (one-way)

Travel* origin	Mean travel distance from origin	Mean calculated distance (short questionnaire)	Mean calculated distance (extended questionnaire)	Mean perceived distance (extended questionnaire)
Gombak	16.0	11.6 (158)	12.7 (42)	13.9 (31)
Federal Territory	20.0	20.0 (314)	20.0 (66)	26.2 (44)
Petaling	38.8	34.3 (99)	37.0 (27)	33.7 (20)
Ulu Selangor	41.8	34.7 (19)	44.0 (8)	38.4 (5)
Ulu Langat	49.1	35.7 (35)	30.7 (14)	34.4 (8)
Kuala Selangor	50.0	51.4 (25)	50.7 (3)	42.1 (3)
Kelang	63.3	62.4 (52)	62.0 (10)	50.1 (6)
Sepang	77.3	86.0 (1)	NA	NA
Kuala Langat	88.7	85.3 (3)	NA	NA
Sabak Bernam	112.0	-	-	-
Out of Region	NA	299.9 (27)	279.3 (6)	47.2 (2)
Out of Country	NA	NA (2)	NA	NA

* Travel origins are listed corresponding to the ascending order of mean travel distance from the origin, from the nearest to the furthest from the recreation area.

\- No visitors from this region

NA Information not available

( ) Number of cases

As previously mentioned, the number of visits from outside the region to the three recreation areas is small and is considered insignificant if compared with the total number of visits. From Table 24 it can be seen that if only the visits from within the region are taken into account, the mean distance travelled is reduced quite substantially. The mean distances travelled from within the region give a better reflection of the distances travelled by the majority of the visitors. Interestingly, if the out of the region travel distances are excluded from the data sets, the mean distance travelled produced by the short and extended questionnaires are remarkably similar (refer to Tables 24 and 25).

As regards perceived distances, the mean values given by the visitors who travel from the different origins are quite similar to the calculated mean travel distances. From Tables 26 to 28 it can be seen that the shorter distances are perceived more accurately than the larger distances. It appears that beyond the calculated distances of 50 kilometres the distances are perceived to be shorter then they should be. Perhaps it is easier to remember shorter rather than longer distances. Moreover, if repeated visits are made by those from the nearer travel origins, the knowledge of the distances involved should be better. The perceived distances for out of region visitors are much shorter than the calculated distances because the visitors, most of whom are on holiday within the region, perceive them as the distances that they travel from the point of departure from within the region. Admittedly this is an unforeseen shortcoming and was not accounted for when the questionnaire was formulated.

Journey Utility

As already described in Chapter 3, the area users' attitudes to travel is an important consideration when using the travel cost technique. It has long been recognised that if there is appreciable utility associated with the journey to the area, then, depending on the treatment of travel time, the technique might overestimate the net benefit to consumers from the activity (the opposite potential bias exists when the journey is an unpleasant experience).

To resolve this we would ideally want some cardinal measurement in monetary units of the degree of pleasure associated with the journey. While the state of the art prohibits this type of cardinal measurement, a distinct advance would be to be able to assess the direction of bias. In order to probe the visitors' attitudes towards the journey undertaken, visitors are provided with five ratings of the attitudes associated with the journey (1 - 5 in Table 29). Ratings 1 and 5 reflect the extreme ends of the attitudes towards the journey. Since this variable is probably determined to a large degree by several socio-economic considerations, it exhibits comparatively little variability among recreation areas. Crudely viewing the ratings as a range of attitudes, then clearly the results are distributed towards the 'indifference' and 'interesting' points of the spectrum with no distinct differences among the three recreation areas. This is somewhat surprising given the varying mean distances travelled.

There is, however, a suspicion that the attitudes towards travel could vary between different travel distances. Given the potential significance of these results for the use of the travel cost technique, it is prudent to investigate this issue further. The mean distance travelled by visitors

against their expression of particular attitudes is summarised in Table 30.

Table 29. Visitors' Attitude To Journey - within region visits

(% of visitors)

	Sungai Lalang	Ampang	Kancing
1) Very boring	1.3	0.0	0.6
2) Boring	2.6	6.7	2.4
3) Neither particularly boring or interesting	33.8	45.0	40.6
4) Interesting	59.7	43.0	53.5
5) Very interesting	2.6	5.3	2.9

Table 30. Mean Distance Travelled versus Attitude To Journey - within region visits

(Distance in kilometres)

	Sungai Lalang	Ampang	Kancing
1) Very boring	42.0 (1)*	-	26.0 (1)
2) Boring	28.0 (2)	9.2 (10)	21.5 (4)
3) Neither particularly boring nor interesting	31.7 (26)	14.5 (67)	25.0 (69)
4) Interesting	40.0 (46)	16.3 (64)	26.8 (91)
5) Very interesting	46.0 (2)	15.3 (8)	26.4 (5)

* Number of cases in brackets.

By inspection, no clear pattern emerges and an analysis of variance for each area confirms that there is no significant divergence in the mean distance travelled within each response category.

Time Spent Travelling

There are two ways of gaining information on the amount of time spent travelling. First, given an assumption of the speed of travel, the time consumed on travel could be obtained from the sample data on distance travelled. The speed of travel is normally assumed to be an average travel speed of a particular vehicle on a normal road under reasonable accessibility conditions. This method of estimating time spent travelling is entirely dependent on the assumed speed. There is also difficulty in assigning a travel speed to those who walk or cycle to the recreation area. Probably, the travel speed would vary between different modes of motorised vehicle. A second method of obtaining an estimate of travel time is to ask the visitors themselves. Although, as discussed earlier, there are problems with perceived answers, it was felt that this method would reveal a reasonable estimate of travel time.

Table 31. Time Spent Travelling on Weekend Trips
(Single journey from home to recreation area)

	Number of observations	Mean calculated travel distance[4] (Km)	Mean perceived travel time (mins)	Travel speed (kilometres per hour)
Sg. Lalang	84	53 Km	48	66
Ampang	151	21 Km	42	30
Kancing	178	36 Km	60	36

4 The mean calculated distance travelled from that of the extended questionnaire were used to estimate the journey speed because the perceived travel times have to come from the same source.

Table 31 implies that there is considerable variation in the speed with which visitors travel to their respective recreation areas, as reflected by the travel speed per hour. The transport infrastructure and the geographical location of recreation areas and visitors' origins clearly account for much of this variation. The average journey speed for the three areas does not vary proportionately with distance. This can be seen, for example, where the visitors to Ampang travel shorter distances but spend about the same time travelling as the visitors to Sungai Lalang who travel longer distances. Thus it appears that the speed of travel in order to reach Ampang is slower although the distance travelled is shorter. The difference in journey speeds might be explained by the conditions of accessibility to an area like Sungai Lalang. Although Sungai Lalang is quite a distance from major population centres, the road leading to it is less congested and the travel to the area encounters less traffic hinderance. This is unlike the accessibility to Ampang, where only one road leads to the area and this road passes through many small towns and residential areas along the way. It is therefore understandable that it takes more time to reach Ampang even if shorter distances are involved. Travellers to Kancing have the benefit of the major North-South highway which could lessen the time to get there. On the other hand lower journey speed would be recorded if the road becomes busy, especially during the weekends. Generally, it is much faster to travel to Sungai Lalang and Kancing than to Ampang from varying distances.

While the average speed of the journey is not affected that much by distance, it does vary substantially with different modes of transport. Table 32 summarises the time spent travelling to the areas by different modes of transport. There is obvious variability of journey speeds to the

Table 32. Time Spent Travelling on Weekend Trips

Modes of Transport	Observations	Mean calculted distance travelled (Km)	Mean Perceived Travel time (mins)	Travel speed (Km/hr.)
		Sungai Lalang		
Car/van	38	55	50	66
Motorcycle	24	53	41	78
Bicycle	-	-	-	-
Public bus	20	51	56	55
Chartered bus	2	26	30	52
Walking	-	-	-	-
Taxi	-	-	-	-
		Ampang		
Car/van	75	28	37	45
Motorcycle	32	9	22	24
Bicycle	1	3	15	12
Public bus	33	17	76	13
Chartered bus	2	54	60	54
Walking	3	4	22	11
Taxi	5	12	27	27
		Kancing		
Car/van	49	36	39	55
Motorcycle	40	27	49	44
Bicycle	1	20	30	40
Public bus	78	26	67	23
Chartered bus	10	122	164	45
Walking	-	-	-	-
Taxi	-	-	-	-

areas by different modes of transport. Several interesting travel features can be observed from Table 32. First, the journey speed varies differently between modes of transport for different areas. Second, the journey speeds for different modes of transport to different areas do not vary proportionally with distance travelled. Finally, the calculated journey speeds using perceived travel time are quite reasonable except for those who cycle or walk. The outcome of these findings are several. One is that there is no need to use assumed vehicular travel speeds to estimate the speed of journey. To use assumed vehicular travel speeds to estimate journey speeds would not only be inappropriate due to the difficulty of judging the best speed for varying transport conditions but would also meet with difficulty in assigning the travel speeds for the different modes of transport. Since the resultant speed of journey for different modes of transport to the areas are reasonably estimated by the use of perceived travel time, and since the speed does not vary proportionally with distance, the method suggested by Common (1973) can be employed to estimate the value of travel time.

5.4.2. Weekday Trips

There are reasons to suspect that, in some ways, the nature of the trip-travel on weekdays is slightly different from that of weekends. Table 33 indicates that on weekdays there are fewer multi-stop visits on the way to the recreation areas, except for those visiting Ampang. In the case of Sungai Lalang, on the other hand, there seem to be more on-the-way stops made by visitors after the day's outing at the area. The majority of the stops on the way to and from the recreation area are made at towns and the main reasons for such stops are either to rest, to stop or to conduct some personal business (see Tables 34 and 35). The time spent at the stops made

Table 33. Multi-Stop Visits - Weekday

	Number of Observations	Number that stop somewhere on the way to.	Mean length of stop (mins.)	Number that stop somewhere on the way from	Mean length of stop (mins.)
Sungai Lalang	9	2 (22.2%)	28	3 (33.3%)	90
Ampang	23	6 (26.1%)	17	1 (4.3%)	45
Kancing	34	4 (11.8%)	78	5 (14.7%)	78

Table 34. Features of Multi-stop visits - Places of Stop (weekday)

	Sg. Lalang		Ampang		Kancing	
Places of stop	To	From	To	From	To	From
Town	2	2	4	1	3	5
Transit station	0	0	1	0	0	0
Recreation area	0	0	0	0	1	0
Friend's place	0	1	1	0	0	0
Others	0	0	0	0	0	0

Table 35. Features of Multi-stop visits (weekday) - Reasons for Stop

	Sg. Lalang		Ampang		Kancing	
Reasons	To	From	To	From	To	From
To rest	1	0	1	0	1	2
For recreation	0	0	0	0	0	0
To shop	0	0	4	0	2	3
On business	1	1	0	0	1	0
To drink/eat	0	1	0	1	0	0
To visit friend	0	0	1	0	0	0
On transit	0	1	0	0	0	0
Unknown reasons	0	0	0	0	0	0

by weekend and weekday visitors on their way to Sungai Lalang is the same. On their way back, though, the weekday visitors of Sungai Lalang tend to stop at other places longer. This is in contrast to those who visit Ampang, where for weekday visits the stops made on the way to or from the recreation area are much shorter than those on weekends. The main reason that might contribute to this is that the weekday visitors come from shorter distances compared with weekend visitors (see Table 36). Weekend and weekday visitors to Kancing spend about the same time at stops on the way back from the recreation area, but among those who stop on the way to the recreation area, the weekday visitors spend a substantially longer time.

Thus, although the places of stops and the reasons for the stops are the same as those of weekend trips, the mean time spent at the various stops during the weekdays differs from that of the weekend trips. There is some doubt that the visits to the recreation area are the principal reason for the weekday trips for some of the visitors. In fact most of the weekday trips to the areas occur in the late afternoon and it is suspected that the time spent in the areas is shorter compared with the time spent by the weekend visitors. Bearing in mind that for weekdays the actual numbers of respondents are by far less than for weekends, comparison may not be perfectly legitimate.

The most striking difference between the weekend and weekday trips and travel is that there are no out of region weekday visitors to Sungai Lalang and Ampang. Only Kancing has some weekday visitors who come from outside the region and this is attributed mainly to the fact that Kancing is a popular stop for long distance travellers who frequent the north-south

highway (see Tables 38 to 40). More of the visitors to Sungai Lalang and Ampang travel from residential areas close to the recreation areas and as a consequence of that the mean distance travelled is much shorter, especially in the case of Ampang (see Table 36).

Another constrast is with respect to the effect of mean distance travelled and the attitude towards the journey. Although the weekday visitors' attitudes towards the journey are similar to those of the weekend visitors, that is, predominantly that of 'interesting' or 'indifference', the mean distance travelled does not reveal any clear pattern in relation to journey utility (see Tables 40 and 41). This is like the case of the weekend visitors, whereby there is no indication that the further the distance travelled the more interesting the journey becomes, thus indicating a negative value of the journey.

The variation in travel time is as follows: Sungai Lalang, 39 minutes, Kancing 58 minutes and Ampang 33 minutes. There is, therefore, considerable variation in the speed with which visitors travel to their respective recreation areas; Sungai Lalang visitors, 49 Km/hr., Ampang visitors, 18 Km/hr., and Kancing visitors, 82 Km/hr. The mean journey speed for Kancing is suspected to be exaggerated because the sample data have captured more out of region visitors who travel longer distances (but not revealed in the short interview).

This suspicion is proven true as revealed by the mean travel speed for those who travel by car or van to Kancing (see Table 44). The journey speed in this particular case is about 210 kilometres per hour, which is rather fast ! In fact if only within the region visits are used to calculate the journey speed, the journey speed for car or van to Kancing is

Table 36. Distance Travelled by Weekday Visitor Groups (Short Questionnaire)

	Visits from within country			Visits from within region		
	Number of visits	Mean calculated distance (one-way)	std. Dev.	Number of visits	Mean calculated distance (one-way)	Std. Dev.
Sungai Lalang	14	35.3 Km.	22.7	14	35.3 Km.	22.7
Ampang	46	7.7 Km.	5.1	46	7.7 Km.	5.1
Kancing	58	76.2 Km.	70.7	56	23.7 Km.	16.2

Table 37. Distance Travelled by Weekday Visit Groups (Extended Questionnaire)

	Visits from within country			Visits from within region		
	Number of obser-vations	Mean calculated distance (one-way)	std. Dev.	Number of obser-vations	Mean calculated distance (one-way)	Std. Dev.
Sungai Lalang	9	32.2 Km.	21.8	9	32.2 Km.	21.8
Ampang	23	10.3 Km.	5.6	23	10.3 Km.	5.6
Kancing	32	79.8 Km.	140.7	27	22.2 Km.	14.3

Table 38. Distance Travelled to Recreation Area (weekday) - Sungai Lalang

Mean Distance in Kilometres (one-way)

Travel origin*	Mean travel distance from origin	Mean calculated distance (short questionnaire)	Mean calculated distance (extended questionnaire)	Mean perceived distance (extended questionnaire)
Ulu Langat	29.4	17.5 (8)	18.7 (6)	14.4 (6)
Sepang	46.7	-	-	-
Federal Territory	52.0	52.0 (3)	52.0 (1)	28.8 (1)
Petaling	58.4	66.0 (3)	63.0 (2)	35.2 (2)
Gombak	59.3	-	-	-
Kelang	90.7	-	-	-
Kuala Langat	101.0	-	-	-
Ulu Selangor	107.7	-	-	-
Kuala Selangor	115.5	-	-	-
Sabak Bernam	169.2	-	-	-
Out of Region	NA	-	-	-
Out of Country	NA	-	-	-

* Travel origins are listed corresponding to the ascending order of mean travel distance from the origin, from the nearest to the furthest from the recreation area.

\- No visitors from this region

NA Information not available

( ) Number of cases

Table 39. Distance Travelled to Recreation Area (weekday) - Ampang

Mean Distance in Kilometres (one-way)

Travel origin*	Mean travel distance of from origin	Mean calculated distance (short questionnaire)	Mean calculated distance (extended questionnaire)	Mean perceived distance (extended questionnaire)
Federal Territory	12.0	12.0 (15)	12.0 (12)	19.2 (8)
Gombak	24.5	26.0 (1)	22.0 (2)	NA
Petaling	30.4	18.0 (1)	NA	NA
Ulu Langat	36.6	4.4 (29)	5.3 (9)	9.3 (5)
Kelang	54.0	-	-	-
Sepang	66.7	-	-	-
Kuala Selangor	78.8	-	-	-
Kuala Langat	79.3	-	-	-
Ulu Selangor	81.2	-	-	-
Sabak Bernam	136.0	-	-	-
Out of Region	NA	-	-	-
Out of Country	NA	-	-	-

* Travel origins are listed corresponding to the ascending order of mean travel distance from the origin, from the nearest to the furthest from the recreation area.

\- No visitors from this region

NA Information not available

( ) Number of cases

Table 40. Distance Travelled to Recreation Area (weekday) - Kancing

Mean Distance in Kilometres (one-way)

Travel origin*	Mean travel distance of from origin	Mean calculated distance (short questionnaire)	Mean calculated distance (extended questionnaire)	Mean perceived distance (extended questionnaire)
Gombak	16.0	9.2 (15)	11.8 (10)	11.4 (9)
Federal Territory	20.0	20.0 (25)	20.0 (9)	24.4 (8)
Petaling	38.8	36.0 (6)	36.0 (2)	NA
Ulu Selangor	41.8	24.0 (2)	24.0 (1)	17.6 (1)
Ulu Langat	49.1	35.3 (3)	27.3 (3)	24.0 (3)
Kuala Selangor	50.0	-	-	-
Kelang	63.3	62.0 (4)	62.0 (2)	72.0 (1)
Sepang	77.3	72.0 (1)	NA	NA
Kuala Langat	88.7	-	-	-
Sabak Bernam	112.0	-	-	-
Out of Region	NA	94.5 (2)	390.4 (5)	21.8 (5)
Out of Country	NA	NA	NA	412.0 (2)

* Travel origins are listed corresponding to the ascending order of mean travel distance from the origin, from the nearest to the furthest from the recreation area.

\- No visitors from this region

NA Information not available

( ) Number of cases

Table 41. Visitors' Attitudes To Journey - weekday

(% of visitors)

	Sungai Lalang	Ampang	Kancing
1) Very boring	0.0	0.0	7.4
2) Boring	0.0	8.7	7.4
3) Neither particularly boring nor interesting	44.4	34.7	40.7
4) Interesting	44.4	56.6	44.5
5) Very interesting	11.2	0.0	0.0

Table 42. Mean Distance Travelled versus Attitude To Journey - weekday

(Distance in kilometres)

	Sungai Lalang	Ampang	Kancing
1) Very boring	-	-	20.0 (2)
2) Boring	-	4.0 (2)	26.0 (2)
3) Neither particularly boring nor interesting	38.5 (4)	12.5 (8)	23.8 (11)
4) Interesting	30.5 (4)	9.8 (13)	20.5 (12)
5) Very interesting	14.0 (1)	-	-

Table 43. Time Spent Travelling on Weekday Trips
(Single journey from home to recreation area)

	Number of observations	Mean calculated travel distance (Km)	Mean perceived travel time (mins)	Travel speed (kilometres per hour)
Sg. Lalang	9	32	39	49
Ampang	23	10	33	18
Kancing	34	80	58	82

Table 44. Time Spent Travelling on Weekday Trips

Modes of Transport	Observations	Mean calculated distance travelled (Km)	Mean Perceived Travel time (mins)	Travel speed (Km/hr.)
		Sungai Lalang		
Car/van	6	34	41	57
Motorcycle	1	14	20	42
Bicycle	1	28	45	37
Public bus	1	14	45	19
Chartered bus	-	-	-	-
Walking	-	-	-	-
Taxi	-	-	-	-
		Ampang		
Car/van	10	9	23	24
Motorcycle	3	7	15	28
Bicycle	1	4	30	8
Public bus	6	15	50	18
Chartered bus	-	-	-	-
Walking	2	12	30	24
Taxi	1	12	90	8
		Kancing		
Car/van	13	122	35	210
Motorcycle	10	50	39	76
Bicycle	-	-	-	-
Public bus	10	53	101	32
Chartered bus	1	46	90	31
Walking	-	-	-	-
Taxi	-	-	-	-

about 41 kilometres per hour, a more reasonable figure. There is very little doubt that the journey speed for cars and vans to Kancing is exaggerated by the larger calculated distances, taken as the distance from the place of origin (which includes many out of region visitors) and smaller perceived travel time because some visitors who were on holiday within the region but from origins outside the region gave the perceived travel time as from their temporary residence rather than from their own residence. There is also a possibility that the journey speeds for those who walk or cycle to all the areas are incorrect. A similar exaggeration of journey speed for those who walk or cycle is also obtained for the weekend visitors. The source of this is the underperceiving of walking or cycling time.

The journey speeds for the other modes of transport to all the areas seem reasonable. The variation of journey speed would mainly be accounted for by the transport infrastructure and the geographical location of the recreation areas. It is found, through the author's experience, that it is much faster to travel by a motorcycle on a busy road than by a car. This is evident by the figures revealed for those who travel to Ampang, in Table 44.

Generally, the perceived travel time is a good estimate and the variable journey speeds by different modes to the recreation areas have indicated that travel time is not highly correlated with the distance travelled. The value of travel time can be estimated through an iterative procedure as suggested in Chapter 3.

5.4.3. Monetary Cost of Travel

Most journeys for recreational purposes are undertaken by motorised vehicles. However, it is possible that the distribution of types of transport will vary among the travel origins. Indeed this is the result obtained from the survey of visitors to the three survey areas. The mode of transport commonly used to travel to Sungai Lalang and Ampang is the car or van (52%). Two different modes of transport are predominantly used to travel to Kancing, the car or van (38%) and the public bus (35%). The next most popular means of journey is the motorcycle : Sungai Lalang, 30 per cent, Ampang, 22 per cent and Kancing, 25 per cent. There are some instances of travel by chartered bus or taxi to the three areas and negligible cases of those who walk or cycle to Ampang and Kancing.

The use of different modes of transport to travel to the recreation areas means that the calculation of the 'running' cost of the vehicle would have to be different for each mode of transport. Besides that, the cost would also vary with the size of the engine of the vehicle, especially that of the car, van and motorcycle. The running cost of the buses and taxis cannot be assigned to the cost of visiting the areas; instead the fare per person seems more appropriate. Thus the monetary costs per person from visiting the areas have to be computed on information from different sources, running cost for cars, vans and motorcycles and fares for buses and taxis. A standard assessment could be derived from the perceived cost of travel. This, however, has given rise to conflicting results on the validity of the perceived costs. Christensen (1983) cautioned that the perceived running costs varied highly significantly with the prompting method in deriving the perceived costs, which includes an 'open' option for visitors to state their costs.

The estimated average running costs for car and van and motorcycle used here are 0.13 cents and 0.05 cents per kilometre respectively. As for the other modes of tranbsport, the charges per kilometre are : for public buses, 0.04 cents per person, taxis, 0.38 cents per person and chartered buses, 0.10 cents per person (Ministry of Transport, Malaysia, 1982 and Abas Said, 1983). Tables 45 and 46 summarise the mean monetary travel cost for a single journey for different modes of transport that are used to travel to the three areas on weekdays and weekends. The calculated average cost varies with modes of transport and with different areas. This is as a result of the variation of distance travelled by each mode to the different areas. The average costs of travel by car or van and motorcycle to Kancing on weekdays are rather high due to the higher mean distance travelled being exaggerated by the out of the Table region travellers.

For an economic analysis of social value it would be ideal if we could establish a trip demand curve from the perceived costs, and then use calculated costs when calculating the consumers' surplus. The questionnaire asked for the perceived cost of travel based on the cost of petrol and charges of fare per person for those who travel by public transport. From Tables 45 and 46 it can be seen that the perceived cost per kilometre of travel by different modes of transport differ. The variation is also reflected in the perceived cost of travel to the different areas. Perhaps a more surprising finding is that there also exists a variation of perceived cost per kilometre for the same modes of transport between the weekend and the weekday travellers. The perceived cost per kilometre for a car or van, on a weekend trip ranges between 0.13 cents for Sungai Lalang to 0.23 cents for Kancing; motorcycle, 0.07 cents for Sungai Lalang to 0.18 cents for Ampang, and public buses, 0.03 cents

Table 45. Monetary Cost of Travel - weekend trips

(Mean single journey)

	Mean calculated distance (Km)	Calculated cost: Observations	Calculated cost: Cost (M$)	Calculated cost: Cost per Km.	Perceived cost: Observations	Perceived cost: Cost (M$)	Perceived cost: Cost per Km.
Sungai Lalang							
Car/van	55	38	7.30	0.13	25	7.30	0.13
Motorcycle	53	24	2.88	0.05	24	3.69	0.07
Public bus	51	20	1.93	0.04	19	1.73	0.03
Chartered bus	26	2	2.63	0.10	NA	NA	NA
Taxi	-	-	-	-	-	-	-
Ampang							
Car/van	28	75	3.74	0.13	58	4.06	0.15
Motorcycle	9	32	0.49	0.05	26	1.63	0.18
Public bus	17	33	0.67	0.04	32	2.10	0.12
Chartered bus	54	2	5.56	0.10	2	7.50	0.14
Taxi	12	5	4.53	0.38	5	6.96	0.58
Kancing							
Car/van	36	49	4.91	0.13	39	8.38	0.23
Motorcycle	27	40	1.45	0.05	39	2.96	0.11
Public bus	26	78	1.03	0.04	75	2.02	0.08
Chartered bus	122	10	12.59	0.10	7	17.96	0.15
Taxi	-	-	-	-	-	-	-

NA - Information not available.

Table 46. Monetary Cost of Travel - weekday trips

(Mean single journey)

	Mean calculated distance (Km)	Calculated cost: Observations	Calculated cost: Cost (M$)	Calculated cost: Cost per Km.	Perceived cost: Observations	Perceived cost: Cost (M$)	Perceived cost: Cost per Km.
Sungai Lalang							
Car/van	39	6	5.27	0.13	5	4.40	0.11
Motorcycle	14	1	0.76	0.05	1	1.00	0.07
Public bus	14	1	0.57	0.04	1	1.30	0.09
Chartered bus	-	-	-	-	-	-	-
Taxi	-	-	-	-	-	-	-
Ampang							
Car/van	9	10	1.19	0.13	8	2.09	0.23
Motorcycle	7	3	0.36	0.05	1	0.50	0.07
Public bus	15	6	0.60	0.04	6	1.88	0.13
Chartered bus	-	-	-	-	-	-	-
Taxi	12	1	4.53	0.38	1	5.00	0.42
Kancing							
Car/van	112	13	16.47	0.13	11	7.29	0.06
Motorcycle	50	10	2.69	0.05	8	2.06	0.04
Public bus	53	10	2.01	0.04	10	11.20	0.21
Chartered bus	46	1	4.74	0.10	1	1.00	0.02
Taxi	-	-	-	-	-	-	-

for Sungai Lalang to 0.12 cents for Ampang. The perceived cost per kilometre is however highest for those who travel by car or van followed by those who travel by motorcycle, public buses and chartered buses, respectively. This is true for all the three areas.

This is however not the case for travellers by different means of transport on the weekday trips. Although the perceived cost per kilometre varies between transport modes and area, there is no clear pattern to show that it is more expensive to either travel by car, motorcycle or public buses. It seems that it was perceived more costly to travel per kilometre on public bus to Ampang, Sungai Lalang and Kancing on a weekday rather than to travel by a motorcycle. Why there should be such variation between weekend and weekday trips cost is not clear from the sample data.

The important feature to look for is whether the calculated cost using an average cost is any different from the perceived costs. The results show that for most modes of transport used on the weekend the perceived cost (cost of petrol or fare charges) is higher than the average calculated cost of travel (includes the total cost of 'running' the vahicles). This revelation is interesting because it would indicate that the perceived costs are closer to the marginal cost of travel. The calculated average cost per kilometre could be closer to the perceived cost per kilometre if the latest figures for the estimated average costs are available (assuming that the latest figures could well be slightly above the 1982 values given by the Ministry of Transport).

A closer look at Table 47 could help to summarise the above discussion. Table 47 shows the average monetary cost of travel for a single journey derived from a summation of the travel costs for all the

modes of transport. It shows that the travel expenditure does not vary in a manner which reflects the variation in travel distance between the areas, suggesting that costs per kilometre do vary. For weekend trips, the calculated cost per kilometre travelled is quite similar for visitors to Sungai Lalang and Kancing, but the value for Ampang is almost double that of the other two areas. The reason for this is that there are visits to Ampang by taxis but none to the other areas. For the weekday trips, the calculated costs per kilometre travelled to Ampang and Kancing are almost equal, but for Sungai Lalang it is higher. Differences in distance travelled and the fact that most visitors to Sungai Lalang travel by cars, which incur higher costs, could well explain this difference.

Table 47. Monetary Cost of Travel

(Mean single journey)

	Weekend Trips					Weekday Trips				
	Mean cal. dis. (Km)	Cal. cost (M$)	Cost per Km. (M$)	Per. cost (M$)	Cost per Km. (M$)	Mean cal. dis. (Km)	Cal. cost (M$)	Cost per Km. (M$)	Per. cost (M$)	Cost per Km. (M$)
Sungai Lalang	53	4.69	0.088	4.98	0.94	32	4.12	0.129	3.47	0.108
Ampang	21	2.39	0.114	3.21	0.153	10	1.05	0.105	2.00	0.200
Kancing	36	2.87	0.080	4.50	0.125	80	8.18	0.102	7.00	0.088

As for the perceived cost, the differences in the proportion of modes of transport, distances and the way the costs are perceived and the interplay of these factors could contribute to the differences in cost per kilometre among the three areas and between the weekend and weekday trips. It has already been explained in Chapter 3 that difficulty arises when the

consumers are asked to perceive the cost of travel if they were to use the public transport system. The results obtained here clearly support that claim. The inconsistency that is observed in the visitors' perception of the cost for the same mode of transport has reduced the validity of using perceived cost in the calculation of monetary cost of travel.

5.5. LENGTH OF VISIT

The most noticeable feature of length of visit is the longer duration of stay at Sungai Lalang and Kancing compared with Ampang. As outlined in the description of distance travelled, there appears to be a difference in the mean distance travelled for the three areas. In particular, visitors making trips to Sungai Lalang and Kancing come from various distances, including those from intermediate origins and origins further away. On average, the visitors making these trips travel further than visitors to Ampang. Given that there is undoubtedly a relationship between travel cost and length of visit, then longer mean distances will be mirrored in a longer mean length of stay (see Table 48).

Table 48. Length of Visit

	Mean Distance Travelled (kilometre)	Mean Length of Visit (hours)	Weighted Mean Length of Visit (hours)
Sungai Lalang	51	5.4	2.66
Ampang	19	3.6	2.75
Kancing	42	5.0	2.96

The relationship between mean distance travelled and length of visit is clearly evident for the weekend trips (see Table 49). The mean length of visit is slightly different for the weekend trips among the three areas.

On weekdays it is much shorter for Sungai Lalang and Ampang mainly because of the shorter mean distance travelled. The mean length of stay on the weekday is longer for Kancing due to the effects of longer distance travelled and the presence of campers who stay overnight. Apart from being a well known stop-by area, Kancing is also popular for overnight camping.

Table 49. Length of Visit - weekend and weekday

	Weekend			Weekday		
	Mean distance travelled (Km)	Mean length of visit (hours)	Weighted mean length of visit (hours)	Mean distance travelled (Km)	Mean length of visit (hours)	Weighted Mean length of visit (hours)
Sungai Lalang	53	5.6	2.68	32	3.2	2.43
Ampang	21	3.7	2.78	10	3.2	2.53
Kancing	35	4.9	2.93	80	5.8	3.14

Table 50. Mean Length of Visit by Origin of Visit - Day visits only

	Visits in hours		
Origin	Sungai Lalang	Ampang	Kancing
Ulu Langat	3.3	3.5	3.0
Sepang	2.0	-	-
Federal Territory	3.4	3.1	3.9
Petaling	2.2	3.0	3.2
Gombak	2.0	3.1	3.5
Kelang	3.0	3.8	4.0
Kuala Langat	3.0	-	-
Ulu Selangor	-	-	3.9
Kuala Selangor	-	-	2.3
Sabak Bernam	-	-	-
Out of Region	4.0	2.5	3.5
Out of Country	-	-	3.5

There are two pertinent issues related to the length of visit. First, if we consider the sample to be random with respect to the date and time of day, then the visitors who stay for a longer time period have a higher probability of being sampled than those who stay for a shorter time period. Perhaps this problem could be reduced if the visitors were sampled on their way out of the area; however the survey for this study was conducted while the visitors were on site. In this instance Lucas (1963) has suggested that to calculate the average length of stay it should be weighted inversely proportional to the length of stay of the visitors. The results of this is also shown in Tables 48 and 49. Undoubtedly, the weighted mean length of stay gives a lower estimate but interestingly the mean values for the three areas are almost similar.The lower almost similar estimates produced as a result of the weighting is more accurate because the few cases of longer length of stay by those who were camping overnight at Sungai Lalang and Kancing is now balanced by the majority of visitors who visited only for the day.

The above results have a bearing on the second issue, which is, if a positive correlation is found such that people from further away stay longer in the area, it may lead to an overestimation of the number of visitors from the furthest origins and thus the trip demand curve is biased upwards. In other words if the length of visit varies with distance travelled we are not, in effect, dealing with homogeneous entities.

Checking this point against the survey results, it is found by a regression analysis that the mean length of visit for the areas does not vary significantly among distances travelled, indicating that the differences in mean distances travelled do not affect the mean length of

stay at a particular area. A regression between length of stay and travel cost was also carried out and the result showed, for each area, that there is no significant relationship between the two variables.This is supported by examining Table 50 where the mean lengths of stay for visitors who travel from various origins (with varying distances) are also seen to be quite similar (not significantly different from one another). Therefore we may conclude that the problem discussed in the previous paragraph does not bias the sample. Seen in this light, then, there is no need to apply a weighting for the length of visits.

5.6. ALTERNATIVE AND COMPETING AREAS

An important determinant of the ultimate value of any good, service or activity to a society is the number of substitutes for it. An area's substitutes are thus relevant to a study of its economic characteristics and value. Moreover, as outlined in Chapter 3, the treatment of substitute areas is an important consideration in the case of the travel cost method. The questionnaire thus attempted to obtain some insight into the alternatives available to visitors at each of the three survey areas. It is of course impossible to consider the whole range and type of recreation areas that a visitor could have visited; indeed for this reason the visitors were asked to consider only resource-based recreation areas. Even this would generate a long list if it included areas throughout the country. To ensure reasonable and genuine alternative areas that a visitor could have visited, only forest recreation areas within the region under study or just outside it were asked to be named. This is reasonable enough, because as already shown, a majority of the visitors to the survey areas come from within the region and they would very likely consider it

unreasonable to be travelling beyond certain distances, especially for a day trip.

Table 51 summarises the number of visitors who have visited other areas which they consider as alternatives.The proportion of those who have visited other areas clearly indicates that there exist alternative, if not competing areas. Several alternatives were named, but they all comprised resource-based recreation areas within and just outside the region. Table 52 lists the names of the alternative areas and the number of visitor groups that have visited the areas. For all three areas the actual spatial distribution of alternative areas specified by the visitors is much broader than expected.

Table 51. Number that had Visited other Recreation Areas

	Number of respondents	Number that had visited other areas	Total number of alternative areas visited
Sungai Lalang	93	51 (55%)	15
Ampang	174	77 (44%)	15
Kancing	212	81 (38%)	13

Ideally we would want to identify the closest substitute and to obtain some measure of its price. If one particular area is regarded by a majority of the survey area's visitor population as a good substitute, it may be possible to establish some proxy for the price of alternatives. Clearly several areas could be regarded as good substitutes for any of the survey areas. Interestingly, even the three survey areas themselves are possible substitutes for one another! From Table 52, two other areas have also emerged as good substitutes, namely Templer Park and Lentang. All these

Table 52. Number of Visitor Groups Who Have Visited Alternative Recreation Areas

Recreation Area	Sg. Lalang visitor groups	Ampang visitor groups	Kancing visitor groups	Total visitor groups
1. Templer Park	11	19	3	33
2. Kancing Recreation Forest	19	36	-	55
3. Ampang Recreation Forest	1	-	30	31
4. Sg. Lalang Recreation Forest	-	3	10	13
5. Pangsoon	2	1	-	3
6. Fraser's Hill	1	1	2	4
7. Ulu Bendul	2	2	-	4
8. Pancing	1	-	3	4
9. Batang C	1	-	-	1
10. Kota Tinggi	1	-	-	1
11. Sg. Mahang	2	-	-	2
12. Lentang	6	5	16	27
13. Ulu Jempul	1	1	-	2
14. Lata Iskandar	1	-	-	1
15. Batu 22	1	-	-	1
16. Pasir Panjang	1	-	-	1
17. Janda Baik	-	1	-	1
18. Alang Sedayu	-	1	-	1
19. Jeram	-	3	2	5
20. Bukit Bendul	-	1	-	1
21. Bukit Pulus	-	1	-	1
22. Lenggeng	-	1	-	1
23. Cameron Highlands	-	1	3	4
24. Mimaland	-	-	3	3
25. Taman Negara	-	-	2	2
26. Jeramtoi	-	-	3	3
27. Bukit Gasing	-	-	2	2
28. Sungai Bill	-	-	1	1

five possible substitute areas are predominantly specified by the visitors groups from the survey areas. One possible reason for this is that, given that a majority of the visitors to the survey areas are from the region and that all the five areas are located within the region, then the five areas constitute the most frequently visited areas.

Some of the other recreation areas named are also located within the region but are not predominantly visited. There are mentions of other areas which are located outside the region, including recreation forests and other resource-based recreation areas. However, these areas could not be considered as reasonable substitutes for the survey areas for several reasons. Firstly, although resource-based, the areas are commercially developed, for example, Mimaland, Fraser's Hill and Cameron Highlands. These areas are, on certain assumptions, an attraction to a different clientele. Secondly, where some of the areas are located a considerable distance from the region, they become poor substitutes because the expenditure of time is likely to prohibit a day's visit to these areas if the visit were to start from within the region. Finally, a combination of further travel distances, relative unpopularity of an area and the different management emphasis of an area could make the area an unreasonable substitute to the survey areas. It has been emphasised earlier that in studying the effects of alternatives or competing areas, only those areas that are of a similar type will be considered. The survey results have revealed five recreation areas that may be attracting different levels of visitors and which may be in competition with one another.

There still remains the question of how to assess the alternatives in

order to show if they could affect the visitation pattern at the survey areas. In the next section, several possibilities are explored in deriving an attractiveness index for all the areas and a proxy price for the alternatives.

5.7. CHARACTERISTICS OF THE AREAS

The three areas differ in some obvious physical and recreational characteristics. Indeed, they are in part selected to be representative of the different types of recreation forest generally available in the region under study. The aim of this study is to put a value on the particular combination of services which are offered by a site. A description of the services that are on offer is thus pertinent, although not crucial, to this study. This was briefly highlighted in Chapter 4. In this respect, it is felt that one way to gauge the quality of the areas, both survey areas and the alternative or competing areas, is by considering the expressed opinion of the users on several aspects of the areas which are considered important in deriving an attractiveness index.

Special Features of the Areas

There are of course many characteristics which may be important in describing the quality of an area. They include, among others, scenic and environmental qualities. Although, by and large, the scenic and environmental characteristics are fixed, they still feature strongly as an important element of an area. When asked what to them are the special features of the survey areas, a predominant number of visitors indicated attractive physical features as an answer (see Table 53). More than 80 per cent of the visitors to Kancing who responded to the question comparing the special features between the area and its alternatives consider Kancing as

Table 53. Special Features of the Survey Areas

	Sg. Lalang		Ampang		Kancing	
	N*	%	N	%	N	%
1. Attractive physical features.	13	27.7	14	20.9	60	81.1
2. Availability of man-made facilities.	8	17.0	8	11.9	5	6.8
3. Less disturbed environment.	12	25.5	8	11.9	1	1.4
4. Less crowded and more peaceful.	6	12.8	1	1.5	0	0
5. Larger and gentler terrain.	3	6.4	11	16.4	2	2.7
6. More accessible from the main road or residence.	1	2.1	3	4.5	1	1.4
7. Food stalls are available.	0	0	0	0	0	0
8. Better and safer area to visit.	1	2.1	8	11.9	2	2.7
9. Vehicle can enter the area.	0	0	4	6.0	0	0
10. Well known area.	1	2.1	1	1.5	1	1.4
11. More visitors.	0	0	1	1.5	0	0
12. Good for a swim or bath.	0	0	0	0	0	0
13. Similar to alternative areas.	0	0	0	0	1	1.4
14. Nothing special about this area.	2	4.3	8	12.0	1	1.4

* N - Number of respondents.

having attractive physical features. The outstanding natural scenic quality of Kancing which is repeatedly mentioned by the respondents is the presence of the seven-storey waterfalls. For Sungai Lalang, what is indicated as its special feature is a balance between its attractive physical features (27.9%) and a less disturbed environment (25.5%). The special feature that stands out for Ampang is a combination of attractive physical features (20.9%) and the fact that the area is larger and relatively gentler in terrain (16.4%). Although the features described above constitute the predominant special features of the individual survey areas, there are other features listed by the visitors that characteristically distinguish one area from another. Sungai Lalang, for example, is considered less crowded and more peaceful. Ampang is different because motorised vehicles are allowed to enter right into the area. One feature that is equally specified as important for the three areas is the presence of man-made facilities.

The last comment raised above is pertinent in the search for a good indicator or indicators of the quality of an area which could help to differentiate one area from another. It is necessary that the choice of the indicators be made on the basis of what can be easily measured. Physical and environmental characteristics are difficult to assess. More often than not, as indicated above, the elements of outstanding physical environment are viewed as equally important in all areas. If a good indicator is to be found it would probably have to be the one that is present in one area and not in the other, or if the same is as important in all the areas its measurement must reveal some degree of difference. Possible good quality indicators may also be revealed when visitors are asked to state which of the many characteristics that are special to the

alternative areas are not present in the survey areas (see Table 54). Very few visitors to Kancing (3.8%) view the alternatives as having attractive physical features compared with those of Kancing. Those alternative areas include Sungai Lalang, Ampang, Templer Park and Lentang. For the visitors to Kancing, the alternative areas offer a less disturbed environment (11%), a good place to go for a swim or bath (28%), a safer area to visit (9%) but otherwise the alternatives are similar to Kancing (11%) and possess no outstanding features (21%). The visitors to Ampang, however, have a rather different perception of its alternatives. More visitors (70%) to Ampang consider the alternatives as having attractive physical features (the alternatives include Kancing). Similarly with the visitors to Sungai Lalang, where 43 per cent state that the alternatives exhibit attractive physical features, larger area and gentler terrain (17%) and availability of food stalls near the areas (9%).

There are several features that distinguish the alternatives from the survey areas. Visitors to Ampang consider the alternatives as less crowded and more peaceful areas, whilst the visitors to Kancing mention the fact that some alternatives allow the entry of motorised vehicles into the area. The one feature that is not stated by the visitors about the survey areas but is substantially mentioned for the alternatives is that the alternatives offer a place to go for a swim or bath.

The Quality of An Area

Thus it has been shown from the above discussion that there are several features of an area which are generally considered equally prominent in all the areas. Such features include physical and environmental characteristics. But although the physical and environmental

Table 54. Special Features of Alternatives to the Survey Areas

	Alternative to Sg. Lalang		Alternative to Ampang		Alternative to Kancing	
	N*	%	N	%	N	%
1. Attractive physical features.	15	42.9	44	64.8	2	3.8
2. Availability of man-made facilities.	0	0	2	3.2	1	1.9
3. Less disturbed environment.	1	2.9	5	7.9	6	11.3
4. Less crowded and more peaceful.	0	0	1	1.6	0	0
5. Larger and gentler terrain.	6	17.1	1	1.6	3	5.7
6. More accessible from the main road or residence.	0	0	0	0	0	0
7. Food stalls are available.	3	8.6	0	0	2	3.8
8. Better and safer area to visit.	1	2.4	4	6.4	5	9.4
9. Vehicle can enter the area.	0	0	0	0	2	3.8
10. Well known area.	0	0	0	0	0	0
11. Presence of more visitors.	2	5.7	0	0	0	0
12. Good for a swim or bath.	2	5.7	5	7.9	15	28.3
13. Similar to survey area.	4	11.4	1	1.6	6	11.3
14. Nothing special about this alternative area.	1	2.9	0	0	11	20.8

* N - Number of respondents.

features may be taken as indicators of the quality of an area, there is the inevitable difficulty in measuring the extent of physical and environmental attractiveness. The features in question exist in all the areas in different forms and in varying degrees of subtlety. An attempt to elicit measurements of the physical and environmental attractiveness of an area from the visitors could prove to be a futile exercise. For practical reasons it is considered more fruitful to ask the visitors to rate or scale certain travel and area features, which could, even if in a more modest way, indicate the overall quality of an area.

From the perception of the visitors, several travel and area characteristics have emerged as being indicators of the quality of an area. These include travel features such as distance travelled, trip journey and area accessibility. The area characteristics that could possibly distinguish one area from another are the number of visitors in an area and its effects on congestion, and the conditions of the facilities currently provided in the area. The presence and state of man-made facilities is selected as an indicator of the area's quality because it is a management decision variable which could vary from one area to another. In order to assess the opinion of the visitors towards the variables mentioned above, rating values are assigned. The ratings range from 1 to 5 for perceived distances travelled, journey of the trip, area accessibility, density of visitors and congestion (see Table 55). As for the facilities available, the ratings range from 1 to 4 (see Table 56). There is no mid-point for the rating on facilities in order to ensure that a definitive answer is obtained. Also, the higher the rating the better is a particular facility provided for.

Table 55. Mean Rating Values for Travel and Area Characteristics

Characteristics*	Sungai Lalang	Alter. to Sungai Lalang	Ampang	Alter. to Ampang	Kancing	Alter. to Kancing
Travel	3.02	2.19	3.16	2.30	3.06	2.78
Journey	3.58	3.28	3.47	3.57	3.54	3.27
Access	3.17	3.69	2.90	3.64	3.52	3.05
Perceived density	3.40	2.05	3.00	2.40	2.99	2.60
Perceived congestion	3.30	2.32	3.01	3.84	3.06	2.76

*Rating Values :

	(1)	(2)	(3)	(4)	(5)
Travel	Too far	Far	Just alright	Near	Too Near
Journey	Very boring	Boring	Just alright	Interesting	Very Interesting
Access	Very	Poor	Satisfactory	Good	Very good
Perceived density	Too many	Many	About right	Few	Too few
Perceived congestion	Packed	Crowded	Comfortable	Deserted	Too deserted

Table 56. Differences between Rating Means of Survey and Alternatives Areas - Travel and Area Characteristics

Characteristics	Sungai Lalang	Ampang	Kancing
Travel	+ 0.83	+ 0.86	+ 0.28
Journey	+ 0.30	- 0.10	+ 0.27
Access	- 0.52	- 0.74	+ 0.47
Perceived density	+ 1.35	+ 0.60	+ 0.39
Perceived congestion	+ 0.98	- 0.83	+ 0.70

Mere inspection of Table 55 reveals several interesting features which distinguish the survey areas from their alternatives. The visitors to the survey areas, for example, feel that they would have to travel a further distance to get to the alternatives. Visitors to Sungai Lalang rate the alternatives as crowded. Accessibility to Ampang is considered poor compared with accessibility to its alternatives - this condition has been described repeatedly earlier because there is only one road leading to Ampang and it is always heavily congested. One feature that is common to the three survey areas is that the alternatives are perceived as being visited by more people; only the visitors to Ampang feel that the alternatives are a comfortable place to visit.

Overall, based on the ratings adopted for the characteristics selected in Table 55, the survey areas have been given slightly higher weights than the alternatives. Judging from Table 56, Kancing is perceived superior in all respects to the alternatives. As far as alternatives are concerned, Ampang is thought of as a closer area to visit but poor in terms of its accessibility and for Sungai Lalang, this area is best if visitors want isolation.

It is rather peculiar that the presence and conditions of the facilities within the areas are perceived quite differently. Almost all the facilities in the survey and alternative areas are perceived as being in a poor or very poor state. The few exceptions are those found of the camping sites at Sungai Lalang, which are rated as satisfactory. The visitors to Sungai Lalang rate the information service, camping sites and swimming and bathing spots at the alternatives as also in satisfactory condition. The visitors to Ampang rate the swimming and bathing spots and

changing rooms as more satisfactorilly available at the alternatives than at Ampang (see Table 57).

As far as alternative sites are concerned it appears that, overall, Kancing proves a better site compared with Sungai Lalang or Ampang. For Ampang, there is no single facility where it is rated better than the alternatives, the worst rating being given to the changing rooms (see Table 58). In summary, where the concern is with travel characteristics and the presence of crowds, the survey areas are rated higher than the alternatives, whilst with respect to facilities, the alternatives are rated better than the survey areas. When the features rated in Table 55 and 57 are taken together, the summation of the ratings is highest for Kancing followed by Sungai Lalang and Ampang.

The description so far has indicated that the quality of an area could differ from one area to another. The consensus of opinion by the visitors on several characteristics of travel, trip and area features have shown slight but distinguishable differences in quality between the survey areas and between each survey area and its alternatives. We could expect the quality of an area to influence the position of the demand curve. One overwhelming feature that would influence the shape of the demand curve would be the differences in the travel distances from the visitors' origins to the different alternative recreation areas. The importance of the travel distances is not only shown by Table 55 but also, when visitors are asked why visits are made to the survey areas and not to the alternatives, a majority of them state that the survey areas are 'easily accessible', above and beyond the other reasons given (see Table 59). Accessibility here has many connotations to it. It could possibly mean that the travel distances to the survey areas are much shorter compared with distances to

Table 57. Mean Rating Values for Facilities Available at the Areas

Facilities	Sungai Lalang	Alter. to Sungai Lalang	Ampang	Alter. to Ampang	Kancing	Alter. to Kancing
Toilets	1.94	2.67	1.67	2.26	1.99	2.16
Parking area	2.26	2.81	2.25	2.92	2.70	2.35
Information service	2.70	3.00	2.51	2.88	2.67	2.61
Camping sites	3.00	3.07	2.80	2.95	2.86	2.96
Forest trails	2.83	2.94	2.60	2.90	2.89	2.82
Road into the area	2.75	2.91	2.17	2.82	2.75	2.64
Litter disposal	2.31	2.38	2.11	2.32	2.25	2.38
Picnic facilities	2.97	2.84	2.76	2.88	2.83	2.64
Swim and bath spots	2.91	3.06	2.89	3.08	2.85	2.82
Changing rooms	1.00	1.00	1.00	4.00	1.11	2.00
Food stalls	1.00	-	1.83	2.00	-	-

* Rating Values:
1 - Very poor
2 - Poor
3 - Satisfactory
4 - Good

Table 58. Differences between Rating Means of Survey and Alternatives Areas - Facilities on site

Facilities	Sg. Lalang	Ampang	Kancing
Toilets	- 0.73	- 0.59	- 0.17
Parking area	- 0.55	- 0.67	+ 0.35
Information service	- 0.30	- 0.37	+ 0.06
Camping sites	- 0.07	- 0.15	- 0.10
Forest trails	- 0.11	- 0.30	+ 0.07
Road into the area	- 0.16	- 0.65	+ 0.11
Litter disposal	- 0.07	- 0.21	- 0.13
Picnic facilities	+ 0.13	- 0.12	+ 0.19
Swim and bath spots	- 0.15	- 0.19	+ 0.03
Changing rooms	0.00	- 3.00	- 0.89
Food stalls	-	- 0.17	-

Table 59. Reasons for Visiting the Survey Area and Not the Alternatives

(% of respondents who are interviewed on the survey areas and those who have visited the alternatives).

	Sg. Lalang	Ampang	Kancing
1. Regular visits are made here	0	1.3	0
2. Visits are made by chance	8.0	8.0	10.1
3. Attractive sites	0	0	5.1
4. Overall, a better site	0	0	2.5
5. To come to know the area	12.0	6.6	5.1
6. Enjoyable visit	2.0	0	12.7
7. Easily accessible	44.0	68.4	40.5
8. For a good swim	0	1.3	1.3
9. A first-time visit	2.0	2.6	3.8
10. Revisiting the area	4.0	0	3.8
11. Cheaper to come here	4.0	1.3	0
12. Children like this area	0	1.3	2.5
13. Change of environment	8.0	1.3	3.8
14. This is a planned visit	14.0	8.0	8.9
15. Do not own a vehicle to enable visit to other areas	2.0	0	0

the alternatives. The cost of a visit does not feature as a strong reason to make a trip to the survey area; thus accessibility is not considered to be expressible in terms of cost of travel. There is, however, a possibility that accessibility is a combination of shorter travel distances and lesser travel time consumed in order to reach an area. Nevertheless, irrespective of what 'easily accessible' might mean, it is fair to assume that the distance travelled is a strong indicator of the propensity to visit a recreation area. For this study, there are two possible ways of deriving a proxy for the price of the alternatives : we could use the travel distances or the monetary cost of travel or both, to the alternatives.

5.8. CONCLUSIONS

This chapter has attempted to describe the travel and use characteristics of the survey areas. It started on the premise that there are differences in the nature of travel to and use of the areas. Kancing recorded the most visits when compared with Sungai Lalang or Ampang. There exists, however, a similarity in terms of the period and weekly visitation patterns. More visits are recorded at the three areas during the school holidays and weekend visits are more prevalent than weekdays.

The differences among the three areas are clearly observed when the travel patterns are further revealed. Ampang is mainly visited by people residing within close proximity. Sungai Lalang receives some visitors from further distances but Kancing has visitors coming equally from near and far. The distribution of visits from various distances affects not only the travel time but also the monetary cost of travel. Monetary travel cost also varies according to the different modes of transport used to

get to the recreation areas. Overall, the average monetary cost of travel is higher for Sungai Lalang because more cars are used (which incur higher cost) due to poor services given by the public transport system to Sungai Lalang.

Much concern was given to the nature of multi-stop and multi-purpose trips. Including those who are on holiday and the groups that travel from out of the region, there exists a considerable proportion of the visitors who stopped at various places before and after spending their time at the sites. The initial concern that this could in effect indicate that the trip was not for the main purpose of visiting the recreation areas was obviated when the reasons given for these stops were shown to be an integral part of the trip to the areas. The small proportion of time spent at the stops also supports this contention.

Also, the almost similar time spent at the areas by visitors from varying travel distances indicate that the visitors are a homogeneous entity. This, taken altogether, has lessened the problem of trying to resolve the sample data in order to permit a proper quantification of consumers' surplus. Another interesting outcome of this analysis is the nature of journey utility or disutility. Recreational travel is an important component of the leisure outing and the journey should be enjoyable. There was no conclusive pattern with respect to journey utility from the sample data and it can be said that this facet of the recreational experience is governed by factors beyond that of distance or time spent travelling. Identification of recreational routes throughout the region, which could lead to the recreation areas, could positively enhance the experience of recreational journey.

The presence of alternative sites was acknowledged and identified by the visitors to the survey areas. Site substitution effects determine visit rates to existing areas. Although the interplay of its roles is rather complex to gauge, it suffices to mention that it could either increase or decrease visit rates to a particular area. In this sense, much can be gained from the perception of the visitors of the survey and alternative areas. With regard to distance travelled, accessibility and level of congestion, the survey areas are rated better than the alternatives. However, the level of site services at the alternatives is cited as better than at the survey areas. Five of the alternatives mentioned include the three areas under study. Preference for particular sites is thus seen to be more largely determined by shorter travel distances and ease of accessibility than by the quality of an area.

The visitation trade-offs among sites mentioned in this study is rather unique. Kancing is not only more popularly visited but is also chosen as the most likely alternative to be visited by visitors to Sungai Lalang and Ampang. Among the alternatives, which includes the survey areas, Kancing is perceived to have better parking facilities, information services, forest trails, picnic facilities and swimming spots. The regional significance of Kancing is unquestionable.

Admittedly, a considerably larger effort in this chapter was given to ensure whether the information available from the data base would allow the application of the travel cost technique for the estimation of consumers' surplus. However, in doing so, the information obtained has revealed trip and use characteristics that could lead to better understanding of the travel pattern of the users and assist in the future planning and

management of forest recreation areas. The application of information given in this chapter for consumers' surplus estimation is further reviewed at the start of Chapter 7 and a more comprehensive coverage of implications for planning and management issues will be discussed in the final chapter.

CHAPTER 6

RECREATIONAL USER BEHAVIOUR - VISIT PATTERNS, ATTITUDES AND ACTIVITY PARTICIPATION

6.1 Introduction

6.2 Visitors' Profile Characteristics and Visits to Recreation Areas

6.2.1 Visit Patterns Between Different Areas

6.2.2 Visit Patterns for Individual Areas

6.2.3 Comparison Between Some Characteristics of the Sampled Visitors and the Regional Population

6.2.4 Frequency of Visits by Demographic/Socio-economic Variables

6.2.5 Attitudes Towards the Visit

6.3 Effects of Non-price Variables Upon Visitation

6.4 Participation in Activities

6.4.1 Activity Participation in the Different Areas

6.4.2 Activity Participation by Categories of Visitors

An Assessment

6.5 Conclusions

6.1. INTRODUCTION

As the demand for outdoor recreation grows, forest managers are finding that more and more of their attention needs to be directed towards changing, controlling, or channelling human behaviour. This is a difficult task, and often also very delicate and sensitive, requiring careful thought and skill if it is to have the intended effects and avoid unnecessary adverse public reaction.

Most recreation demand analyses do not adequately consider the needs and satisfaction demanded by the recreationists or users. If a recreation area is viewed as a production system having an input, participation processes and outputs, then too little is known about what is being produced from a public or a private investment in recreation resources. What are the social values of what is being produced, and what alternatives are forgone in the production process? How do benefits differ for different types of users ? Can those 'ultimate' products or social benefits be measured, and how do they relate to recreation demand?

Recreation is an experience. Why a person participates, what he or she does while participating, what she or he derives personally from the participation or visit, and the effects of personal and environmental influences on recreation behaviour, encompass this experience. One conceptual framework of the social-psychological model of recreation behaviour defines recreation demand as the preference-aspiration-desire level before it is, or is not, expressed in overt or observable behaviour (Driver and Brown, 1975). Recreation is also defined not as an activity but as a particular type of human experience that finds its source in intrinsically rewarding voluntary engagements (mental and physical) during non- obligated time. Individuals seek and use recreation to achieve ends

that are perceived by them as desirable.

In the terms stated above, the visitors to the three recreation areas under study represent a fraction of the expressed demand : quoted by Patmore (1983) as 'the current level of structure of demand as expressed by present patterns of participation'. Patmore further asserted however, that "the problems of describing recreation demand stem not only from the relative paucity of survey data but from the very nature of leisure activities themselves". In this instance some comfort can be gained from on-site survey of visitors to recreation areas. On-site survey could yield good data about the actual participants. In this study, about 35 per cent of the total visitors to the three recreation areas were chosen as sample units. It is also important to mention the earlier finding that the three areas are the most popularly visited forest recreation areas in the region. In essence the 35 per cent of total visitors sampled may well represent the majority of visitors who frequent any of the existing forest recreation areas. This point was substantiated when a quarter of them indicated that they had visited the area during the year the survey was conducted and more than half had visited the area the year before the survey. The overall frequency of visits per visitor for the three areas and for those who had visited during and before the survey year is about six. Consequently, the results from the ensuing analysis could represent the overall structure of visitation and the pattern of participation in activities in forest recreation areas within the region.

Outdoor recreation by definition is resource-related and increasing attention is being given to the 'setting' in which action takes place as a prime influence on perception and on the pleasure gained from the ensuing

recreation experience. Environmental psychologists suggest that all human behaviour should be interpreted with reference to the ecological environment or behavioural setting in which it occurs (Levy, 1979). Given a knowledge of the behavioural setting for a specific recreation experience, such as a visit to a forested area, it should be possible to identify the human values and expectations associated with the experience. Examination of the human and non-human attributes of the behavioural setting should indicate those contributing to and detracting from social satisfaction. All recreation environments affect recreation behaviour in some way and, with insight into recreation preferences, can be structured to facilitate expression of demand through participation (Hecock, 1970).

The point of conjecture is the problems that arise in describing the nature of the participation. The crux of the problem is related to the identification, measurement and derivation of social values for recreation-related experience. We can measure relevant experiences across large groups of users on the assumption that:

(i) the attributes of the experience perceived to be desirable or undesirable have meaning for recreationists and

(ii) these meanings can be identified and measured to a useful degree (i.e., useful in better structuring of our intuitions and thinking). Early work in motivation psychology and attitude theory suggests strongly that the personally defined values, meaning, and attributes of recreation experience can be identified and measured reasonably well. To do this we need to : (a) bring this information to a level of consciousness or awareness at which it can be evaluated systematically and (b) identify the attitudes worth measuring, especially recreational experiences that are managerially relevant.

Awareness of the factors generating recreation demand and the relationships between varying components are important in recreation planning and resource management. That said, it is obvious that most attention in recreation research has been devoted to recreation behaviour *per se*, i.e. to actual participation or effective demand. It is in the spatial and temporal expression of demand and the use of specific sites and facilities that most of the resource problems exist. Whereas these patterns of use are derived in part from underlying preferences, they reflect also the availability, quality and effective location of recreation opportunities, as revealed in the chapter preceding this. Explanation of revealed recreation behaviour, therefore, must be sought in terms of the interaction between recreationists and the resource base.

Firstly this chapter focuses its attention on the types of visitor who participate in the recreational outing. The assumption is that different types of visitors visit different areas and that each area would attract different categories of visitors. The analysis will explore the possibilities that demographic and socio-economic variables of the visitors will influence different levels and patterns of recreational use. The perceived attitudes towards some travel and area characteristics are used as surrogates to determine the attractiveness of an area. Secondly, regression analysis will be employed to observe the combined effects of demographic/socio-economic factors and travel and area characteristics on visitation patterns. Finally, a close examination of the participation in activities at the areas could reveal features that would help in the enhancement of natural resources and provision of facilities in the effort to provide a more meaningful visit and increased enjoyment to the users.

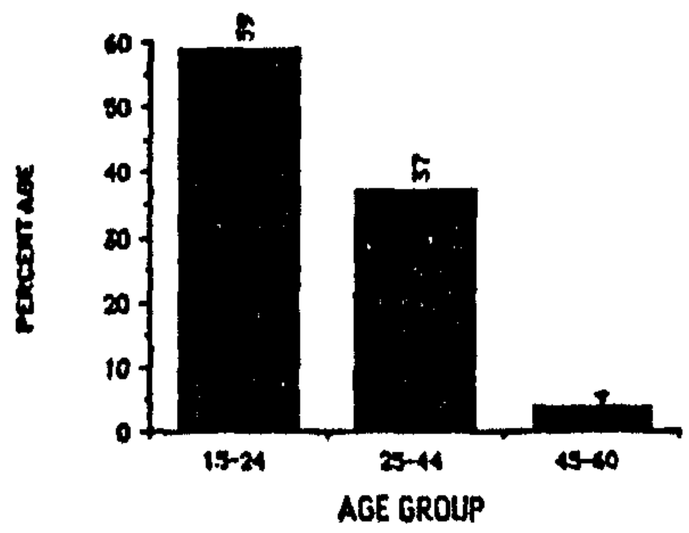
6.2. VISITOR PROFILE CHARACTERISTICS AND VISITS TO RECREATION AREAS

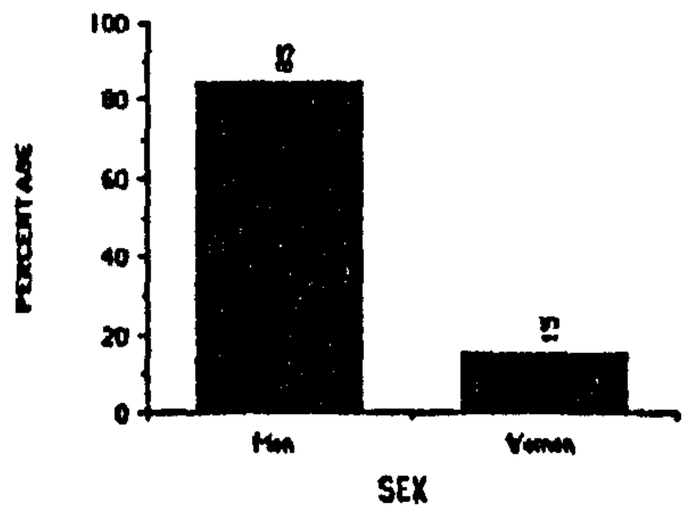
Demographic and socio-economic characteristics generate the propensity to participate in recreational activities. Age and sex, marital status and family composition, have all been recognised as affecting recreation preferences. Among the socio -economic factors which influence the desires and inclinations of individuals for recreation are social structure, education, occupation and income. Questions concerning the age, sex, marital status, ethnic group, education level, employment type, socio-economic group, family income and visitor group type are included in the questionnaire for two main reasons. Firstly, it is to produce data regarding the characteristics of the visitors, which are generally used as inputs in participation models. Secondly, it is to enable the investigation of relationships between attitudes and trip-resource characteristics and recreational behaviour in terms of participation for activities.

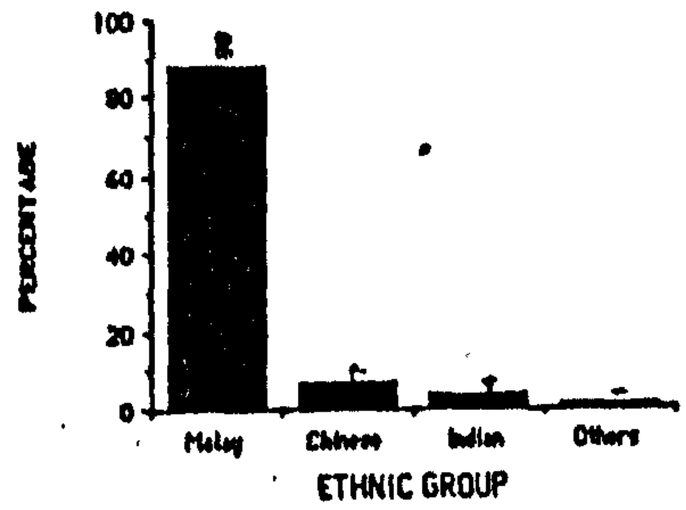
Obviously, any attempt to discover which profile characteristics are significantly correlated with recreation behaviour (that is, to the extent that they may reasonably be presumed to have causal influences) requires that the measure of recreation behaviour being employed be as broadly based as possible. For this purpose a visit is taken as a measure of recreation participation. Figure 18 shows the percentages of visitors interviewed according to the categories of demographic and socio-economic variables originally set in the questionnaire for the three recreation areas (see Appendix 6 for tabular representation).

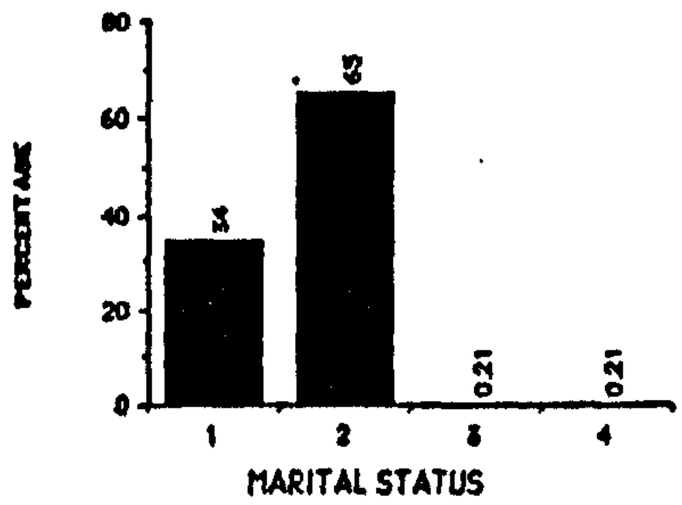
Figure 18 shows the visitors interviewed at all the three areas according to their demographic and socio-economic variables. There are

Figure 18 DEMOGRAPHIC/SOCIO-ECONOMIC FACTORS AND PARTICIPATION IN FOREST RECREATION

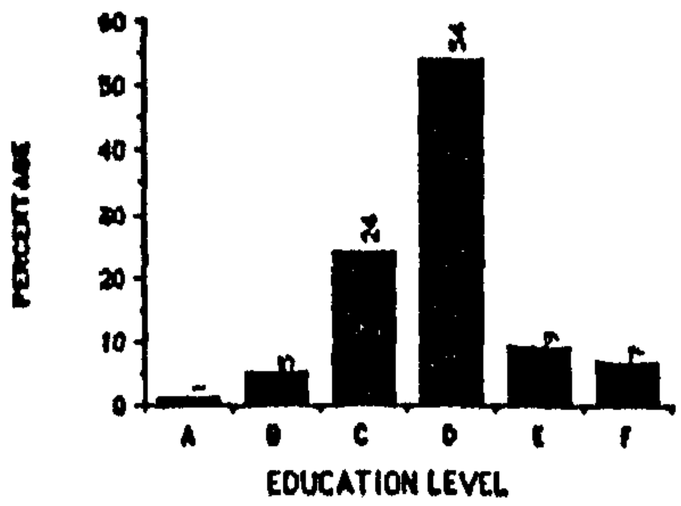






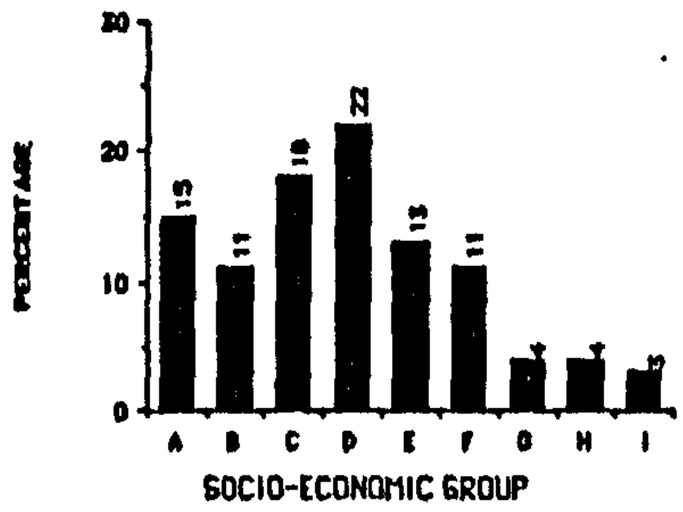


A-MARRIED
B-SINGLE
C-DIVORCED/SEPERATED
D-WIDOWED

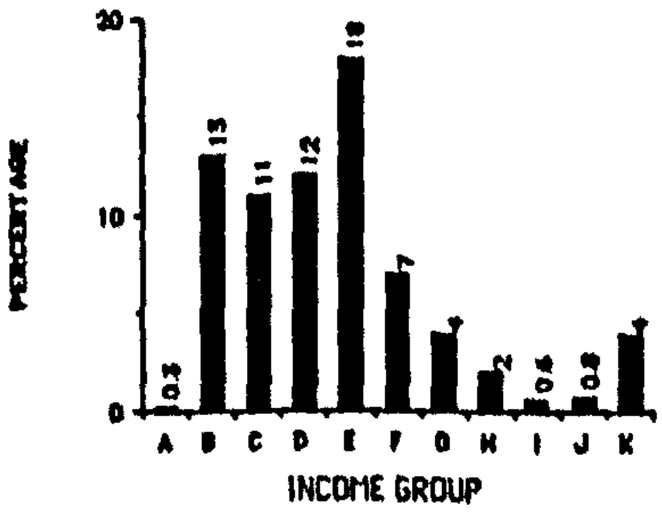


A-SELF TAUGHT
B-PRIMARY
C-LOWER SECONDARY
D-UPPER SECONDARY
E-COLLEGE
F-UNIVERSITY

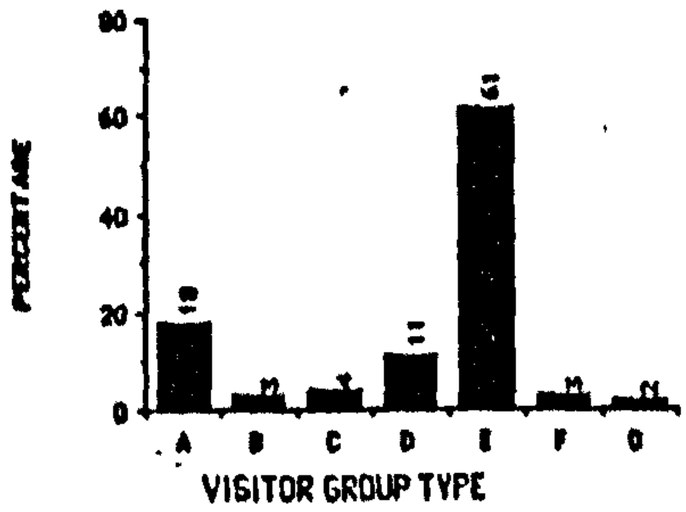
A-GOVERNMENT SECTOR
B-PRIVATE SECTOR
C-STUDENTS
D-SELF-EMPLOYED
E-UNEMPLOYED
F-HOUSEWORK
G-RETIRED



A- PROFESSIONAL/TECHNICAL
B- ADMINISTRATIVE/EXECUTIVE
C- CLERICAL
D- SERVICE
E- PRODUCTION
F- SALES
G- TRANSPORT OPERATORS/MANUAL
H- WHOLESALE/RETAIL
I- HOUSEWIFE/STUDENTS/OTHERS



A- UNEMPLOYED
B- LESS THAN $200
C- 200-399
D- 400-599
E- 600-799
F- 800-999
G- 1000-1499
H- 1500-1999
I- 2000-2499
J- 2500-2999
K- MORE THAN $3000



A- SINGLE FAMILY WITH CHILDREN
B- SINGLE FAMILY WITH NO CHILDREN
C- TWO OR MORE FAMILIES
D- FAMILIES PLUS FRIENDS /RELATIVES
E- WITH FRIENDS
F- ORGANISED GROUP
G- ALONE

several striking features of the categories within some of the variables. There is a high proportion of males interviewed (85%) compared with the females (15%). The majority of the visitors to the areas are Malays (88%) and the other ethnic categories, Chinese, Indian and other origins combined comprise only about 12 per cent of the visitors. The 15 - 24 age category is best represented (59%) while there is a dearth of visitors in the older age category (45 - 65 years) and none in the over 65 age category.

This does not mean, however, that there are no visitors in the age category below 15 years and none for the over 65 age category. The 15 years and below age category had not been included as respondents to the questionnaire and the interview sampling was unable to capture any of those above 65 years old. A separate line of inquiry in the questionnaire has revealed the true composition of members within a visitor group by sex and age categories (see Table 60). The composition of visit groups in terms of the number of adults and children between the recreation areas are significantly different at 5 per cent level of probability (see Table 61). An interesting feature shown by Table 61 is that the visitor groups to Ampang consist of more children and the visitor groups to Kancing are predominantly adults.

Table 60 also indicates that there is bias during sampling which has exaggerated the male over the female visitors. Indeed, the interviewers confirmed that the head of the party, usually male, quite often acted as spokesman for the group, despite the fact that another member of the party may have been the initial contact. Due to this bias, the sex variable needs to be recategorised.

Table 60 Number of Visitors by Age Groups in a Visiting Party

Age Groups (years)	Sg. Lalang M*	Sg. Lalang F	Ampang M	Ampang F	Kancing M	Kancing F	All areas M	All areas F	Total (All areas)
Less than 5	9	19	51	44	11	20	71	83	254
5 - 14	60	44	108	114	66	76	234	234	468
15 - 24	217	153	274	267	769	359	1260	779	2039
25 - 44	74	27	149	65	151	77	374	169	543
45 - 64	5	6	19	3	6	6	30	15	45
Over 65	0	0	1	0	1	0	2	0	2
Total	365	249	602	493	1004	538	1971	1280	3251

* M - Male
F - Female

Table 61 Composition of Group Visitors

	No. of Adults	No. of Children	Mean No. of Adults	Mean No. of Children
Sungai Lalang	482 (79%)	132 (21%)	5.2	1.4
Ampang	728 (71%)	317 (29%)	4.5	1.8
Kancing	1369 (89%)	173 (11%)	6.5	0.8
All Areas	2629 (81%)	622 (19%)	5.5	1.3

The total visitor population sampled also showed that 41 per cent are single and 54 per cent married. More than 78 per cent have received secondary education and the employment type is well distributed between

that of government employed (31%) and private-sector employed (31%). Both the socio-economic and family income categories are well distributed with no distinct category represented.

Although the questionnaire was designed to obtain the broadest possible categories within a particular demographic and socio-economic variable, there emerged a need for recategorising. There are several reasons for this.

(i) Insufficient numbers of respondents within certain categories means they cannot be treated as distinct categories for statistical analysis. For instance, if there are insufficient numbers (less than 5) of a particular category of the socio-economic variable participating in an activity. This also includes the visitor group type and employment type variables.

(ii) Recategorising is necessary to allow for comparison with some other similar variables. This arises because, for example, the regional population statistics have fewer categories as compared with those of the ones employed in the extended questionnaire.

(iii) Due to one or both of the above reasons, all variables, except for the sex variable, were recategorised when results of chi-square tests for significance between categories were suspect. In doing so, care was taken to ensure that the recategorising did not cause the loss of the original purpose of showing meaningful relationships between distinct categories within a variable. The sex variable was recategorised in a slightly different manner. A cardinal scale was established to indicate three distinct categories, that is predominantly male, predominantly female and a third category where neither sex predominated.

Question 1.3 from the questionnaire led to the establishment of an additional social group variable. An alternative to using only demographic/socio-economic variables to explain participation is to consider how social interaction patterns among participants occur. The social groups with whom people interact are suggested as relevant variables for explaining the recreation activity selection process (Dottavio, O'Leary and Koth, 1980). The visitor group type employed here showed that 61 per cent of the sampled visitors participated in the activity with a friend or friends. The visitor group types were recategorised into two distinct groups, family and non-family group types.

6.2.1. Visit Patterns Among Different Areas

It was envisaged that there would be differences among the profile characteristics of the participants who visited different areas. Therefore, the data were cross-tabulated and the contingency tables among categories of the profile variable and the three areas were subjected to a chi-square test of association. The chi-square is used to test the hypothesis that different categories of visitors that visit an area are independent of the three recreation areas. Significantly different relationships (at the 5 per cent level of probability) are shown to exist among categories ofage, marital status, ethnic group, education, employment type, socio-economic group and visitor group type of the respondents to the three different areas. The variables that notably show no statistical difference among variable groups and visits to the three areas are family income group and sex (see Table 62).

The total distribution of visitors by categories within each variable to the three areas shows some interesting participation patterns. Since

Table 62 Chi-square Test of Association Among Categories within a Variable and the Three Areas

Variables	Degrees of Freedom	Chi-square	P
Age	2	12.92	0.002
Sex	4	5.76	0.218
Marital Status	2	24.89	0.000
Ethnic Group	2	17.55	0.000
Education	4	11.17	0.025
Employment Type	6	26.95	0.000
Socio-economic Group	8	18.80	0.016
Family income Group	12	7.98	0.787
Visitor Group Type	2	15.07	0.001

more visits are sampled at Kancing, higher percentages of visits within a variable are recorded at that recreation area. There are, however, differences between the categories of a particular variable amongst the three areas. The 15 - 24 years age group that visit Kancing, for example, represents the largest percentage (30%) of the age variable. Similarly single respondents (33%), Malays (36%), those with secondary education (34%), being either employed in the private sector or self-employed (19%), within the clerical or service socio-economic group (18%) and participating within a non-family party (33%) are represented significantly more at Kancing than at the other two areas. The analysis conclusively shows, except for sex and family income groups, that different categories of visitors visited the three areas.

6.2.2 Visit Patterns Within An Area

The results of the above section indicate the differences between categories of profile variables of the visitors that were sampled among the three areas. There are possibilities that the profile of the visitors to an individual recreation area would also vary among the categories of a single variable, for example, there may be a higher proportion of the lower income category visitors at any one of the three areas (see Figure 19). Since in this case it involves looking at one independent variable (a particular variable) at a time, the test to be used is called a goodness-of-fit test. This test differs from a normal one-sample chi-square test in that it does not compare data with a 'rectangular' distribution of even proportions but with a biased distribution. The difference between the distribution of the variable being tested and the biased distribution, as with the contingency chi-square test described earlier, was not considered statistically important unless it was at least significant at the 95 per cent level. Additional information regarding this test is provided by Howell (1985). As a reminder, the groupings of the variables are similar to the one used in the earlier section.

Table 63 shows tests of significance for the variables within individual areas. It indicates that for Sungai Lalang and Ampang, the age categories of the visitors sampled are not significantly different between one another. Also, for Ampang, the differences between the number of single and married individuals and the family and non-family visitor category types are not significantly different. The categories within the other variables of the visitors for Sungai Lalang, Ampang and Kancing are all significantly different. It is very likely that the visitors' profiles to the three areas are quite different from one another. The following

Table 63 The Chi-square Goodness-of-Fit Test of The Profile Variables for Each Area and All Areas Combined

Variables	Sg. Lalang	Ampang	Kancing	All Three Areas
Age	NS	NS	**	**
Sex	**	**	**	**
Marital Status	**	NS	**	**
Ethnic Group	**	**	**	**
Education Level	**	**	**	**
Employment Type	**	**	**	**
Socio-economic Group	**	**	**	**
Family income Group	*	**	**	**
Visitor Group Type	*	NS	**	**

NS - Not significant at the 5 per cent level of probability

* - Significant at the 5 per cent level of probability

** - Significant at the 1 per cent level of probability

profile descriptions is with reference to Figure 19.

Sungai Lalang

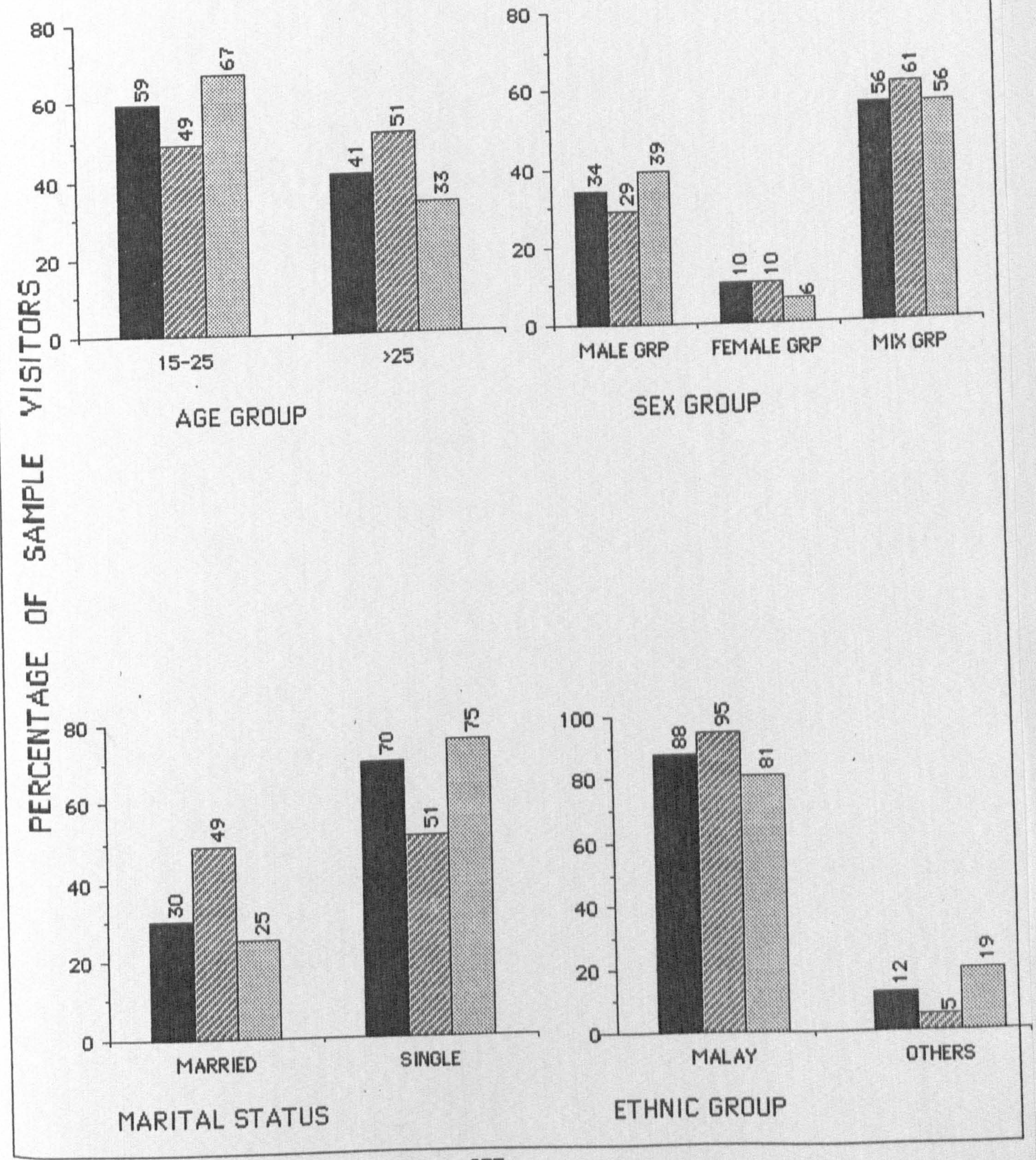
The visitors to Sungai Lalang are mostly a mixture of males and females (56%), single (70%) and Malays (88%). Persons with secondary education (70%), age 15 - 24 years (59%), in the higher prestige occupations (mostly government employed and within the professional category) and earning a family income of about M$ 1000 - 1499 (25%) appear to constitute most of the visitors to this area (see Figure 19).

Ampang

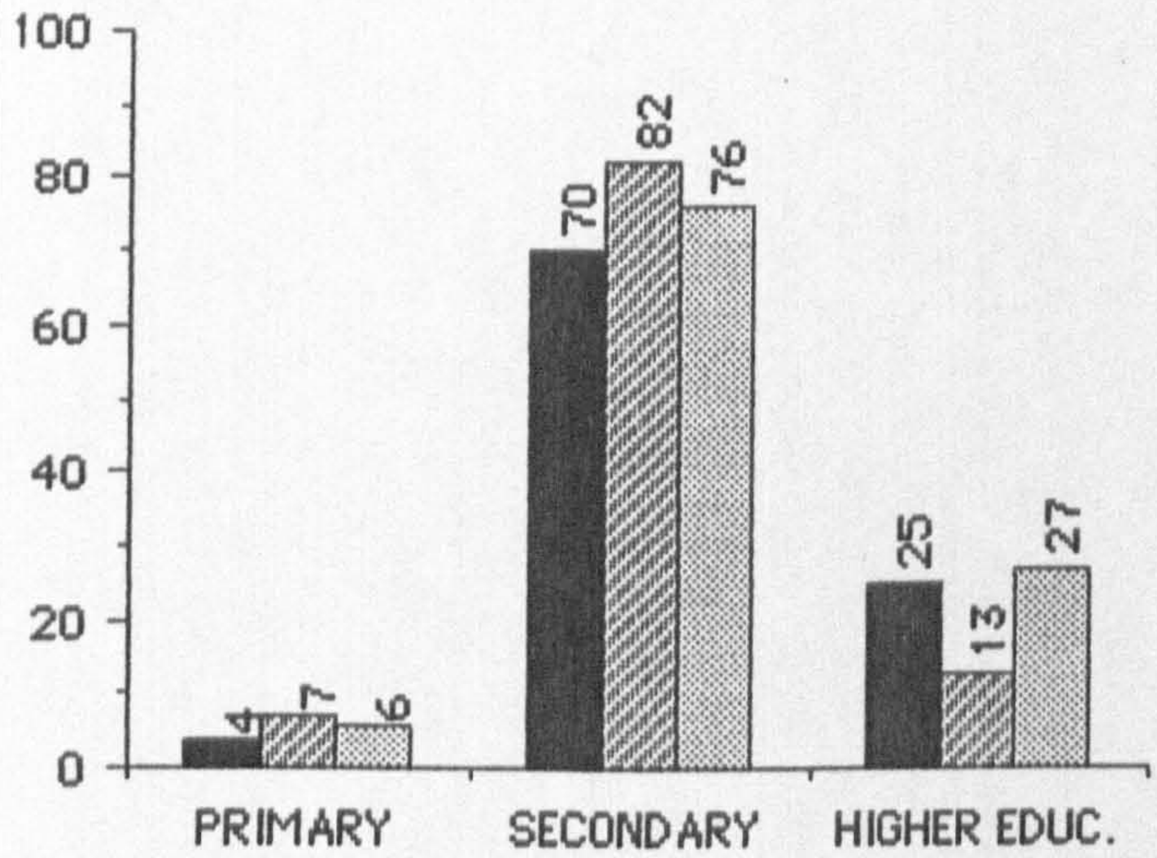
Ampang seems to attract a slightly different group of visitors compared with that of Sungai Lalang. Although the visitors are still mostly a mixture of males and females (61 per cent), there are more of those in the above 25 years age groups (49%) and the proportions of single (51%) and married (49%) individuals are almost equal. In contrast to the other two areas, Ampang has the lowest mean number of adult visitors but the highest mean number of children in a visitor group. Quite clearly this area is favoured by family groups, most likely with children, for it has shown that the proportions of family group visitors (45%) is the highest among areas, cf. Sungai Lalang (35%) and Kancing (26%). Ampang should attract more family visits because the area is easily accessible by motorised vehicles and the gentle flowing, clean and clear river is ideal for children to swim in.

Interestingly the visitors to Ampang are represented more by the lower prestige occupations; mainly clerical and service workers (43%), either self or privately employed (46%) and earning a total family income of M$400 - M$599.

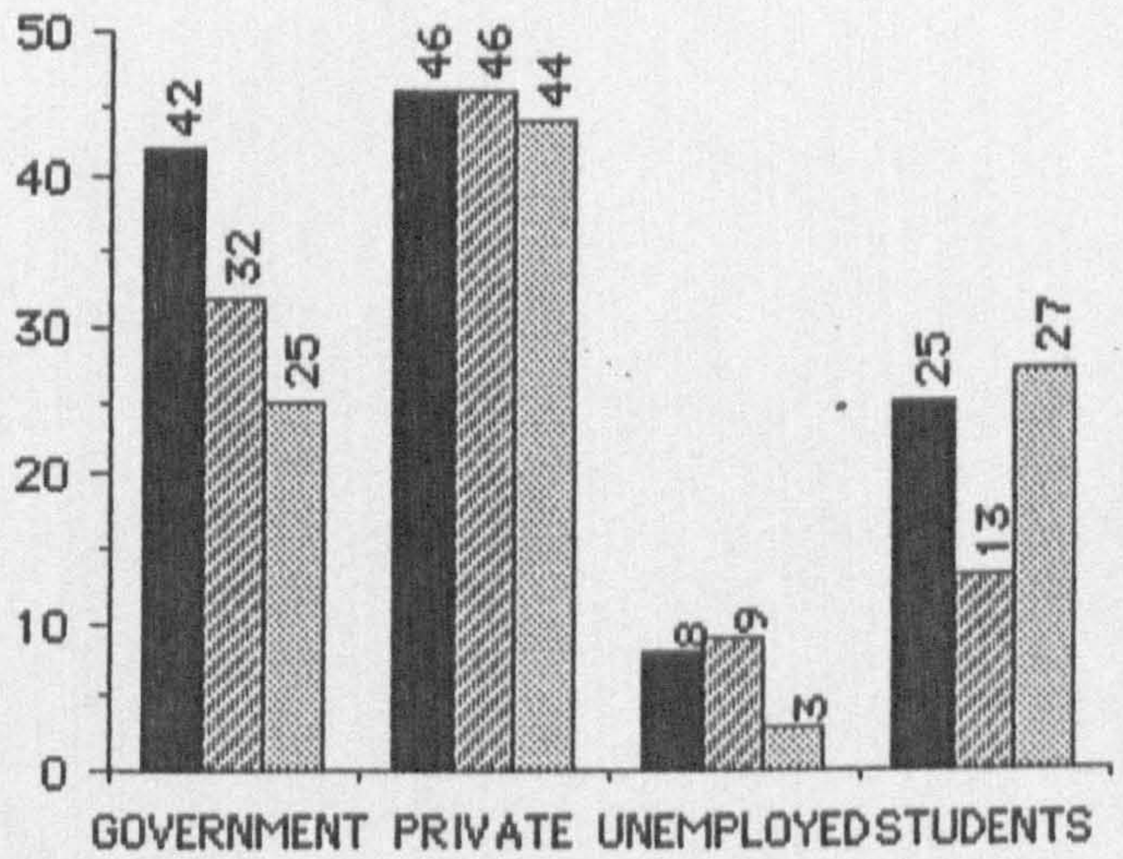
Figure 19 THE SOCIO-ECONOMIC FACTORS AND VISITATION TO THE THREE AREAS



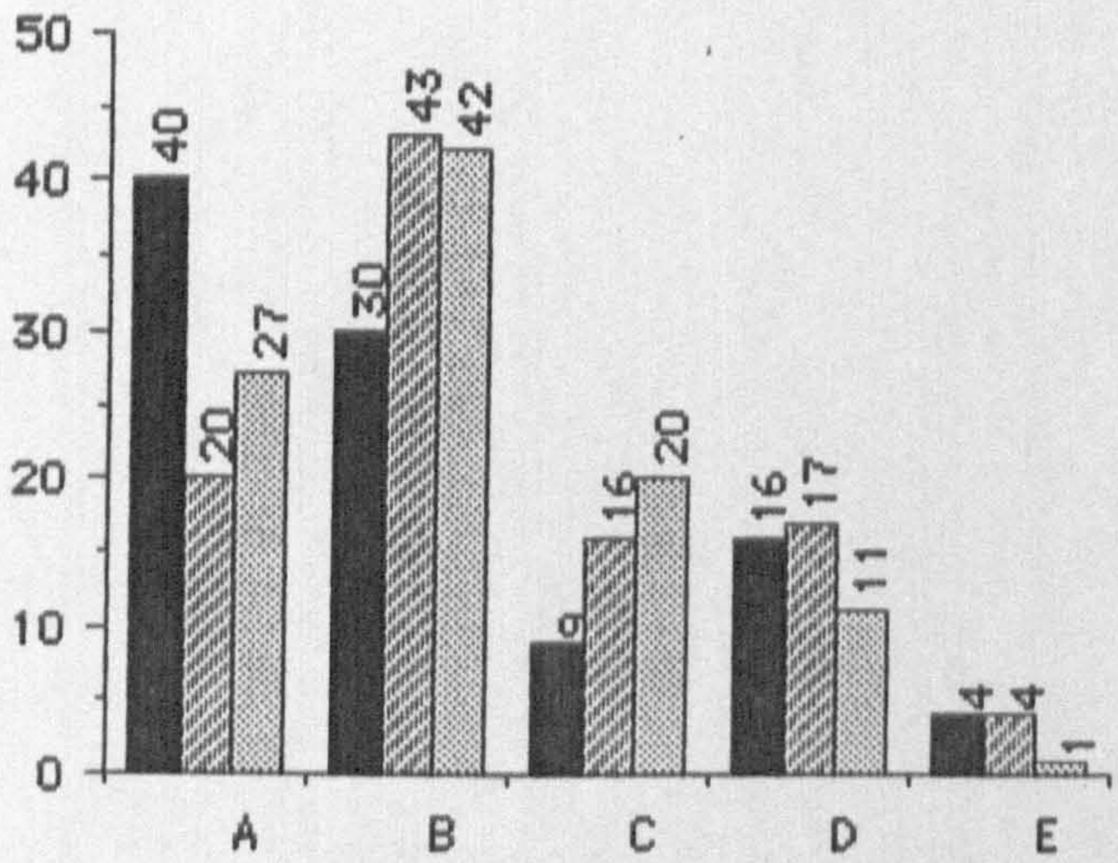
continue Figure 19



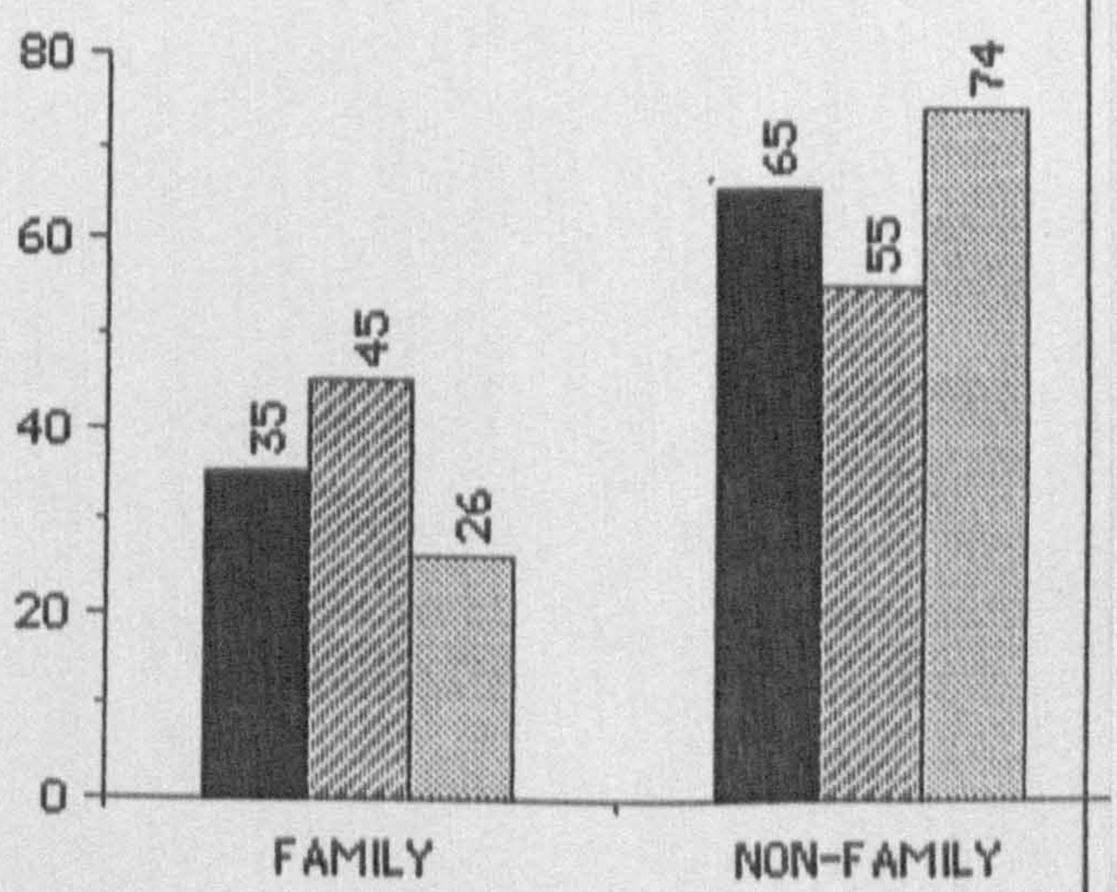
EDUCATION LEVEL



EMPLOYMENT TYPE

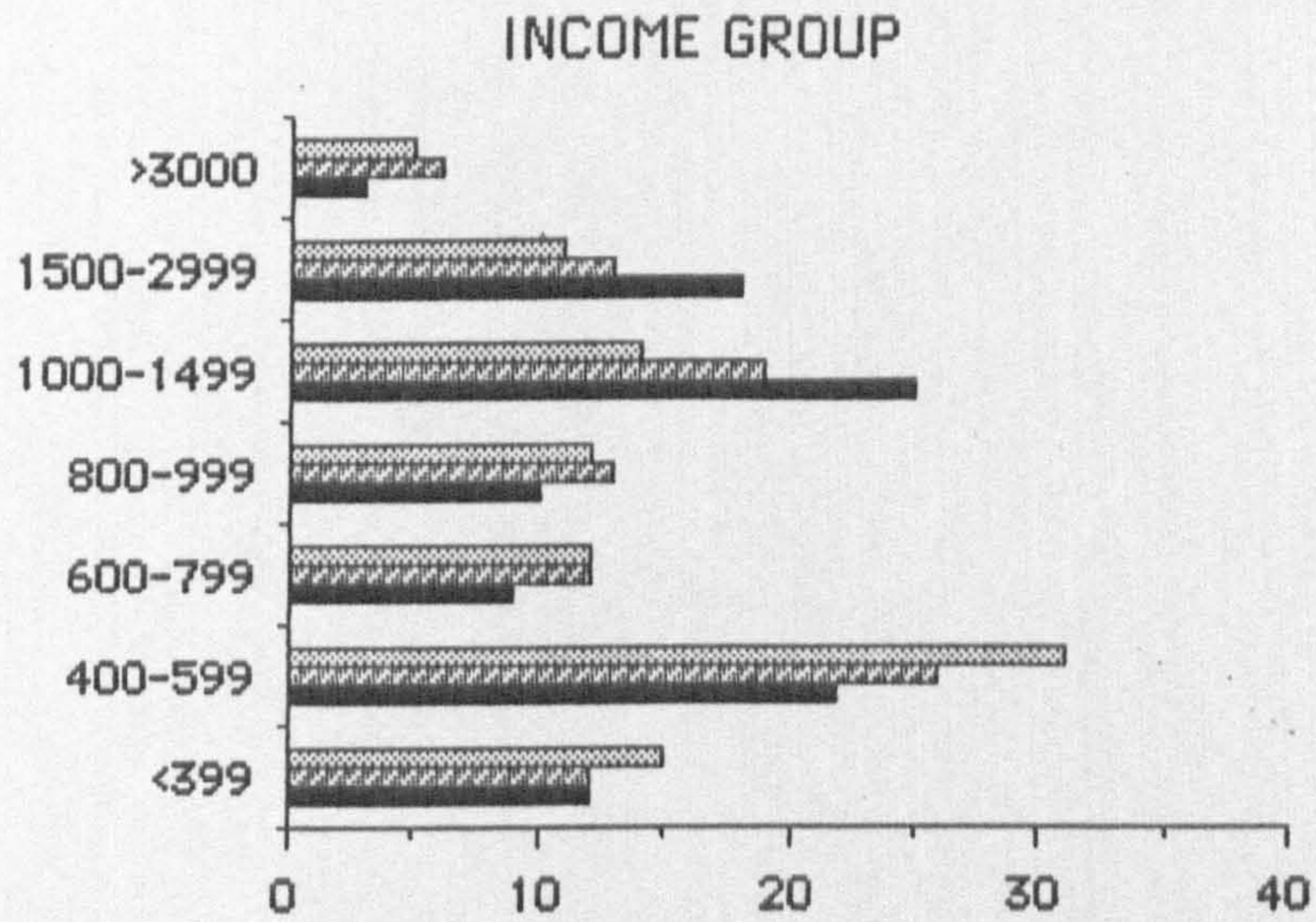


SOCIO-ECONOMIC GROUP



VISITOR GROUP TYPE

continue Figure 19



RECREATION SITES

- LALANG
- AMPANG
- KANCING

SOCIO-ECONOMIC GROUP

A- PROFESSIONAL, TECHNICAL, MANAGEMENT
B- CLERICAL AND SERVICE
C- PRODUCTION, OPERATORS AND MANUAL
D- SALES, WHOLESALE AND RETAIL
E- HOUSEWIFE AND OTHERS

Kancing

Kancing's visitors are similar to those of Ampang and thus also quite different from those of Sungai Lalang. The differences from Ampang, are that there are more 15 - 24 year old visitors (65%), singles (75%) and they come as non-family groups (74%). They are different from Sungai Lalang's visitors in that more are self or privately employed (44%), in the clerical and service socio-economic group (42%) and earning between M$400 and M$ 599 (31%).

A further analysis was also carried out to test for differences among the categories of each variable if the visitors to all the three areas were treated as one sample. Chi-square goodness-of-fit test indicates that the null hypothesis of the relationship between each category within a particular variable is rejected at the 1 per cent level of probability (see Table 63). It means that the number of visitors to the recreation areas according to the categories of, for example, marital status or education level, for all of the variables are proportionately different from one another.

6.2.3 Comparison Between Some Characteristics of the Total Sampled Visitors and the Regional Population

The proportion of visitors according to the variable categories is also compared with that of the regional population. The purpose of this analysis is to observe, for example, if the proportion of Chinese visitors at a site is higher than the proportion of Chinese in the regional population generally. This would give a fair picture of the representation of the type of visitors that would visit a forest area emanating from the regional population. There is, however, a restricted number of variables

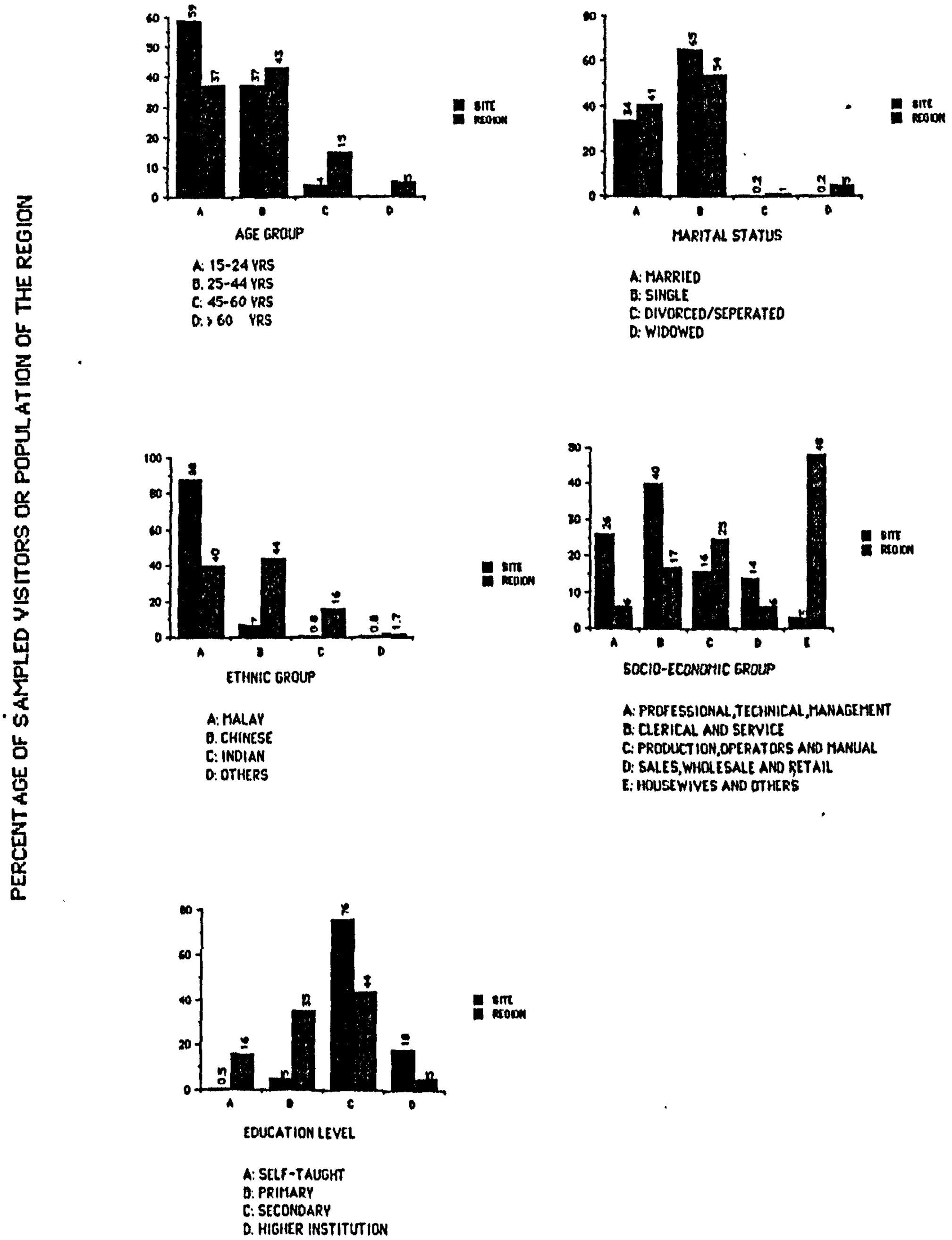
that could be used for this analysis. Only regional population information that is available in the categories used for this study would enable any form of comparison. Chi-square contingency analysis among the categories of the age, marital status, ethnic group, education and socio-economic group variables of the three areas and the regional population characteristic show that the different proportions of visitors are all highly significant (at 1 per cent level of probability). Figure 20 shows the population of visitors to the sites, treated as a single sample, and that of the regional population.

Several interesting patterns should be highlighted from Figure 20. Although there are more people in the 25 - 44 years age category (43 %) in the regional population, the visits to the three recreation areas are mostly those of the 15 - 24 years (59%). A very striking feature is that of the ethnic categories, where most visits are made by the Malays (88%) but the proportion of Malays in the population is only about 40 per cent, second to the Chinese (44%). The clerical and service socio-economic group (40%) is prominently represented in the visits to forest recreation areas.

6.2.4. Frequency of Visits by Demographic/Socio-economic Variables

In the preceding sections the pattern of visits is obtained from the sample of visitors during the survey period. The frequency of visits by the categories of a particular variable would vary over a specified time period. Questions 1.28 and 1.30 of the questionnaire were asked to obtain the number of visits already made by the respondents to the area during the year before the survey and that of the year when the survey was conducted. Although the mean number of visits per visitor to the three areas during

Figure 20 THE SOCIO-ECONOMIC CATEGORIES OF VISITORS TO RECREATION SITES COMPARED TO THAT OF TOTAL POPULATION OF THE REGION



the year the survey was conducted and that of the previous one year is almost the same, there are possibilities that the number of visits made over a span of time by different categories within a particular variable type would vary significantly .

An analysis of variance was carried out to observe the differences in the number of visits among categories within a particular demographic-socioeconomic variable for the total sample during the periods mentioned above, and the results are shown in Table 64. Clearly, over a time period only the categories within the sex, education and socio-economic group show significant differences in the number of visits made to the areas. The mean number of visits, for the survey and previous year, by category, within each variable for the total sample are shown in Figure 21.

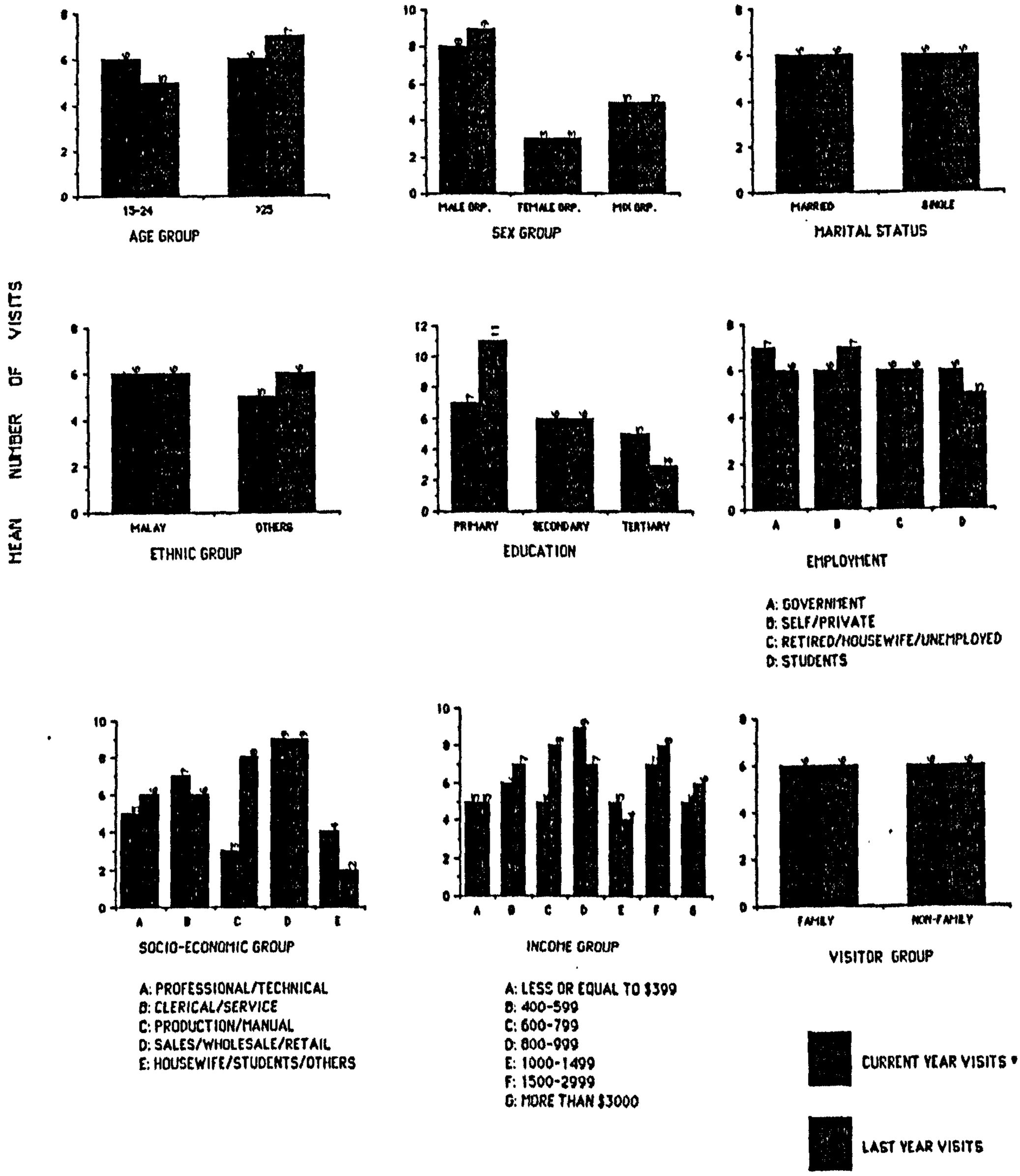
Table 64. Level of Significance on Number of Visits Among Categories Within a Variable - for total sample

Variables	Visits during Survey year	Visits from Previous year
Age	0.875	0.260
Sex Group	0.000	0.000
Marital Status	0.977	0.811
Ethnic Group	0.481	0.572
Education Level	0.259	0.002
Employment Type	0.914	0.055
Socio-economic Group	0.019	0.149
Family Income Group	0.530	0.334
Visitor Group Type	0.895	0.457

Note : The acceptable level of significance is at p <= 0.050

A slight departure from the overall pattern of participation was shown when the number of visits made by each category of a particular variable

Figure 21 FREQUENCY OF VISITS BY SOCIO-ECONOMIC VARIABLES FOR THE TOTAL SAMPLE



was analysed separately for each area. Table 65 shows that, for the survey year, for both Sungai Lalang and Ampang, there is no significant difference in the number of visits, irrespective of the categories within any variable. It appears that the number of visits are similar among the individuals who made the trips to these two areas. In comparison, those within the sex group and socio-economic group show differences in their number of trips to Kancing.

Table 65 Level of Significance on Number of Visits Among Categories Within a Variable - for individual areas

	Visits during survey year			Visits during the previous year		
Variables	Sungai Lalang	Ampang	Kancing	Sungai Lalang	Ampang	Kancing
Age	NS	NS	NS	*	NS	NS
Sex group	NS	NS	*	NS	**	NS
Marital status	NS	NS	NS	NS	NS	NS
Ethnic group	NS	NS	NS	NS	NS	NS
Education level	NS	NS	NS	NS	NS	*
Employment type	NS	NS	NS	NS	NS	NS
Socio-economic group	NS	NS	**	NS	NS	*
Family income group	NS	NS	NS	NS	NS	NS
Visitor group type	NS	NS	NS	NS	NS	NS

NS - Not significant at the 5 per cent level of probability
* - Significant at the 5 per cent level of probability
** - Significant at the 1 per cent level of probability

For those who had visited the three areas the year before the survey year, differences in visits are seen for several variable groups.

Categories within the age group variable for Sungai Lalang and sex variable for Ampang made significantly different numbers of visits to the areas. Most uniquely, for Kancing, within the education and socio-economic group variables differences are seen to exist in visits made.

The above result could be looked at in a rather different perspective. The more frequently a visitor of a certain category visits an area over a known time period, the more likely that the profile characteristics of the visitors to that area is significantly represented by that particular category of visitors. For example, the most frequent visitors to Kancing, during the year before this survey, could be represented by those who have received primary school education and hold lower prestige occupations.

There is, however, another revealing pattern in the number of visits made over a time span. The pattern is not static between any given time period. Evidently, as shown in Table 65, the type of visitor who frequents Lalang, Ampang and Kancing during the survey year is quite different from those who come during the previous year. One could assume, based on this, that the daily or weekly pattern of visit to all the areas would be represented by different categories of visitors. Thus it would be wrong to claim that all forest recreation areas are constantly visited only by a particular group of visitors. Only if records of the type of visitors are kept over a very long and continuous time period could it be subjected to time series studies in order to see the true influence of demographic/socio-economic variables on the patterns of visits. The result here supports the contention that any reports pertaining to the effect of these variables on propensity to visit a particular recreation area which is concluded on the basis of one survey should be treated with caution.

6.2.5. Attitudes Towards the Visit

In Chapter 5 several travel and area characteristics are compared between the surveyed areas and the alternatives to these areas. The comparison is based on the expressed opinions of the visitors following the rating of the characteristics of travel, journey, accessibility to an area and the perceived density and perceived congestion characteristics of the area. It is conceiveable that the consensus of opinion would vary between categories within a demographic/socio-economic variable. It is also possible that attitudinal measurements of the above characteristics could explain more meaningfully the differences in visitation to an area than could actual measurements of distance travelled or the number of people on a per-unit-area basis.

In order to observe whether there are any differences in stated opinions of the above characteristics among the study areas, a Kruskal-Wallis one-way ANOVA is employed. The Kruskall-Wallis test is a non-parametric test for deciding whether there is a significant difference among three or more samples and can be suitably applied to ordinal data (Ebdon, 1978). The result shows that there are differences in opinion on a number of travel and area characteristics among the three areas (see Table 66).

The accessibility to Kancing is rated as much more satisfactory than that to Sungai Lalang and Ampang. Not surprisingly, Ampang is perceived as having more visitorsand is also perceived as crowded. The number of people and level of congestion at Sungai Lalang and Kancing is considered about right and comfortable. Although the facilities are perceived significantly differently among the areas, the differences are only a matter of degree

Table 66 Differences in Perceived Travel and Area Characteristics Among Surveyed Areas

Characteristics	Significance level+
Journey	P = 0.336
Travel	P = 0.156
Accessibility	P = 0.000
Perceived density	P = 0.005
Perceived congestion	P = 0.008
Summation rating of facilities	P = 0.000
Satisfaction of overall visit	P = 0.065

+ - The acceptable significance level is at P <= 0.050

since for all the areas the rating values indicate that the facilities are either poor or very poor.

It is also indicated that there are no significant differences in the subjective attitudes toward travel distances and journey utility among the three areas. The visitors appear to think that the three areas are neither too far nor too near from their place of residence and that the journeys are neither particularly interesting nor boring. The overall visits to the areas are thought of as either satisfactory or good, with no one area contributing significantly more to the satisfaction gained from the visits.

A statistical test similar to that above is used to see if there are any differences in the stated opinions on travel and area characteristics by different categories of individuals. There are no significant differences in perception among categories of individuals to Ampang on any of the travel or area characteristics. For visitors to Sungai Lalang, the categories of age, marital status and visitor group type show differences in their perception of travel, density and congestion. The visitors to Kancing in the different categories of age, marital status and education

level perceive differently the attributes of travel, density, congestion and satisfaction towards the visit (see Table 67).

A majority (58%) of the younger visitors to Sungai Lalang think that the travel to the area is neither too far nor too near but only 40 per cent of those of 25 years and above think so. Somehow the older category of visitors perceive the area as containing fewer people than do the younger set, although both groups agree that the area is neither too congested nor too deserted and quite comfortable to be in. The reaction towards the number of people and congestion level is similarly expressed by the married and unmarried visitors. Assuming that the older visitors are mostly married, they too think that the area contains too few people whereas the unmarried visitors seem quite happy that the area contains just the right number of people.

Although the majority of the two age groups to Kancing think that the travel is about right, a larger number of the younger visitors have the impression that the area is located in close proximity to their residence. Most of the younger visitors regard the visit as just ordinary, but quite a large number of the older visitors (25%) rate the visit as excellent. Those who have a higher level of education perceive the area as being visited by too many people and rate their visit as just ordinary, while the primary educated visitors feel that the visit is good (42%). Overall, it appears that the younger set of visitors are more affected by the presence of other visitors and rate their visits as less satisfactory.

The differences in attitudes towards travel to and characteristics of the areas are felt to be likely to affect the frequency of visits made to an area. An analysis of variance between the number of visits and attitude

Table 67. Differences in Perception of Travel/area Characteristic by Demographic/socio-economic Variables.

Sungai Lalang

Variables	Journey	Travel	Access	Density	Congestion	Satisfaction
Age	NS	*	NS	*	*	NS
Sex	NS	NS	NS	NS	NS	NS
Marital status	NS	NS	NS	*	*	NS
Ethnic group	NS	NS	NS	NS	NS	NS
Education level	NS	NS	NS	NS	NS	NS
Employment type	NS	NS	NS	NS	NS	NS
Socio-economic group	NS	NS	NS	NS	NS	NS
Family income	NS	NS	NS	NS	NS	NS
Visitor group type	NS	NS	NS	*	NS	NS

Ampang

Variables	Journey	Travel	Access	Density	Congestion	Satisfaction
Age	NS	NS	NS	NS	NS	NS
Sex	NS	NS	NS	NS	NS	NS
Marital status	NS	NS	NS	NS	NS	NS
Ethnic group	NS	NS	NS	NS	NS	NS
Education level	NS	NS	NS	NS	NS	NS
Employment type	NS	NS	NS	NS	NS	NS
Socio-economic group	NS	NS	NS	NS	NS	NS
Family income	NS	NS	NS	NS	NS	NS
Visitor group type	NS	NS	NS	NS	NS	NS

Table 67 con't.

Kancing

Variables	Journey	Travel	Access	Density	Congestion	Satisfaction
Age	NS	*	NS	NS	*	*
Sex	NS	NS	NS	NS	NS	NS
Marital status	NS	*	NS	NS	NS	NS
Ethnic group	NS	NS	NS	NS	NS	NS
Education level	NS	NS	NS	*	NS	*
Employment type	NS	NS	NS	NS	NS	NS
Socio-economic group	NS	NS	NS	NS	NS	NS
Family income	NS	NS	NS	NS	NS	NS
Visitor group type	NS	NS	NS	NS	NS	NS

NS - Not significant at the 5 % level of probability
* - Significant at the 5 % level of probability

ratings towards the travel and area characteristics resulted in the probability levels shown in Table 68. It is very clear that the knowledge gained from previous visits made and attitudes towards some characteristics of travel and area affect quite considerably the frequency of visits to an area. The most outstanding factors which appear to affect visits are travel, which is a subjective rating of distance travelled, and the standard of facilities available at an area (see Table 68). Minor influences are exhibited by the accessibility to Sungai Lalang and Kancing. Surprisingly, the poorer accessibility to Ampang does not significantly influence the frequency of visits to it. The number of people at an area seems to affect the visits to Ampang and, more so, to Kancing. It has already been previously shown that, compared with the other two areas, at Kancing more of the visitors have the opinion that the area is congested, and this seems to affect the level of visits to this area.

Table 68 Travel and Area Characteristics Determining the Frequency of Visits

	Sg. Lalang		Ampang		Kancing	
Characteristics	Survey year	Previous year	Survey year	Previous year	Survey year	Previous year
Journey	NS	NS	NS	NS	*	NS
Travel	**	**	**	**	NS	**
Accessibility	NS	*	NS	NS	*	*
Density	NS	NS	NS	*	**	**
Congestion	NS	NS	NS	NS	*	**
Satisfaction	NS	NS	NS	NS	NS	NS
Facilities	*	*	NS	**	NS	**

NS - Not significant at the 5 per cent level of probability
* - Significant at the 5 per cent level of probability
** - Significant at the 1 per cent level of probability

In summary, the characteristics of travel and area as perceived by the visitors to the areas would play an important role in determining the level of use of a particular area and should feature reasonably well in the travel model if they are included in and as a part of the attractiveness index. It would be a fruitful exercise to observe the effects of the quality of an area, as perceived by its users, on the level of visits to an area. This will be attempted and described in Chapter 7. The role of travel and area characteristics in determining the frequency of visits to an area will be further revealed in the next section.

6.3 EFFECTS OF NON-PRICE VARIABLES UPON VISITATION

The voluntary nature of recreational pursuits and the frequent absence of user charges enable personal preference to play a major role in individual recreation decision making. Two personality attributes that could influence the decision to visit an area are the demographic/socio-economic characteristics of the individual and his attitudes and experience in the evaluation of sites. The previous sections have shown that, individually, several different visitors' characteristics have influenced some of the variance in the number of visits made to an area. Also, some attitudes towards the characteristics of travel and area have been shown to influence different frequencies of visits. It has also been proven that the mental construct of the different visitors towards attributes of travel can be measured; different attitudes towards site and travel characteristics have been shown among categories of individuals.

However, in recreation research it is recognised that the decision-making process is a complex, multivariate structure. Visitors' personal characteristics and attitudes are seen, therefore, as only a few of several

explanatory variables which interact and could jointly influence the recreationists' travel behaviour. At this stage, the analysis is concerned with a limited model of travel behaviour. The common practice with these models has been to derive a regression model to test the predicted relationships of the travel model. Utilising this procedure it is hypothesized that the number of visits made by the visitors to a particular area (V_{ij}) would be a linear function of their demographic/socio-economic characteristics (E_i) and their attitudes towards travel and area characteristics (T_j and A_j). The main aim of this analysis is to observe which independent variable(s) would contribute most in explaining the number of visits made to an area.

Dependent Variable (V_{ij}). The dependent variables are the number of visits made to the surveyed areas during the year the survey was conducted (Y_2) and the year previous to it (Y_1).

Independent Variables

(i) Demographic and socioeconomic categories of the visitors (E_i). The visitors' profiles are categorised as described in the previous sections. In order to observe the effect of individual categories within a variable, dummy variables are created to represent each category. SYSTAT (1984) creates one fewer dummy variables than categories specified. The coding is the classic analysis of variance parameterization, in which the sum of effects estimated for a classifying variable is zero. As an example, since employment type has 4 categories, 3 dummy variables are created and coded as follows:

1	0	0	for observations under employment = 1
0	1	0	for observations under employment = 2
0	0	1	for observations under employment = 3
-1	-1	-1	for observations under employment = 4.

In all, 21 dummy variables are created for the 9 demographic/socio-economic variables.

(ii) Travel characteristics (T_j). The attitudes towards travel for each area are measured by using a 5-point ratings scale, as described in Chapter 5. The characteristics of travel, journey and accessibility to the areas are each treated as a single continuous variable.

(iii) Area characteristics (A_j). A similar rating scale as above is used to assess opinion on the number of people (perceived density) and crowdedness (perceived congestion). The 4-point ratings scale for each of the 15 facilities at each area is summed up and divided by the number of facilities to represent a single popularity weight for all the facilities. The area characteristics are entered as a continuous variable.

As stated earlier, there are two dependent variables and the analysis is considered separately for each dependent variable: visits made during the year the survey was carried out, and visits made the year previous to it. The analysis is also treated separately for the three areas, on the assumption that the different visitors' profile and attitudes towards the travel and area characteristics would highlight different visit predictors. A stepwise regression analysis is used to test the model (Howell, 1982). This type of procedure is valuable for selecting the minimum number of variables necessary to predict a dependent variable among several predictors which are closely related (Crandall, 1976). The step-up method is deployed whereby the variable that explains the greatest amount of variation in the dependent variable is entered and is then followed by the variable(s) that explain the greatest amount of variation remaining unexplained. A criterion for the inclusion of any variable is that it should have an F value significant at the 5 per cent level. The result

also produces a T value for each predictor variable, which is equivalent to testing the significance of the correlation between the dependent and the independent variable concerned.

In accordance with the aim of this analysis and the criterion for inclusion that is set, only the variables that explain the most variance are tabulated, and discussion is focused on the variables that play a significant role as predictor variables. Conventional criteria are used to explain the regression forms. These are, R^2, the overall F statistics and the T values. For each area, the results are outlined below. The value in parenthesis is the T value.

The results of the stepwise regression for the three areas are presented in Tables 69 to 71. It is evident that the visitors' personal characteristics and their evaluation of travel and area characteristics do play some role in predicting the visitation pattern. The low total R^2 values are expected because of poor model specification and omission of other relevant variables (e.g. travel cost or distance and effects of competing areas) that could explain more meaningfully the variation in the number of visits. Nevertheless, the level of explained variation and the variables that contribute to it differ substantially among the study areas and between periods of measurement. For visits made the year before the survey was conducted, five predictor variables for Ampang explain about 31 per cent of the variation in the number of visits as compared to three that explain 18 per cent of the variation for Kancing. As for Sungai Lalang only two variables emerge to explain about 18 per cent variation in visit levels. For the visits made during the year of the survey, one variable explains 5 per cent of the variation for Ampang, two explain 15 per cent

Table 69 Stepwise Regression Results for Ampang

Step	Variable Entered	Variable Name	R^2 Contribution
		Visits the previous year (Y1)	
1	X23	Travel	0.116
2	X2	Male dominated group	0.100
3	X5	Ethnic group - Malay	0.033
4	X27	Facilities	0.036
5	X20	Income - M$1500-2999	0.023
		Total :	0.308
		Visits during the year of survey (Y2)	
1	X23	Travel	0.054

$$Y1 = -17.567 + 4.132X23 + 3.755X2 + 4.108X5$$
$$(4.773)^{**} \quad (4.913)^{**} \quad (2.739)^{**}$$
$$+ 4.861X27 + 3.345X20$$
$$(2.429)^{*} \quad (2.086)^{*}$$

F ratio = 11.974^{**} (5 x 136 d. of f.)

$$Y2 = -3.028 + 1.687X23$$
$$(3.050)^{*}$$

** Significant at 1 % level

* Significant at 5 % level

Table 70 Stepwise Regression Results for Kancing

Step	Variable Entered	Variable Name	R^2 Contribution
		Visits the previous year (Y1)	
1	X25	Density	0.076
2	X27	Facilities	0.056
3	X14	SEG - Sales and Retail	0.046
		Total :	0.178
		Visits during the year of survey (Y2)	
1	X14	SEG - Sales and Retail	0.094
2	X18	Income - M$ 800 - 999	0.056
		Total :	0.150

$$Y1 = -7.906 + 1.278X25 + 3.251X27 + 3.229X14$$
$$(3.381)^{**} \quad (3.239)^{**} \quad (2.814)^{**}$$

F ratio = 10.495^{**} (3 x 146 d. of f.)

$$Y2 = 1.406 + 4.552X14 + 2.672X18$$
$$(4.019)^{**} \quad (3.088)^{**}$$

F ratio = 12.864^{**} (2 x 145 d. of f.)

** Significant at 1 % level

* Significant at 5 % level

Table 71 Stepwise Regression Results for Sungai Lalang

Step	Variable Entered	Variable Name	R^2 Contribution
		Visits the previous year (Y1)	
1	X2	Male dominated group	0.119
2	X27	Facilities	0.063
		Total :	0.182
		Visits during the year of survey (Y2)	
1	X2	Male dominated group	0.077
2	X15	Income - M$ < 399	0.061
		Total :	0.138

$$Y1 = -1.984 + \underset{(2.334)^{*}}{0.819X2} + \underset{(2.494)^{*}}{2.332X27}$$

F ratio = 6.187^{**} (2 x 90 d. of f.)

$$Y2 = 1.961 + \underset{(2.741)^{**}}{1.057X2} - \underset{(-2.128)^{*}}{2.094X15}$$

F ratio = 5.139^{**} (2 x 64 d. of f.)

** Significant at 1 % level

* Significant at 5 % level

for Kancing and two explain 14 per cent of the variation for Sungai Lalang.

The socio-economic feature which stands out in the results for the previous year's visits is the influence of the male dominated group, which is entered by the first step of the regression analysis for Sungai Lalang and second for Ampang; it possesses a positive relationship with the dependent variable. Although the contribution of the ethnic group, income level and socio-economic group are less, these correlates are significant in explaining the variances in the frequency of visits to the three areas. In contrast, with the exception of Ampang, the socio-economic group variables are featured prominently as predictors of visits made during the year of the survey. Those in the sales and retail business explain about 9 per cent of the variations of visits to Kancing and the male dominated group, about 8 per cent, for visits to Sungai Lalang. Two particular income groups explain less, but the variation is nevertheless significant.

The negative relationship between visits and visitors with income level less than M$ 399 at Sungai Lalang shows that this group of visitors are unwilling to travel greater distances or pay more to visit an area; this is reasonable, considering that Sungai Lalang is furthest away from major population centres as compared with the other two recreation areas. It shows that income is a significant determinant of use and increases in income could be associated with shifts of the demand curve to the right. This gives support to Seckler's (1966 and 1968) argument that the slope and position of the demand curve could be a function more of income than the utility of the recreational experience itself.

The most interesting results of this analysis are reflected in the roles of the attitudes of the visitors towards travel and area

characteristics in determining the frequency of visits. Three attitude features which influence the frequency of visits are perceived density, travel and ratings of the facilities at the areas concerned. All the three are positive correlates, which indicates that less visits would be made if the areas were to contain many people, within close proximity to the visitor's residence and provide better recreational facilities. The significant contribution of these attitude features means that these features should be measured and that they can indicate areas where user preferences lead to behaviour patterns. These features could also be used to derive general attraction indices. These indices can be used to predict visits to areas possessing similar facilities and characteristics or to aid the design of future facilities by utilizing the general preference pattern. Even if such generalisations fail to emerge, site surveys which bring the users' evaluation into the recreational travel equation would place the recreation manager in a better position to make predictions and better serve the users on a site by site basis.

The analysis above has in addition highlighted another very important aspect of recreation participation. Participants in recreation activities are very heterogeneous in terms of their background characteristics. This explains why descriptive population indicators have been weak statistical predictors or discriminators of participation. Field and O'Leary (1973) found that none of the nine demographic/socio-economic characteristics they studied explained a significant amount of variance in frequency of recreation participation when individual water-based activities were examined. In the case of this analysis, contrary to what is at first expected, age groups do not show a significant contribution to visitation. Even when some demographic/socio-economic variables emerged as significant

contributors to participation, the level of influence is very low.

Perhaps the use of other forms of social aggregates could better explain the variance. Dottavio et al. (1980) suggest that the social groups with whom people interact are more relevant variables for explaining the recreation activity selection process. When the social group variable is combined with age and sex of a participant, sharp increases in the multiple R occur for the straight frequency specification of participation. This is in fact what is done for this analysis; the male dominated and female dominated groups are transformed variables derived from the conventional female-male sex variable. Another potential problem of using demographic and socio-economic variables to explain visitation lies in the interrelatedness of these variables. Therefore, not surprisingly, education level and employment type do not emerge as significant predictors, while instead income, socio-economic group and sex-group type do. Bearing in mind that the social aggregation process in the Malaysian population could easily be different from that of its western counterparts, much potential for further development in this line of analysis is envisaged.

6.4. PARTICIPATION IN ACTIVITIES

Ideally, the investigation of activities pursued at recreation areas should facilitate better planning and management. However, as in this case, since the surveyed areas are of one type, the kind of activities pursued at the areas are quite similar and little new or unexpected has emerged. Nevertheless, information concerning the relative differences in the number of participants and non-participants among the activities may prove to be of value. In addition, the activities pursued can be said to

represent a characteristic of the areas in recreational terms.

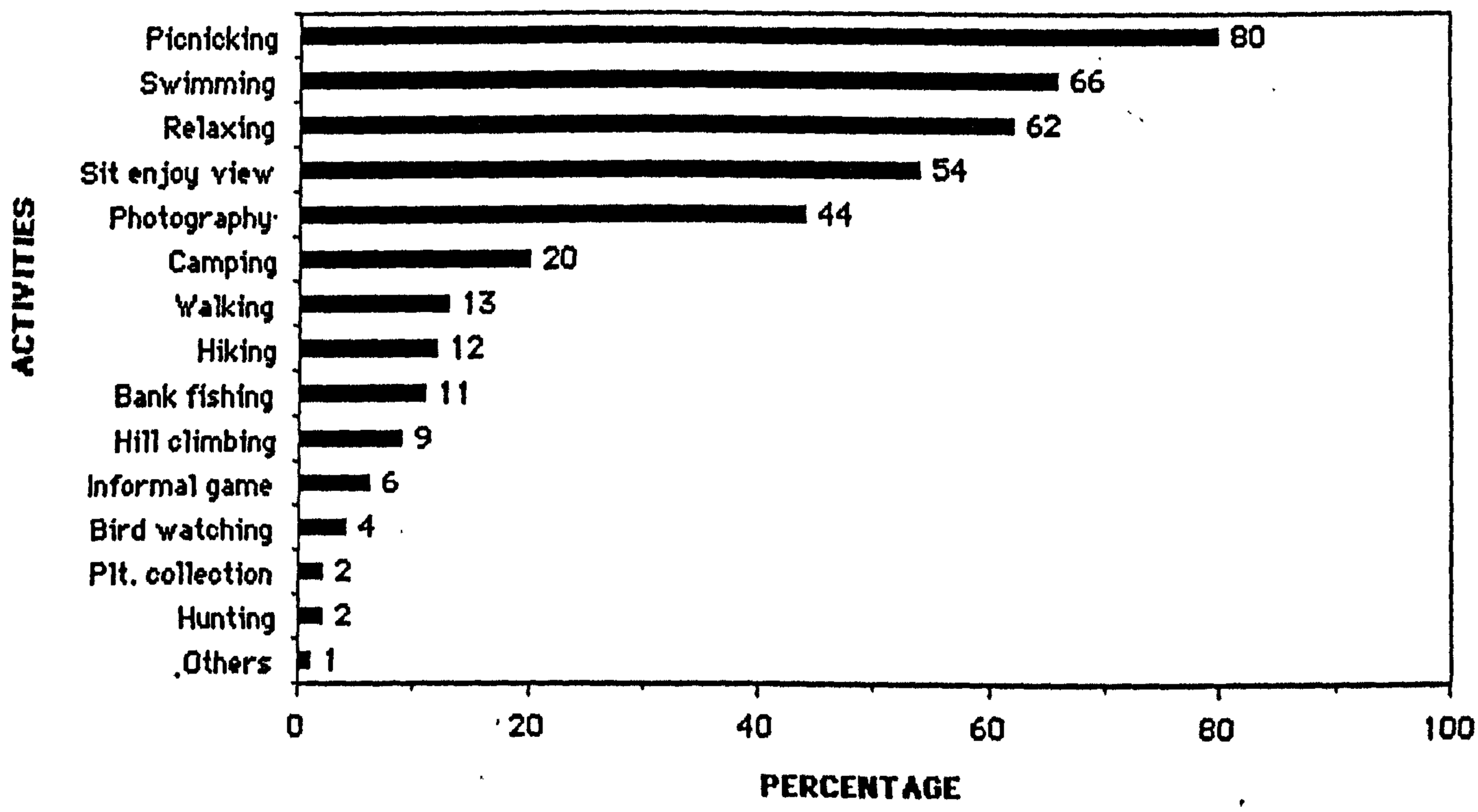
This section discusses the activities shown in Table 72 and their association with the different study areas and categories of visitors. Associations are tested using the chi-square tests of association which are normally used to examine the occurrences in a sample distribution compared with those in a 'rectangular' distribution of even proportions (Runyon and Haber, 1967). The associations among areas are tested in order to observe if there are any differences in the types of activities participated in on the assumption that there are no preferences among the activities. The associations between a particular type of activity and categories of visitors are tested to find out if categories within a visitor's variable affects the participation or non-participation in that activity.

6.4.1. Activity Participation in the Different Areas

The majority of the respondents in all the three areas participate in 'passive' and 'informal' pursuits. Picnicking, swimming, or bathing, relaxing, sitting and enjoying the view and taking photographs are among the most popular activities (see Figure 22). The participation in 'active' pursuits such as camping, walks to scenic points, hiking, bank fishing and hill climbing seems to be less pronounced.

As indicated in Chapter 2, the activities pursued at the areas reflect not only the type of management policies operating, but also the facilities available and the natural resources of the recreation areas. Chapter 5 has highlighted, among other things, visitors' views regarding the special features present at the three areas. The subtle differences in the features of each area, ranging from its physical attractiveness to the availability of man-made facilities, to the presence of crowds and the

Figure 22 THE PROPORTION OF VISITORS PARTICIPATING IN DIFFERENT ACTIVITIES



nature of the terrain appear to have a relationship with the popularity of certain activities within certain areas.

The five 'passive' pursuits mentioned are about equally popular in all three areas, although more visitors seem to engage in picnicking and swimming at Sungai Lalang. Sungai Lalang is rated as having better camping facilities among the areas and this is reflected in the higher engagement in that activity (see Table 72). At Kancing, the terrain poses a relatively greater challenge for activities such as walking to the scenic points, hiking and hill climbing. At Ampang, the river being comparatively wider and slower flowing may be a reason why bank fishing is more popular compared with the other 'active' pursuits. Also, since there are more families with children visiting Ampang, it is here that engagement in 'informal games' involving children is noted more. It is these subtle differences that bring out the uniqueness of an area. Although all three areas are considered to form one type of recreation resource, knowledgeable identification of resource characteristics within an area could enhance certain recreational pursuits. The information gathered by asking the visitors to identify the facilities of the areas that stand out as special to them could help in the process of developing certain recreational features which have been shown to affect the participation in specific activities.

6.4.2. Activity Participation by Categories of Visitors

Since on average for all the three areas the activities participated in have about the same order of popularity, no differentiation among the areas will be made in observing the association between participation and the categories of visitors. Such treatment is appropriate on the assumption that categories of visitors to all the areas would participate

Table 72 Percentage of Participation in Activities at the Three Areas+

Activities	Sg. Lalang	Ampang	Kancing
	(% of total visitors participating in each activity)		
1. Picnicking	85	80	77
2. Swimming/ bathing	72	63	65
3. Relaxing	61	57	67
4. Sit and enjoy view	49	53	56
5. Photography	41	39	49
6. Camping	28	14	22
7. Walking to scenic points	15	9	17
8. Bank fishing	11	16	8
9. Hiking	11	9	15
10. Hill climbing	8	5	12
11. Informal games	6	10	4
12. Bird watching	5	3	4
13. Plant collection	2	3	2
14. Hunting	0	1	3
15. Others	0	2	1

+ The differences among activities and areas is not significant at 5 % level of probability.

in a particular activity irrespective of the areas concerned. The purpose of this analysis is to observe whether different categories of visitors have indicated participation or non-participation in an activity.

There is, however, a limitation to this analysis. Due to the small sample of visitors participating in the less popular activities, the analysis involving all the profile indicators is only possible for activities that are participated in by at least 12 per cent of the total visitors, and thus includes the first eight activities listed in Figure 22. The result of this analysis is summarised in Table 73. The differences in the participation according to profile indicators vary from one activity to

another. The percentage participation in activities by categories of profile indicators are shown in Figures 23 to 30.

Table 73 Association between Activities Participation and Non-participation and Categories of visitors

Variables	Activities							
	Picnic	Swim	Relax	Viewing	Photo-graphy	Camp	Walk	Hike
Age	*	NS	NS	NS	NS	NS	NS	NS
Sex group+	*	*	NS	NS	NS	NS	NS	NS
Marital status	**	**	NS	NS	NS	NS	**	NS
Ethnic group	NS	NS	NS	NS	NS	NS	NS	NS
Education level	NS	NS	*	NS	NS	NS	*	NS
Employment type	NS	NS	**	*	NS	*	NS	NS
Socio-economic group	NS	NS	NS	NS	NS	NS	NS	NS
Family income	**	NS	NS	NS	*	NS	NS	NS
Visitor group type	**	*	NS	NS	NS	NS	*	*

NS - Not significant at the 5 % level of probability
* - Significant at the 5 % level of probability
** - Significant at the 1 % level of probability
\+ - The sex variable is retained as that of male and female

Picnicking and swimming/bathing

From observation, picnicking is normally associated with swimming or bathing. Picnicking is the most popular activity. It tends to be informal, requiring few facilities. Invariably, due to shortages of picnic tables and benches at all the areas, groups of visitors tend to locate their own spots and the best ones, usually close to the water, are usually immediately taken up. The picnickers are chiefly the older age group,

married, from the middle or upper income category and the family group type (Figure 23).

Swimming or bathing is the second most popular activity at all the three areas. In the real sense, swimming in the type of river at the areas is not like swimming in the sea coast. It is more of dipping and wading or bathing under the waterfalls. Since the river at Ampang is much wider and without the presence of waterfalls, it is possible for the children to 'swim'. Swimming or bathing is equally popular among all ages and family income groups (Figure 24).

Relaxing, Enjoying the view and Photography

These activities are the third to fifth most popular at all areas and are usually combined with other pursuits. Consequently, the type of participant and, indeed, their behaviour is not governed by the activities themselves. There is, however, an exception to this generalisation in that those involved in these 'passive' relaxing and viewing pursuits are mostly students (of higher institutions) and photography is a more popular activity (72 % of visitors) among those in the uppermost family income bracket (earning more than M$ 3000) (Figure 25 - 27).

Camping

Camping is the sixth most popular activity for all areas and among the three sites is most popular at Sungai Lalang (28 per cent of visitors). The isolated and relatively much more undisturbed environment in Sungai Lalang has proven to be more suitable for this activity. Not surprisingly, the participants are chiefly students (Figure 28).

Walking to scenic points and hiking

These activities may be classified as 'active' pursuits as they involve considerable expenditure of energy. They are more popular at Kancing (17 % for walking and 15 % for hiking), where the terrain is more varied and there are longer hiking trails. The majority of those walking are unmarried individuals, with higher education (college and university level), and principally from the non-family groups. Hiking is significantly participated in by those in the non-family group (Figure 30).

The less popular activities

Although, overall, fewer than 12 per cent of the total visitors participated in these activities, bank fishing (16%) and informal games (10%) are pursued more than walking or hiking at Ampang (see Table 72). Bank fishing is a significantly more popular activity amongst the males, while the 'informal games' are, naturally, as an activity, most popular amongst single and extended family groups with children. Hill climbing is pursued by 12 per cent of the visitors to Kancing. This activity involves hiking across undulating terrain through the forest environment and culminating at several possible high points in the Kancing forest reserve. Since the activity is most energy consuming and involves a measure of endurance, it is significantly taken up by those who are younger (less than 24 years), unmarried and from the non-family group.

An Assessment

Two broad conclusions can be drawn from the association between areas and activities and between profile characteristics and activity participation. Firstly, although the differences among the three areas in the proportion of participation in different activities is not significant at the 5 per cent level of probability, the presence of certain

Figure 23 PICNIC AND PROFILE INDICATORS

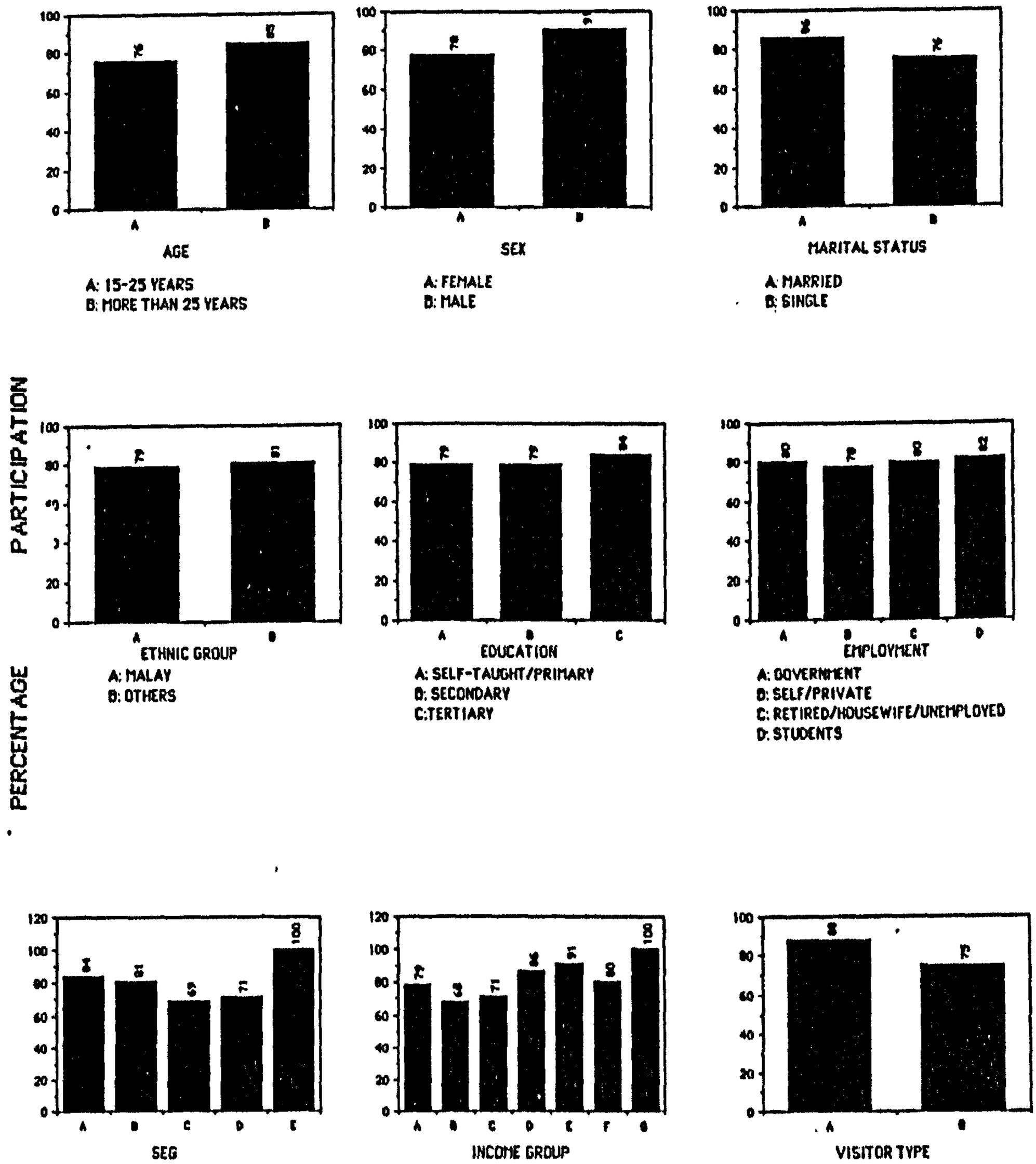


Figure 24 SWIMMING AND PROFILE INDICATORS

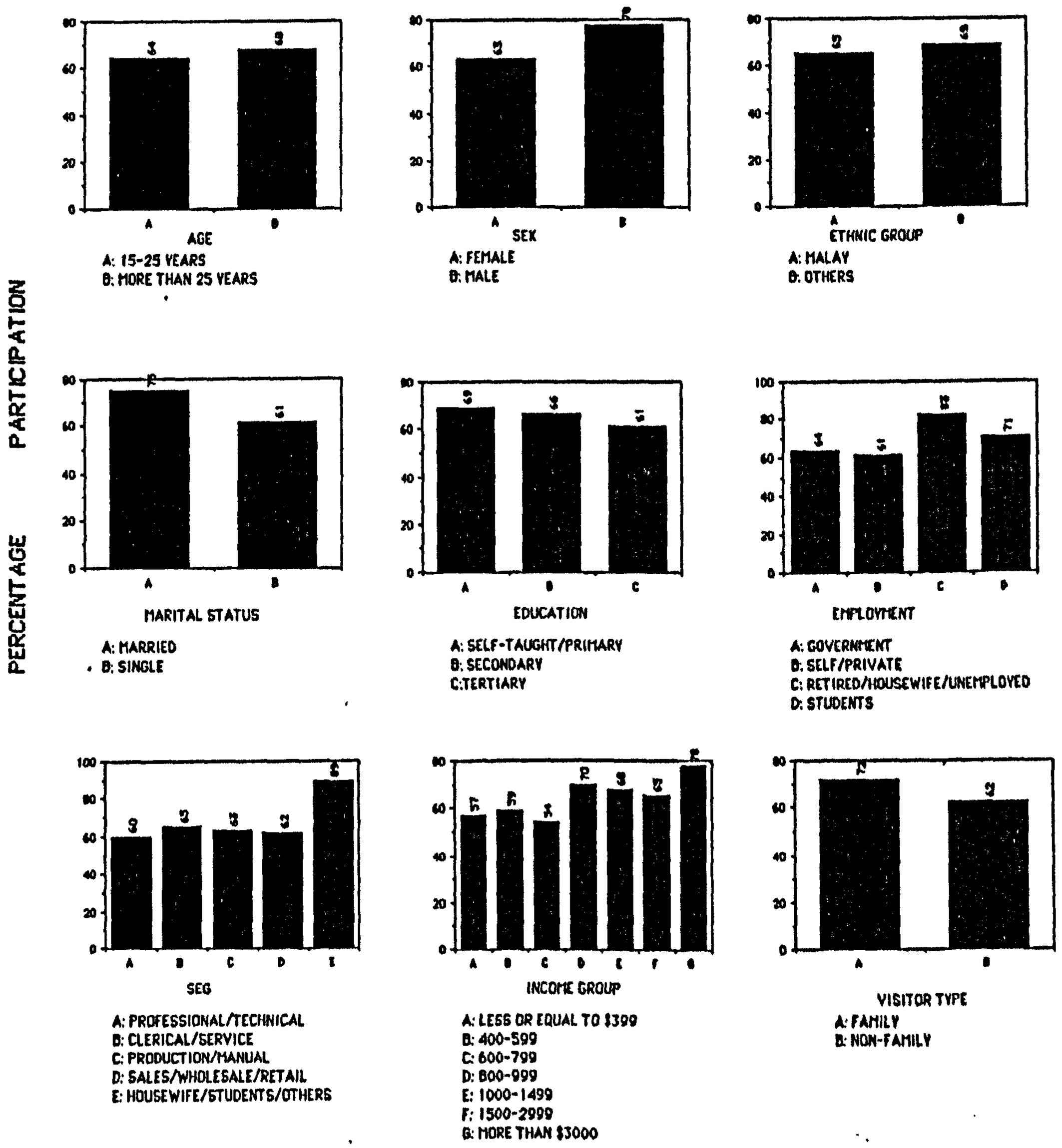


Figure 25 RELAXING AND PROFILE INDICATORS

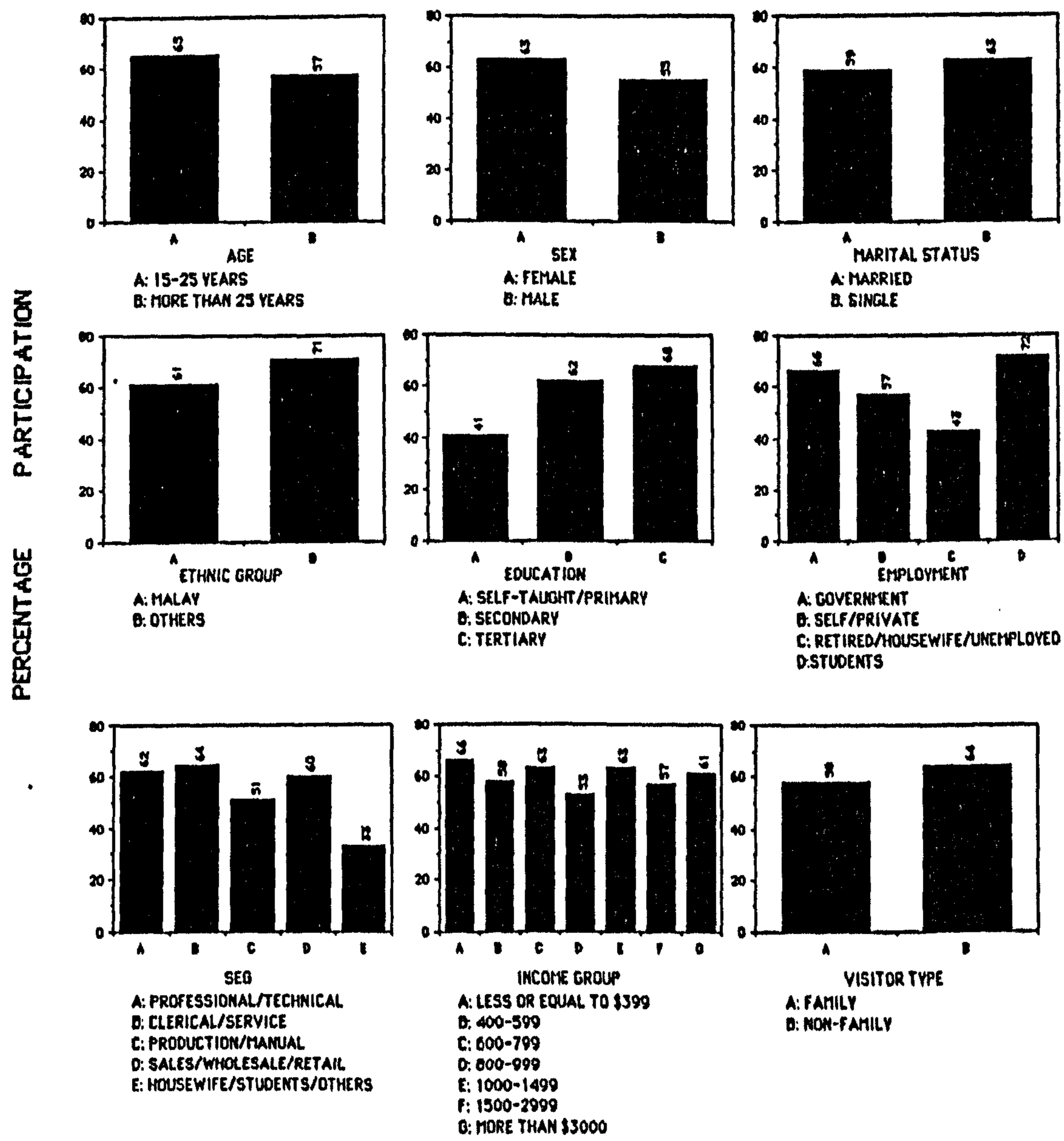


Figure 26 VIEWING AND PROFILE INDICATORS

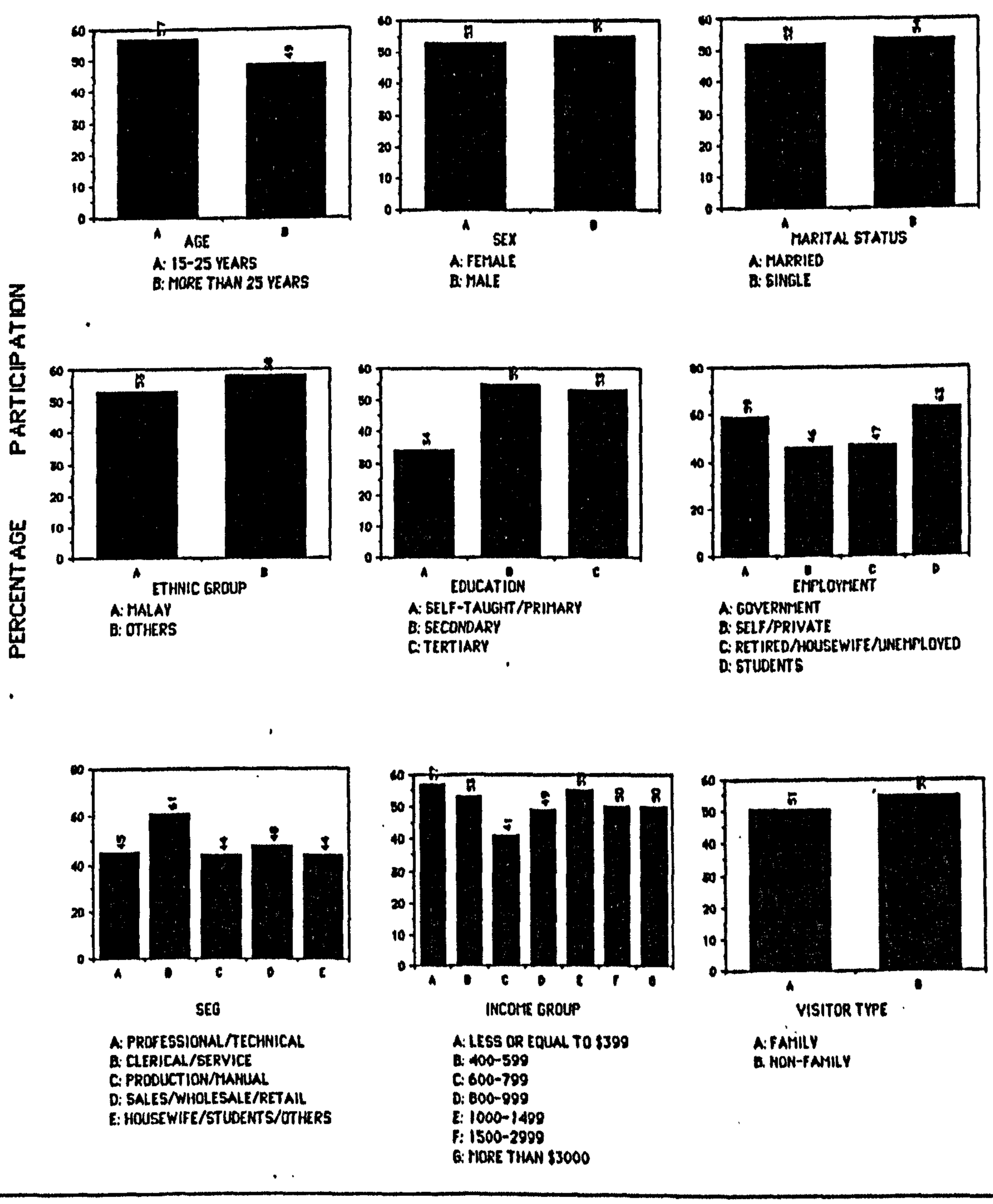


Figure 27 PHOTOGRAPHY AND PROFILE INDICATORS

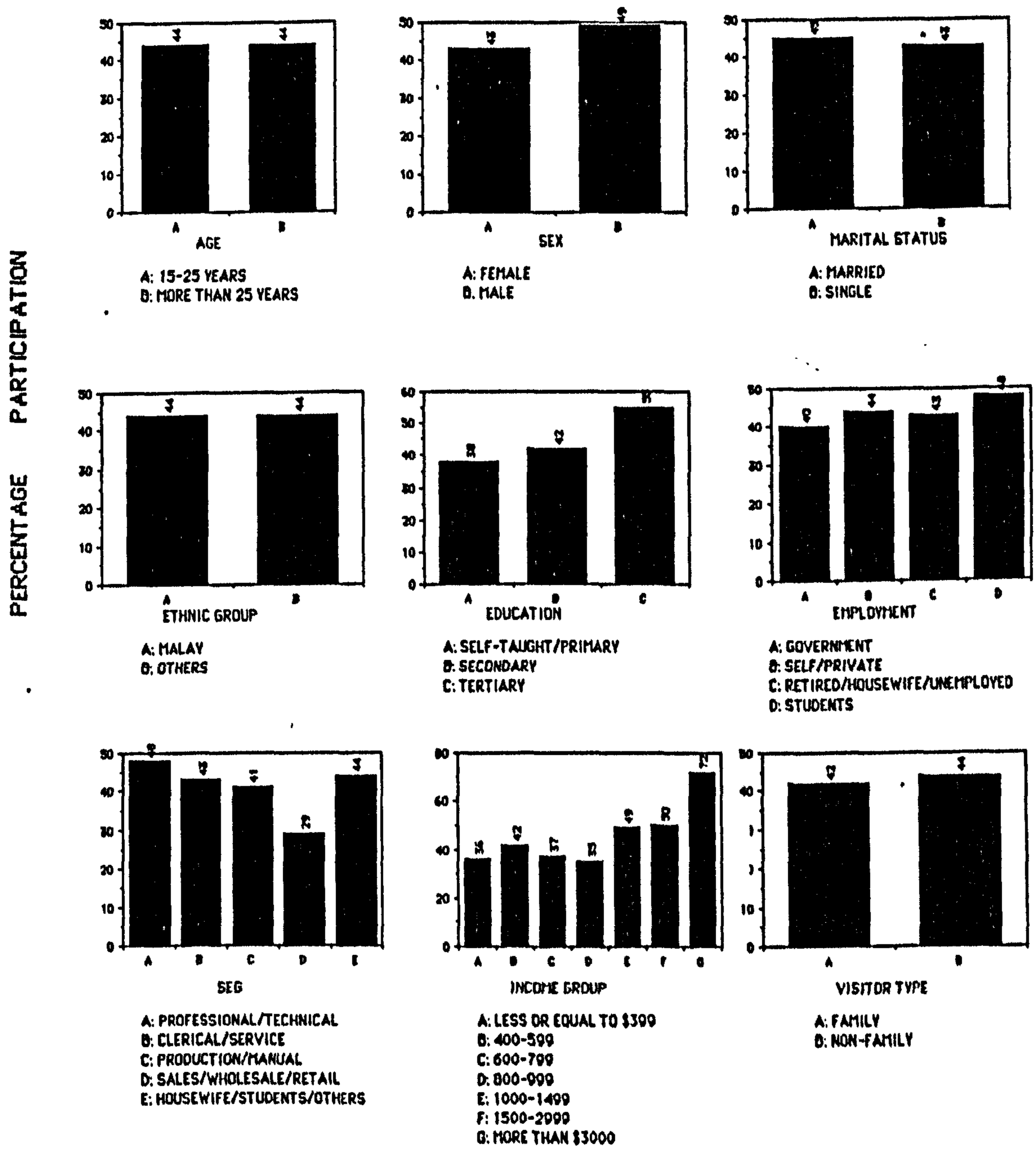


Figure 28 CAMPING AND PROFILE INDICATORS

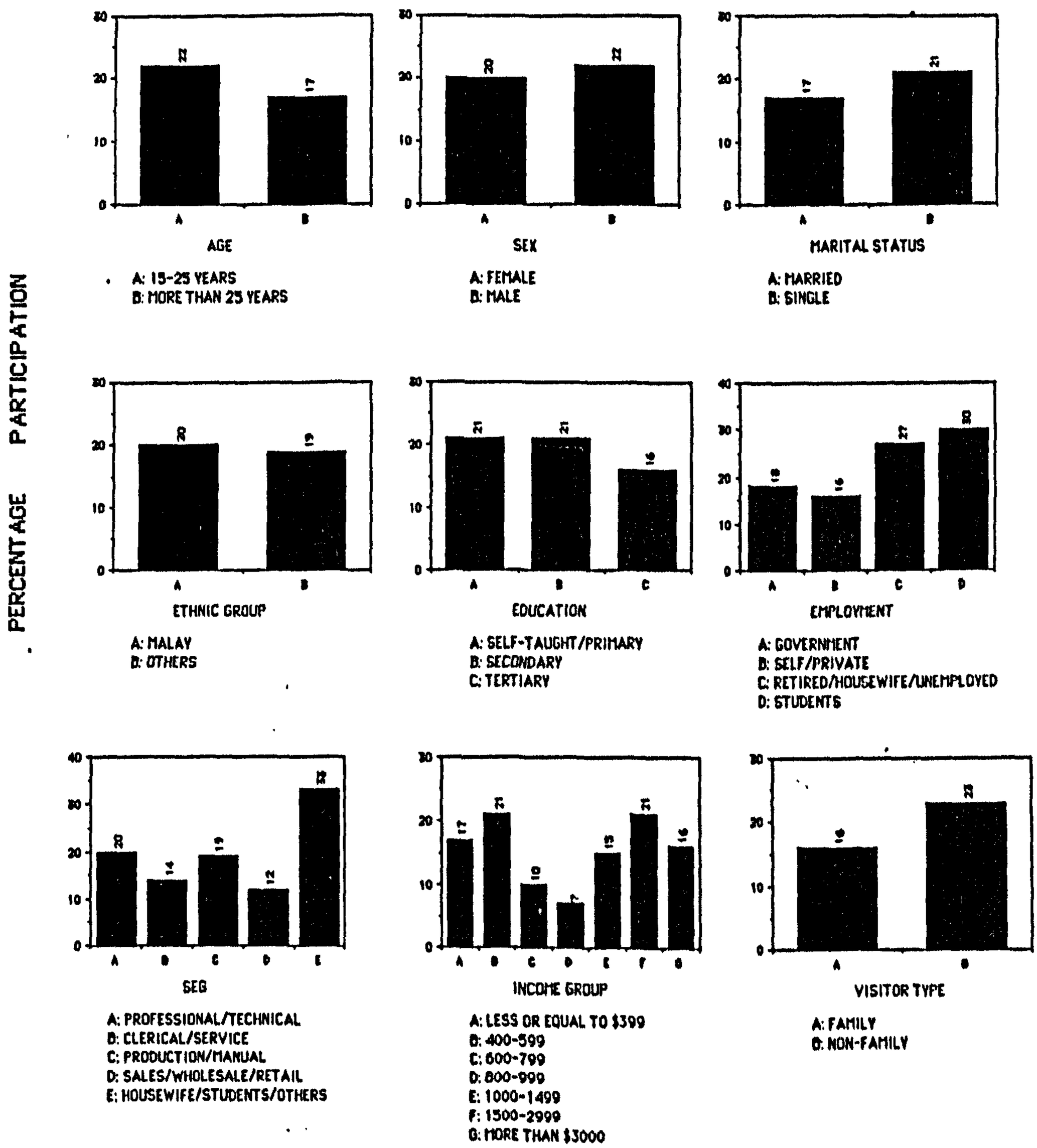


Figure 29 HIKING AND PROFILE INDICATORS

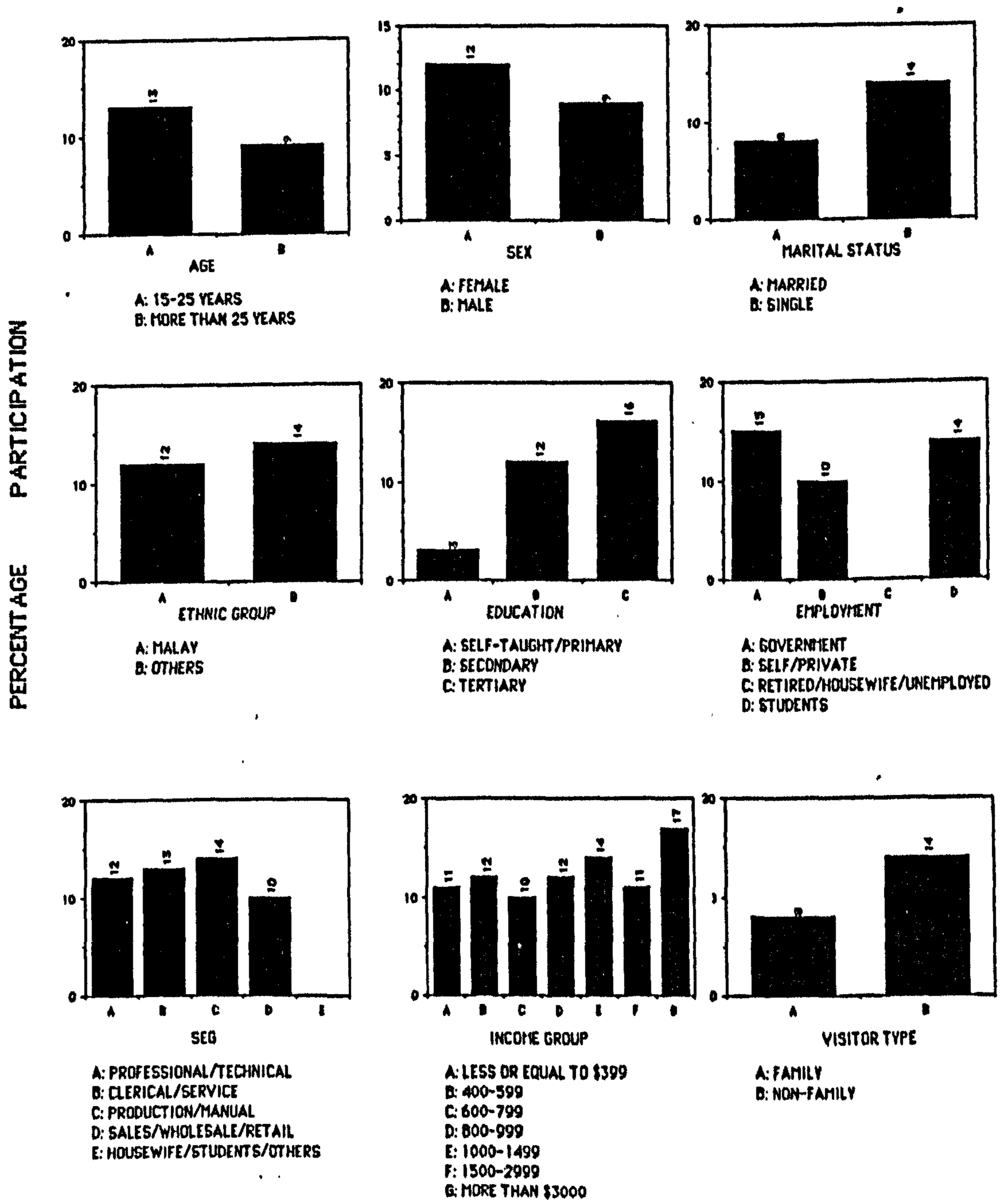
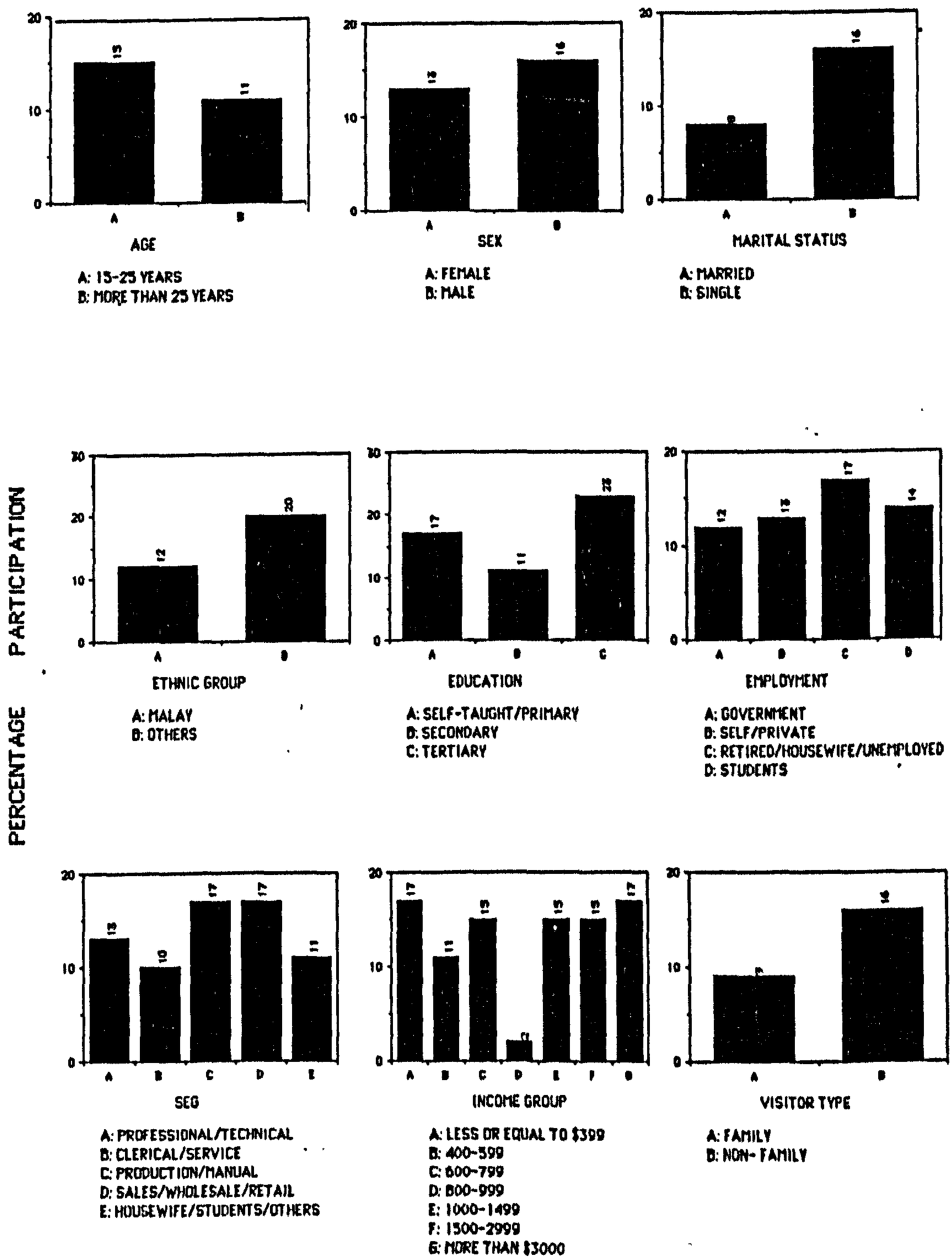


Figure 30 WALKING AND PROFILE INDICATORS



characteristics in an area does seem to favour participation in certain activities. That is, certain features within an area create more opportunity for participation in a specific activity and an activity is closely related to the features that enhance that activity. Secondly, particular categories of visitors are shown to participate significantly in particular activities while not in others. Knowledge about those who participate in any particular activity is seen to be useful towards improving the features or providing for facilities that could enhance participants' engagement in that activity.

In addition, this section has shown that valuable information could be gathered from the visitors of an area, that is information which could, if properly assessed, be used to assist in site planning and the provision of facilities and activities.

6.5. CONCLUSIONS

The process of recreation resource management begins with people; they are the heart of any recreation system. The demographic features, socio-economic status and their opinions on the resources are fundamental inputs to the success of recreation development programmes. Insights into the characteristics of the users are the key to the understanding of leisure behaviour and to ensuring that the planning of recreation opportunities is sensitive to the desires and aspiration of the recreation clientele. In this chapter, recreation behaviour is described to help structure the thinking about the linkages between individual users, their participation in recreation, the opportunities provided, and the social-individual values of those recreation opportunities.

Overall, the visitor surveys at the three areas reveal visitors who represent a distinct segment of the population within the region. Most visitors come in a predominantly male-dominated group, are younger adults and have gone through at least secondary level education. They are equally represented by those who work in the public and private sector employment. There are, however, no distinct categories of visitors within the socio-economic and family income groups. That these visitors form a distinct clientele emerging from the general population is revealed when it was shown that the differences between the categories of site visitors and the regional population are highly significant. Although the region comprises more Chinese and the older age group the visitors to the sites are predominantly Malays and the younger adults.

The assumption that different categories of visitors visit the different sites is also proven true where, except for the sex and family income groups, different categories of the demographic/socio-economic groups visited the three areas. This is also reflected when the profile of the visitors to each individual area reveal differences in the type of visitors.

There are then possibilities that the differences in the type of visitors that visit an area are attributed to the differences in the opinion towards certain characteristics of the recreation resource and that these opinions differ between categories of individuals. The results here suggest that the areas are perceived quite differently with respect to some travel and area characteristics. Access into Kancing is significantly better than Ampang and Sungai Lalang. Although the facilities at the three areas are perceived as being in a rather poor condition and inadequate,

Kancing is rated better than Ampang or Sungai Lalang.

The differences in the perception of the recreation areas among its users are by themselves a revealing outcome and show that the visitors are able to tell the difference in the conditions existing among the recreation sites. A more rewarding revelation from this study is that the varying perceptions among the users can be reasonably measured.

It was shown that categories within the age, marital status, visitor group type, education level and family income groups express different opinions about travel to the area, density and congestion, and satisfaction gained while at the site.

The revelation mentioned above prompted another form of analysis to observe if the differences in the frequency of visits made to an area are attributable to perceived ratings of travel or area characteristics. A similar form of enquiry was conducted to observe if the number of visits reportedly made over a time span varies among categories of individuals. The results of both inquiries show that differences in the ratings towards travel and site characteristics resulted in different number of visits made and that different categories of people made different numbers of visits to the sites over an extended time period. Thus, a derivation of an attractiveness index encompassing revealed attitudes toward certain characteristics of the trip or an area could help explain more meaningfully the effects of substitute sites on the overall pattern of recreational use for a system of recreation areas. The fact that different categories of age, sex group, education level and socio-economic group made significantly different number of visits to an area shows the importance of demographic/ socio-economic characteristics in determining the propensity for recreation

participation.

The interacting roles of travel and area characteristics and demographic/socio-economic variables in determining the frequency of visits to an area are shown by an application of a simple linear participation model. A step-wise regression result of the participation model reveals that the variability of visits is significantly explained by attitudes towards travel, facilities and density. Socio-economic variables such as socio-economic group, family income group, sex group and ethnic group have something to say about the variability of visits. These variables will be included in the use-demand model to predict visitation rates and estimation of consumers' surplus.

The usefulness of the information obtained from this chapter is not restricted to the derivation of the use-demand model only. It was also shown that a particular category of visitor participation in a particular activity and that the resource characteristics of the sites has a close relationship with the activities participated in. Such information, if properly gathered and assessed is useful for site planning and management.

CHAPTER 7

RECREATION AREA USE-DEMAND MODELS AND ESTIMATION OF CONSUMERS' SURPLUS

7.1 Introduction

7.2 Derivation of Area Use-Demand Models

7.2.1 Review of the Variables for Analysis

The list of variables

7.2.2 Review of the Estimation Procedures

Aggregation
Functional Forms
An Assessment

7.2.3 Estimation Procedures Adopted for this Study

Individual Participation Function (V_{ij})

Semi-Disaggregated Demand Function (VPC)

7.3 Regression Results

7.3.1 Estimation of Individual Participation Model

7.3.2 Estimation of Semi-Disaggregated Use-Demand Model

7.4 Calculation of Consumers' Surplus

7.5 Conclusions

7.1 INTRODUCTION

In Chapter 3, different methods of measuring recreational behaviour and benefits have been outlined. In addition to the travel cost method and its variants, the direct evaluation technique and the household production function approach were also considered. In the case of the former, the judgement was made that direct evaluation survey of willingness to pay would introduce bias in its stated answers. Household production functions were rejected on the grounds that, among other things, the underlying theoretical model does not apply to visits made to general outdoor recreation areas.

With regard to the travel cost approach, some of the inherent difficulties of the method were discussed in Chapter 3. The design of the interview survey of the visitors took these difficulties into account and a reasonable amount of information was obtained which described the travel and use characteristics of the users. The information was also assessed in order to find out if it is appropriate for the derivation of the area-use demand function. This assessment was amply conducted and presented in Chapters 5 and 6.

Prior to considering procedural issues, that is, the manipulation of the visitors' data base to derive an area use model and estimation of consumers' surplus, it is appropriate to examine the theoretical problems of the technique and to re-examine some of the issues and results raised in both Chapters 5 and 6. This is necessary not only to appreciate the boundaries and contents of the data set, but also to identify the need for additional extra-sample data in the effort to improve the specification of the use model. Moreover, in the light of the data obtained from the interview survey it is possible to assess more fully the scope of the

analysis and the validity of some of the tentative conclusions previously drawn.

The estimation of consumers' surplus also involves the choice among several methods and since this estimation is dependent on the outcome of the use-demand function, this chapter proceeds first with the derivation of the use-demand functions, followed by the estimation of benefits (consumers' surplus).

7.2. DERIVATION OF AREA USE-DEMAND MODEL

7.2.1. Review of the Variables for Analysis

The purpose of this review is two-fold. Firstly, it is to re-examine the variables that may have an effect on the estimation of area use and benefits. The variables in question are already presented in Chapters 5 and 6. The travel cost technique is probably the most widely used method for estimating outdoor recreation demand functions. Consequently, problems of specification have attracted much attention. Among others, specification errors, due to variable omission have received the most attention. Yet the effect of variable omission is likely to vary depending upon the type of activity, the existence of substitutes and related factors. The second reason for this review is to arrive at a consensus to select a list of variables that would best explain the use-demand function for an area. This list of variables will derive an appropriate and reasonable demand function specification as expected *a priori* and as allowed by the set of data at hand.

In Chapter 3 various difficulties of the travel cost technique as it is applied to single sites were identified. Following that, the interview

questionnaire has gathered information that showed that some of the constraints are not operative or can be obviated by the use of appropriate sample data obtained. The descriptive data obtained in Chapter 5 and the analytical results of Chapter 6 lead to the conclusion that, outlined below, difficulties (a) to (i) inherent in the travel cost technique could fall into three separate classes. In this respect, difficulties (a) and (b) can be viewed as being somewhat irrelevant to this study in that they are largely obviated either by the sample data obtained or the nature of the general outdoor activity. Issue (c) is relevant to this study and hence a potential source of bias. However, it is ignored by the analysis because it cannot be treated quantitatively within the constraints of data collection and/or the mechanics of the technique. Finally, the third group is composed of issues (d) to (i). These problems of the technique are addressed directly through the use of sample or extra-sample data. For this group, some issues are given the necessary treatments to allow for their proper use.

(a) Congestion

It is almost axiomatic that there exist certain levels of congestion in publicly owned recreational areas which are provided at a zero entrance cost to the user. To some extent, while the degree of congestion may be important, the more significant issue is whether the existence of congestion seriously affects the reliability of the travel cost method. On this point, Anderson (1981) demonstrates that the travel cost method effectively estimates consumers' surplus with the present level of congestion held constant. Given this, and this study's aim of quantifying *ex post* benefits, there would seem to be insufficient reason to be concerned with congestion cost as a single factor affecting recreational

visits. Stated opinion by the majority of its users that the areas under study do not contain too many visitors at the time of their visits and that the level of congestion is tolerable amounts to no more than a suggestion that the bias, if it exists, might well be small. Ratings of the number of people in an area and the degree of congestion perceived would, however, be included as a quality indicator and part of the attractiveness index for the area concerned. This will be discussed further in the following sections.

(b) Length of Visit

The issue at hand is that, if the time spent at the site varies positively with distance and is ignored (assuming that the scarcity value per unit of time is constant), then benefits will be underestimated as the estimated demand function will be more elastic than the function which includes on-site time costs. Benefits are overestimated when time spent at the site varies inversely with distance. From the survey of the visitors, time spent on-site does not vary directly or inversely with distance, nor does it indicate a bias from the sample of visitors from varying distances. In effect, we are dealing with a homogeneous entity. Moreover, the benefits obtained through the time spent at the site would most likely cancel the envisaged cost. Seen in this light it is not warranted to include the length of visit in the demand function.

(c) Journey Utility

There is general agreement that the utility or disutility per mile of the journey should be incorporated into the demand function. The survey of the visitors attempted to ascertain the direction of any bias and to provide supporting evidence for the estimated value for travel time. A bias towards utility or disutility of journey would show if the majority of

visitors could show a clear opinion one way or the other. For example, if most visitors find the journey uninteresting and the degree of dissatisfaction associated with the journey increases with distance, then one can be fairly confident that any failure to account for journey utility will result in an underestimate of consumers' surplus. As reported in Sections 5.4.1 and 5.4.2, the journey has not been described as being particularly boring or particularly interesting, by a majority of visitors. Moreover, attitude to the journey does not vary significantly with distance travelled. This is particularly so for Kancing. For Sungai Lalang however, the mean distance travelled by visitors who find the journey 'boring' is shorter than the mean distance travelled by visitors with other opinions. Travelling further distances would then be, presumably, more interesting but this is not the case either, because those who travel from further distances describe the journey as either 'very boring' or 'very interesting'. Further, for Ampang, the average distance travelled is greater among visitors who find the journey 'interesting' than among those in other classes of opinion. Given that there is no clear majority of opinions towards the journey experience and no discernible relationship between opinion of journey and distance, it would not be possible to assess the direction of bias with any confidence. One possible interpretation is that the disutility or otherwise of the journey is not closely dependent on the length of journey. Overall, these results are surprising and, in the absence of further information, are difficult to explain. What is clear is that the utility of the whole journey is influenced by many factors other than the distance travelled. If the utility of the journey is not determined by distance alone, the relative visitation rates from different zones may not be seriously influenced by journey utility. Thus, while we

cannot be sure of the direction of bias we might speculate tentatively that in this study, if journey utility were to be ignored, then the bias would not be as large as hitherto thought. In any event the procedure for dealing with travel time (see g) should reflect the utility for the journey itself. Consequently, the utility of the journey is relegated largely to be explained by the values for travel time.

(d) Multi-Stop Visits

Given the nature of weekend and weekday travel patterns to the forest recreation areas under study, there exists a reasonably high proportion of visitors who stop at various places before reaching the area. These stops are shown to be an essential part of the travel to the recreation areas and moreover the trips are mainly single purpose, that of visiting the recreation area. There is, however, a suspicion that the 'unplanned' trips to the areas are in fact incidental stop-overs by those who travelled from outside the region. In fact it was shown that there is a category of visitors who stop and visit the area only as a stop-over before proceeding to other, preplanned, destinations. They are mainly those who are on holiday and are travelling from one region to another. The question of multi-purpose trips then relates only to those who treat the visit to the recreation area as a stop-over. The suspicion that those on holiday are the ones that treated the areas as a stop-over was confirmed but such trips do not form a large proportion of total visits. It was found that those on holiday and on stop-overs at the areas accounted for 5.4 per cent of visits to Sungai Lalang, 2.3 per cent of visits to Ampang and 2.8 per cent of visits to Kancing.

There are three ways of treating the problem of multi-purpose visits. One can make no distinction between types of trips; this effectively

assigns all the willingness-to-pay for multi-purpose visits to the recreation area and will result in an overestimate of consumers' surplus. Alternatively, multi-purpose trips can be taken out of the demand analysis yielding an underestimate of consumers' surplus. In between these two extremes there is the possibility of apportioning only part of the cost of a multi-purpose trip to the recreation area. While the latter approach has some appeal - if only because it is a compromise - given the relatively small ratio of multi-purpose visits to total trips, such a procedure is not warranted. Moreover, there is insufficient information within the sample data on which to base the necessary division of trip costs. The treatment of multi-purpose trips is thus a choice between ignoring the problem or excluding multi-purpose trips from the analysis. The latter course was preferred as multi-purpose trips are more likely to originate from more distant zones and in this study it was shown that most of them are out of the region visits.The problem here is an observation from out of the region may be the only observation and thus can carry a greater weight than an observation from a nearer zone where it is only one of many. Consequently, the degree of overestimation of consumers' surplus from including multi-purpose trips may be greater than the underestimate produced by excluding them. It is thus decided to exclude multi-purpose trips and to recognise the potential bias.

(e) Monetary Cost of Travel

The main issue with respect to the estimation of the monetary cost of travel revolves around whether the cost of travel as perceived by the visitor can be used as the cost incurred on the trip to the recreation area. The sample has shown that the cost per calculated kilometre travelled is perceived inconsistently for the same mode of transport used

to visit the three areas. Although the cost per calculated kilometre is perceived inconsistently for the same mode of transport, they are within the range of the per kilometre cost when extra-sample data for 'cost of running' the mode of transport is used to calculate the cost of travel.

It is generally accepted that personally stated values are very inconsistent among individuals even though they are assessing the same object and using the same unit of measurement to express them. In order to avoid the introduction of such biases, the calculated distances travelled and the extra-sample data for the running cost of vehicle will be used to calculate the monetary cost of travel. The calculated cost of travel is used here because the travel cost perceived by the visitors is almost similar to the marginal cost.

The question arises whether the cost of travel should be calculated on a per person basis. This is reasonable if a visitor is travelling by public or chartered buses. More often than not the head of a household would pay for the cost if travel is made by a private vehicle or taxi. It is hence only appropriate to assign the total cost and not a cost per person for those who visit the area by the use of a private vehicle or a taxi. Thus, for those who travel by the public or chartered buses the cost of travel is assigned on a per person basis and for those who travel by cars or taxis, on a per mode basis. The decision was also made to exclude those who visit the area by foot or on a bicycle, chiefly because the number of visitors involved here is negligible and partly because it is difficult to assign a monetary cost for these cases.

(f) Travel Time

In contrast to on-site time there is a clear consensus amongst

researchers as to the case for including travel time in the estimation of demand functions. Within the framework above it can be appreciated that the value of travel time does vary unequivocally with distance. The sample data also show that besides distance, the mode of transport used to get to the area also affects the perception of travel time. Consequently a judgement has to be made as to whether or not the perceived times stated by visitors who travel by different modes of transport are reasonable estimates. The sample data show inconsistent perceptions of travel time by those using the same mode of travel to the different areas. This is expected because although the distances might be the same, the conditions of the road, volume of traffic and the road network system that leads to a particular recreation area would differ considerably. Furthermore, the inconsistency could arise mainly because of the differences in personal evaluation of the distance and time spent on travel.

Discounting all the reasons given above as the ones that cannot be avoided, the travel speeds (kilometres per hour) based on the visitors' perceived time are, nevertheless, reasonable and thus can be used to estimate the value of travel time. The only exceptions are the travel speeds cited by those who walk or cycle to the area but since an earlier decision was made to exclude them from the travel model, this problem does not arise any more. The question arises, however, as to what value would be appropriate to place on the travel time for the other modes of transport.

It is worthwhile here to consider more formally the issues involved. Following Willman (1980), total costs of the marginal visit V_j, are composed of both money and time costs. Money cost M_c, is given by

$$M_c = \lambda (P_j + D_j) \qquad (8)$$

where

P_j is admission cost to site j (in our case this does not apply)

D_j is monetary travel cost

λ is the marginal utility of income.

Time cost T_c, are given by

$$T_c = \alpha(S_t + D_t - U_t) \qquad (9)$$

where

S_t is on-site time (not considered here)

D_t is travel time

U_t is the utility associated with the journey itself

and α is the marginal utility of time.

Given this, and expanding the brackets in (8) and (9) the equality between the marginal utility of the on-site activity at j, U_{vj}, and its cost implies that

$$U_{vj} = \lambda P_j + \lambda D_j + \alpha S_t + \alpha D_t - \alpha U_t \qquad (10)$$

In this respect, λP_j represents the opportunity cost of admission fees, λD_j represents the opportunity cost of monetary travel cost, αS_t represents the opportunity cost of on-site time and αD_t represents the opportunity cost of travel time. The opportunity cost of time, both on-site and travel time, is the value of time in its next best activity. This has been termed the 'scarcity value' of time. As Willman points out U_t represents the 'commodity value' of time or its value in its existing use. The scarcity value of time minus its commodity value represents what De Serpa (1971) terms the 'value of time saved'. Thus when the last two terms of (10)

above are taken together the implication is that time spent in travel is valued on the basis of time saved, whereas time spent on-site is valued simply on its commodity value.

As indicated above, Willman argues, convincingly, that the value of 'time saved' should be used (i.e. opportunity cost minus the utility of the journey). The approach adopted by this study is to use sample data to estimate, through an iterative procedure, a value for travel time (this was described in Chapter 3). In effect since this value is estimated from the sample data it should reflect the value of 'time saved'. Indeed, in applying the technique Common (1973) found that the value of travel time was negative suggesting that the commodity value of travel time was positive and greater than its scarcity value.

(g) Alternative and Competing Areas

As previously stated, the case for including some measure of the influence of alternative or competing sites is well established. The visitor survey was able to identify at least five forest recreation areas which are good substitutes for the areas visited. These five areas are located within the region under study and three of the areas are, in fact, the areas under study themselves. This is not surprising because a visitor to a particular area could have chosen to visit any of the five areas on a particular weekend or weekday.

There are two possible ways of deriving a proxy for the price of the alternatives: we could use the travel distances to reach the area or the monetary cost of travel to the alternatives. Choosing the latter course of action would not be possible due to the lack of sample data. An assumption has to be made on the mode of transport used to get to the areas in order

to estimate the cost of travel. The first option is more feasible because travel distance to the substitutes can be easily measured and moreover it is in line with the use of calculated travel distances in the estimation of travel cost for visits made to the survey areas. Hof and King (1982) suggested that, for single site demand functions, prices of substitutes and complements can be included, based on travel distance and use data collected for the substitute site. Thus, travel distances to the substitute sites will be used as a proxy for price in determining the influence of alternative or competing sites on relative visitation rates to the survey areas.

(h) The Quality of an Area

In Chapter 5 special natural or man-made characteristics are used to describe the relative quality of the recreation areas. From the perception of the visitors, several travel and area characteristics have emerged as being good indicators of the quality of an area. The quality ratings are shown to differ among the survey areas, and between the survey areas and the alternatives or competing areas. The differences in perceived travel and area characteristics among the survey areas are significant for characteristics such as accessibility, perceived level of congestion and ratings of facilities. Furthermore, it is shown that, among the non-price variables affecting visitation rates, the three attitude features which influence the frequency of visits are perceived density, travel, and ratings of the facilities at the areas surveyed. It has also been proven that attitude ratings measure the intensity of an individual's preference (or taste) for one environment over another. Thus their inclusion explicitly removes the assumption of constant tastes. The differences in quality ratings between the survey areas and their

alternatives allow for the derivation of an attractiveness index for each of the type of areas concerned. In this vein, the 'attractiveness' of the survey areas and their alternatives will also account for the effects of competing sites on visitation rates within the framework of the demand estimation.

(i) Income Effects

Among the demographic/socio-economic variables that have shown significant differences in the number of visits to an area are age, sex group, education level and socio-economic group. However, when all the demographic/socio-economic variables, travel and area characteristics are used together to determine the frequency of visits made, only certain categories of the sex group, ethnic group, socioeconomic group and family income group emerge as significant correlates to visitation levels. All the categories mentioned above, except family income, can be regarded as showing the frequency with which visitors within those categories tend to visit the area. The variable family income is, however, a measure of the ability of all households within a region to consume this particular kind of recreation. Since the three areas are shown to attract different family groups it seems plausible that the relationship between visits and family income would influence the cost variables.

Whilst it seems clear a priori that visits would tend to vary inversely with cost per visit, it is worth including the demographic/socio-economic variables in the demand function for it would reflect the effects of tastes and preferences in the use of the areas. As noted in Chapter 3, the travel method assumes that persons in different distance zones take the same quantity of recreation at the same monetary cost. Inclusion of socio-economic variables, such as those mentioned above, partially removes this

assumption. In the first stage of the estimation procedure, each category within a variable is treated as a dummy variable representing the occurrence or non-occurrence of a visitor within that category. The derivation of dummy variables is as discussed in Section 6.3.

The list of variables

The above considerations and the information outlined in Chapters 5 and 6 lead to the establishment of the variable list below, compiled mainly from sample data. Each variable represents the observation of one individual (i) at survey area (j) and substitute area (s) or their attitudes toward characteristics of (j) and (s).

P_i = Population of sub-district

V_{ij} = Number of visits to (j) by the ith visitor

TD_{ij} = Return travel distance to (j) in kilometres by the ith visitor

TC_{ij} = Monetary travel cost to (j) in M$ for the ith visitor

= TD_{ij} X Average cost per kilometre for mode of transport

TT_{ij} = Travel time to (j) in minutes for the ith visitor

DINCOME = Dummy variables for family income 1 to 6

DSEG = Dummy variables for socio-economic groups 1 to 4

DETHNIC = Dummy variables for Malay Ethnic group

DSEXGROUP = Dummy variables for sex groups 1 and 2

PD_{ij} = Perceived number of people by ith visitor at site (j)

PC_{ij} = Perceived level of congestion by ith visitor at site (j)

FAC_{ij} = Summation rating of facilities by ith visitor for site (j)

T_{ij} = Summation rating of travel characteristics by ith visitor for site (j)

TD_{is} = Return journey from (i) to substitute site (s) in kilometres for the kth visitor

PD_{is} = Perceived number of people by ith visitor at site (s)

PC_{is} = Perceived level of congestion by ith visitor at site (s)

FAC_{is} = Summation rating of facilities by ith visitor for site (s)

T_{is} = Summation rating of travel characteristics by ith visitor for site (s)

Some of the variables above are alternative measures and thus will be highly correlated, for example, variables which measure congestion, perceived density and perceived congestion. The two congestion-related variables are included separately because there is no clear correlation between perceived density and perceived congestion. There are also separate treatments for distance travelled and monetary cost of travel. One would expect collinearity between these two variables. There is however a possibility that distance would be a more important determining factor rather than the cost of travel (as reported by Sinden, 1974). The same can be said for treating the monetary cost of travel as a separate entity from that of the value of travel time. By using the observations at the individual level, it is hoped that it would be possible to distinguish between variables and thus lessen the problem of multicollinearity.

Separate demand functions could be estimated for weekday and weekend visits. While this seems a worthwhile exercise it is found that there is little to show that weekday visits differ from those at the weekend. The similarity in the mean time spent at the areas by the two types of visitors has removed the suspicion that the visits on weekdays are not for the primary purpose of visiting the areas. Even if separate demand functions

are attempted, undue difficulties would be met through having too few regression observations for the weekday demand function. To eliminate weekday visits from the estimation of the demand function would waste valuable information gained.

7.2.2 Review of the Estimation Procedures

A large effort was made above to ensure that the conceptual foundations and limitations of the Clawson technique were conformed to or improved on by using the available sample data. This can be regarded as concern over the appropriate model specification given the nature of the activity in question. Recently, more attention has been focused on econometric procedures. Before considering these, it should be noted that many of the valuable empirical examples are presented to demonstrate a particular point rather than to yield practical results. Contributions to this discussion need to, and can legitimately, ignore those issues already discussed in Chapter 3. The main areas of concern are outlined below.

Aggregation

One serious difficulty with the traditional Clawson approach for estimating outdoor recreation demand arises from the high correlation between increase in distance and increase in travel time, which tends to result in an underestimate of value for a particular outdoor attraction as noted by Knetsch in 1963 and reiterated by Cesario and Knetsch (1970).

Along with the increase in travel time required as distances increase, Clawson and Knetsch (1966) have noted that alternative recreational opportunities also become relatively cheaper in travel and related transfer costs as distance increases. Thus a strong negative bias could be expected to result collectively from the complicating factors of increased travel

time and substitute areas among various distances travelled.

Thus it appears that recreation demand functions that do not take into account the effects of value of travel time and substitute areas have been poorly specified. It would therefore seem highly desirable to eliminate or reduce this bias, if possible, in the model specification and demand estimation procedures.

Increased correlation among several explanatory variables result from the use of highly grouped (average) data. The optimal level of disaggregation, in the effort to lessen the problem of multicollinearity among variables, is to the level of the individual, as suggested and applied by Brown and Nawas (1973) and Gum and Martin (1975). Demand functions are estimated for individuals from which individual benefits can be calculated. These are then scaled up by an appropriate response rate to obtain population values. One overwhelming advantage often stated for disaggregating at the individual level is that it is possible to distinguish between travel time and money costs.

Thus substantial efficiency can be gained in estimating demand functions using individual observations instead of traditional zone averages. However, using individual observations can lead to incorrect consumers' surplus estimates unless they are on a per capita basis (Brown et al., 1983). Essentially, the problem with fitting a travel-cost-based demand function to unadjusted individual observation is that such a procedure does not properly account for cases in which a lower percentage of the more distant population zones participates in the recreational activity. Brown et al. (1983) recommended that it is best to define the dependent variable by, first, expanding each observation by the inverse of

the sampling rate and then divide by the appropriate share of the main distance zones's population.

The procedure to readjust individual observations on a per capita basis, as recommended by Brown et al., can be illustrated by a simple hypothetical example, Table 74. In Table 74, zone populations were allocated equally among the three sample observations per zone. Assuming a random sampling of 0.1 per cent from all users and a corresponding expansion factor of 1,000, each individual observation was multiplied by 1,000 to give the estimated total number of visits. The estimated total number of visits were then divided by one-third of the main distance zone population to adjust the individual observations to 'individual observed visits per capita', the last column of Table 74. The values in the last column of Table 74 are then used as a dependent variable to estimate the demand function.

Table 74 Hypothetical Observations and Distance Zones

Main Distance Zone	Main Zone Population	Annual Visits per Individual Respondent	Estimated Total Number of Visits	Zone Average Visit per Capita	Individual Observed Visit per Capita
1	3000	6	6000		6
		8	8000	8	8
		10	10,000		10
2	3500	5	5000		4.3
		7	7000	6	6.0
		9	9000		7.7
3	4500	3	3000		2
		6	6000	4	4
		9	9000		6

Functional Forms

Another empirical problem is the specification of the form of the demand function. Various functional forms have been suggested. Ignoring variables other than the visit rate and travel costs, the three most popular forms are the linear, semi-log and double log forms.

Linear: $V_{ij} = x + bC_{ij}$

Semi-log: $\log V_{ij} = x + bC_{ij}$

Double log: $\log V_{ij} = \log x + b \log C_{ij}$

Among those who have used the linear form are Brown, Singh and Castle (1964); Clawson and Knetsch (1966); Burt and Brewer (1971); Mansfield (1971); Cicchetti, Fisher and Smith (1976); Bowes and Loomis (1980) and Vaughan, Russel and Hazilla (1982). Typically, in these cases the linear form has been used for computational ease, with other forms ignored. Kavanagh and Gibson (1971); Everett (1978); Smith and Kopp (1980) and Menz and Wilton (1983) used a double log form. Often researchers have considered more than one functional form. For example, Smith (1971); Lewis and Whitby (1972); Smith (1975); Flegg (1976) and Shucksmith (1979) considered the use of at least two forms, usually the double log and single log forms. In addition to these three common specifications, Cheshire and Stabler (1976) suggest the use of an asymptotic logarithmic form; Gum and Martin (1975) and Christensen (1983) suggest a quadratic form.

Without exception, previous researchers who have assessed the performance of the linear form against other specifications have found that it is theoretically and statistically weak, e.g. Smith (1975); Zeimer, Musser and Hill (1980) and Vaughan, Russel and Hazilla (1982). Further, when used to calculate consumers' surplus the linear form yields estimates

of consumers' surplus which are biased upwards - at least in comparison with 'better' specifications. For example, Zeimer et al. found that the consumers' surplus estimate of the linear form was 3.8 times that produced by a quadratic form and 2.9 times that produced by the single log. Similarly, Vaughan, Russel and Hazilla (1982) report that the linear form produces benefits six times as large as the benefits produced by a more appropriate semi-log form. This leads to the obvious conclusion made by the authors that one needs to be careful in selecting functional forms. To some extent it should be recognised that this conclusion, although valid, is derived because one clearly inappropriate functional form was used to calculate consumers' surplus. By using a poor and 'better' form, the significance of functional form is indeed emphasized; however the degree of significance cannot automatically be generalised to other possible choices between functional forms.

This is indeed true when Christensen (1983) used three models to predict visitation at Gwydyr Forest, Snowdonia National Park. The double log model was not recommended as the points are actually weighted by the transformation process and also considerable variation results from the units used for the visit rate, when arbitrary weightings are employed. The second degree polynomial was, in some instances, unable to yield a result due to inadequate samples. However, normal linear regression model in most cases was able to yield a result and despite the traditional interpretation of a demand curve as being non-linear, application of the linear regression model proved useful for the study. In his application of the result of that study to forest recreational use in a region of Denmark, a negative exponential model was however preferred. The overriding reason for choosing the exponential model was because it ensured that no negative

visit rates will be predicted for any given cost.

With respect to the exponential and double log forms, economic theory does not provide an overriding preference for one over the other. Specifically, with the exponential form, the elasticity of visits with respect to costs increases in absolute terms as costs increase. This may be more realistic than the constant elasticity assumption of the double log model. Moreover, it is desirable that for calculating consumers' surplus the result should at least approach a finite limit as costs are increased. As Flegg (1976) points out, the single log form satisfies this condition but the double log only does so when $b < -1$. Care needs to be exercised when the double log model is used with a cost coefficient of greater than -1.

As regards empirical comparisons of the double and single log forms Smith (1971), Lewis and Whitby (1972), Flegg (1976) and Shucksmith (1979) found only marginal differences in their statistical performance. While this is somewhat comforting, Smith (1975) found that, despite both forms being perfectly satisfactory when assessed using R^2, T - statistics and overall F - statistics, when an adaptation of Cox's method for discriminating between models was applied neither form was acceptable. Smith does not however suggest alternative specifications of the demand function but suggests that the poor performance of both might be due to the nature of the activity or the characteristics of the participants. Following on Smith (1975), further sophisticated statistical inference techniques have been suggested for discriminating between functional forms. For example Zeimer et al. (1980) suggested the Box and Cox transformation procedure and used it to test linear, quadratic and semi-log forms.

Vaughan, Russel and Hazilla (1982) proposed the Lahiri-Egy Maximum Likelihood estimation and compared a linear with a single log form. While procedures could be used to select between forms, they rely on iterations to yield log likelihood test statistics. Given the further necessary iterations to produce travel time values in our own case study, such techniques could not be easily employed.

Vaughan, Russel and Hazilla (1982) emphasise that the question of functional form (specifically linearity) and heteroskedasticity are interrelated. The aforementioned Lahiri-Egy Estimator can be used to test for both linearity and heteroskedasticity[5]. In doing so, the above authors find that the problem of heteroskedasticity is less severe with a non-linear form than with the linear form, e.g. p. 405, 'the appropriate functional form appears to be non-linear and when this is taken into account the heteroskedasticity essentially vanishes'. This is also confirmed by Strong (1983).

Even when the dependent variable is logged, the potential for heteroskedasticity would still exist if no weightings were applied (as explained in the previous section on aggregation). Empirically, natural logarithmic transformation of the dependent variable seems to move the error variance towards homogeneity. According to Tukey (1957), the conventional purpose of performing transformation on a random variable Y is to remove either one or a combination of those undesirable properties: nonadditivity of effect; nonconstancy of the error variance; and asymmetry or nonnormality of the error distribution. On the other hand, weighting is intended to be a measure of the influence exerted by one point on another

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5 The assumption of constant variance of errors about the regression is violated.

and thus removes some effects of heteroskedasticity. In her empirical results, Strong (1983), detected significant heterogeneous error variance in the linear model but heteroskedasticity was not detected in the semi-log model. Consequently, the weighted least squares (WLS) model was applied to the linear model to remove heteroskedasticity, and the resulting WLS model was compared with the semi-log model on the basis of their mean squared errors in estimating trips. The results showed that the semi-log form of the travel cost model generates somewhat better estimates of total trips.

An Assessment

There is some confusion about the meaning of the terms aggregated and disaggregated demand function. When both the dependent variable and the independent variable(s) are aggregated data the resulting demand function is termed the aggregated demand function. The main reason for aggregating both the dependent and the independent variable is because most information is gathered to represent the visitors from a particular zone, and thus average characteristics of all the visitors from a particular zone are used. On the other hand, the disaggregated demand function uses the observed characteristics of each individual visitor, for example, the number of visits that individual makes to an area and the socio-economic characteristics of that individual alone, as the dependent variable and the independent variables respectively.

In between the two forms of aggregation mentioned above there also exists a third category whereby the dependent variable is aggregated (to estimate zonal population visit rates) but the independent variable(s) are disaggregated at the individual observation level. This form of analysis should be correctly termed semi-disaggregated. In this study the

explanatory variables are disaggregated at the individual level and the dependent variable is aggregated to estimate the visits per capita from a zone of origin.

The purpose of aggregating the dependent variable into zones of identifiable origins was originally specified by Hotelling and Clawson and was achieved by drawing concentric circles around the recreational site. While on conceptual grounds this approach is probably the most appropriate it does raise the problem of establishing the population of the area formed by the concentric circles. Aggregation of the dependent variable to reflect population visit rates can be expediently carried out by using government regions. However, aggregating by local government regions raises the possibility of having zero visits within the boundary formed by the furthest observations. Theoretically there is an open-ended zone bounded by the travel cost beyond which visitation drops to zero. If we reduce the size of zones within this boundary the incidence of zones with zero visits is increased and may even exceed the number of zones with positive visits. Ignoring zones of zero visits would however, bias the estimation of the demand function for "these zones have something to tell us about the demand for recreation" (Christensen and Price, 1982, pp. 399).

Smith and Kopp (1980) address the above issue and see it, in part, as being due to the greater probability of multi-purpose trips from more distant zones. Such outlier trips thus extend the observed spatial limits beyond those consistent with the behavioural model. Since multi-purpose trips have been excluded from the set of data available the problem of zero visits does not automatically arise.

What has been suggested by Brown et al. earlier is similar in spirit

to the suggestion by Bowes and Loomis (1980). The grouping of observations raises the problem of heteroskedasticity. The larger the zone's population (i.e. potential visitors) the smaller will be the variance of the zonal per capita visit rate. Bowes and Loomis (1980) suggest that, given this, it is necessary to weight observations proportionally to the population level. Bowes and Loomis further state that this results in a generalised least squares estimates. Christensen and Price (1982) suggest a further source of heteroskedasticity; namely, that even with zones of equal population, as distance increases fewer individuals make any trips and individuals' positive visit rates decline. The effect of this is to decrease the variance of the zonal visit rate. Consequently it is necessary to weight observations not only proportionally to the population level but also inversely to the visit rate.

It should also be appreciated that other forms of aggregation have been suggested. For example, Wetzstein and McNeely (1980) propose and demonstrate that observations can be aggregated over costs rather than distance. This would minimise the sum of squares of the cost variable within each aggregated group, thus increasing the efficiency of the cost coefficient. Given the importance of this parameter this leads to more reliable benefit estimates.

In this study, disaggregated explanatory variables will be used to estimate the demand function but the dependent variable will be aggregated to give a new dependent variable (visits per capita) which takes into account zones of zero visits. The importance of this will be described later.

The aggregation of the dependent variable into identifiable zones of

origin raises another issue, that of zones of unequal population. This has led to various suggestions on how to treat the variance of visit rates from the population zones (Bowes and Loomis, 1980 and Christensen and Price, 1982) and its effects on the demand estimation. Vaughan et al. 1982, using the data on which Bowes and Loomis based their recommendation, found that it does exhibit heteroskedasticity but the weighting suggested by Bowes and Loomis to correct for heteroskedasticity is not recommended by them (similarly argued by Christensen and Price, 1982).

In the case of Brown et al. (1983), not only is the 'weighting' wrongly conceived but an error arises when only the dependent variable is transformed by the 'weighting' but not the independent variables. It is well known that in a weighted least squares estimation, both the dependent and the independent variables should be weighted or transformed accordingly (Neter, Nasserman and Kutner, 1985).

Brown's transformation to derive the dependent variable has led to the overemphasis of the more frequent visitors (in a complete inventory, one would put an individual, interviewed V_{ij} times and each interview repeated V_{ij} times, V_{ij}^2 times).

As quoted by Christensen and Price (1982), "The reliability of results from zones with large populations does not arise from the fact that they despatch more visitors to the site (which is not necessarily true) nor from having a larger, and therefore less quirk-prone population to draw from (which is not necessarily relevant). It arises from the obviously relevant truth that dividing a set of numbers by a larger number greatly reduces their variance".

As discussed above, misleading procedures were adopted (as exemplified in Bowes and Loomis, 1980 and Brown et al., 1983) to resolve the problem of heteroskedasticity in an assumed linear model. The importance of the above matter should not be ignored. As mentioned earlier, Smith (1975) found that neither the linear, semilog or double log specifications tested on visit data for a wilderness area were appropriate representations of recreation behaviour. This shows the seriousness of the problem when misspecification of functional forms can produce distorted estimates of consumers' surplus and commensurate errors in estimates of site value. It also suggests that estimating a linear visitation-travel cost relationship when the true relationship is non-linear can produce the appearance of non-constant variance in the residuals which could be erroneously diagnosed as heteroskedasticity.

Thus various problems arise when a demand function is estimated on the assumption that linearity exists. It is obvious then that the first step towards the selection of the most appropriate functional form would be to use the support of theoretical considerations and inspection of scatter diagrams of the relationship between visit rates and the cost variables. From the data obtained in this study the assumption of linearity is invalidated. This would allow the application of functional forms that conform to nonlinear data, principally the double log or exponential models.

A final point regarding the conventional use of aggregated data (both dependent and independent variables) is that any model estimated using these data will be 'heteroskedastic' unless, by chance, the population in each aggregated zone of origin is the same for all zones. A completely disaggregated analysis (e.g. Brown and Nawas, 1973) would however exclude

zones of zero visits, which is clearly inappropriate unless one is quite sure that no visits would come from beyond the furthest zone chosen. As such, aggregating the dependent variable is still desirable and the problem of unequal population can be overcome by using the method of 'weighted least-squares'. Probably a better procedure could emerge whereby, as stated earlier, the desired weighting factor for all the variables could be achieved by a logarithmic transformation of only the dependent variable.

7.2.3 Estimation Procedures Adopted for this Study

Within the context of what has been discussed above, the approach to the analysis for Chapter 7 will encompass two aspects. The most important issue is the derivation of an area-use demand function and its subsequent use to estimate a value for consumers' surplus. An estimation procedure will be selected to best achieve this. The procedure involves a semi-disaggregated function whereby firstly, the number of visits an individual makes to an area (V_{ij}) is aggregated to derive a new dependent variable - visit rate per zone. Secondly, a weighting is sought to resolve the problem of non-constant variance. Finally, a model is specified to estimate the demand and subsequently used to derive consumers' surplus.

The second aspect will be the assessment of the performance of a weighted least squares method to predict the number of individual visits. For this a comparison will be made between individual participation functions where only the dependent variable is transformed by an appropriate weight and those where both the dependent and independent variables are transformed by the same weighting factor. The objective of the latter exercise is to prove that substantial differences in the performance of the two types of models would occur when only the

dependent variable is transformed by a chosen weighting factor.

Individual Participation Function (V_{ij})

The model to be tested is in the form :

$$V_{ij} = \text{constant} + b_1 X_1 + \ldots\ldots + b_i X_i + e_i \qquad (11)$$

where V_{ij} = Number of visits by individual i to site j during a year period.

X_i = explanatory variables as listed earlier.

e_i = random error (residual).

The weighting believed to be correct for this analysis is $1/V_{ij}$, where V_{ij} is the number of visits an individual makes to site j. The argument for this is that the weights $w_i = 1/V_{ij}$ gives more emphasis to observations for smaller V_{ij} (for which the distribution of V_{ij} has a smaller variance) and less emphasis to observations for larger V_{ij} (for which the distribution of V_{ij} has a larger variance). In a weighted least squares estimate the dependent and independent variables should be transformed by the square root of the weights (Neter, Nasserman and Kunter, 1985).

Semi-Disaggregated Demand Function (VPC)

Aggregation of visits

As described earlier the dependent variable needs a certain level of aggregation to take into account visits from origins of different population sizes. For this purpose the observations of visits made to the three areas are aggregated into origin zones, by the use of local government regions (district or subdistricts), where there are no origin zones (within the region) of zero visits. This process produces 12 origin zones for Sungai Lalang, 5 for Ampang and 11 for Kancing. The number of

zones for each recreation area, zone populations (P_z) and observed number of visits (V_z) from each zone are shown in Appendix 7. The visit rate per zone is obtained by V_z/P_z and is termed visits per capita (VPC).

The assumption of nonlinearity in the model specification has favoured the use of either the double log or exponential models. A particular difficulty of using double log or exponential forms is that there may be no finite value for actual trip costs which drives the visit rate to zero. This implies that even an infinite cost will result in some positive visit rate. To avoid this problem $(V_z/P_z + 1)/P_i$ has been used as the dependent variable, e.g. Smith and Kavanagh (1969)[6]. The above problem is avoided when, during the aggregation process mentioned above, all zones considered have positive visit rates. However, the addition of unity to the dependent variable has been called into question by Common (1973), Flegg (1976) and others because it introduces the assumption that the elasticity of total visits with respect to population size is equal to unity. Indeed, Flegg found that the elasticity was significantly different from unity for casual visiting and angling (at the 1% level) but not different from unity for sailing. Similarly, Common found that elasticity was not equal to unity; however this did not seriously affect the parameters of the demand equation or the estimated values for consumers' surplus. Despite these reservations the visit rate is still a popular specification of the dependent variable.

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6 The addition of a constant to the visit rate has also been used to avoid the case of logarithm of zero. This has the effect of providing finite estimates.

Weighting of the Use-Demand Curve

The specification that can be tested could be in form of a general linear model (GLM):

$$VPC = a + b*X_1 + \ldots\ldots + m*X_i + e_i, \left\{e_i\right\} \in N(0,\sigma^2) \quad (12)$$

where VPC = zonal visit per capita (V_z/P_z)

X_1 to X_i = the independent variable(s)

a, b and m = coefficients (parameters)

e_i = random error (residual)

The procedure is to minimize e_i^2, hence the name 'least squares method'.

An appropriate weight should be applied to the points upon which the trip demand curve is being determined since these points do not have the same reliability because they originate from samples of varying sizes of population. That is, the variance of VPC differs from one zone to another. The points are independent estimates of visit rate with unequal precision attached and when a combined estimate is desired they must, therefore, be weighted according to their precision. For the numerous VPC's, in this case where the independent variables are the individual values (disaggregated), the weighting is P_z^2/V_z^2. The argument for this is that, because each value of V_z is introduced V_z times (once for each sampled visit), its influence has to be counterbalanced as such : small numbers of visits are not only less variable, they are also entered less frequently as values in the regression. To correct for this we weight by $1/V_z$. The weighting above also believed to be the correct weighting for visit rates per capita (VPC) emerging from zones of unequal population. The argument is that if the number of visitor groups V_z from a given zone of origin

observed within a given forest recreation area is assumed to be Poisson distributed[7], then the variance of the visit rate (VPC) will be :

$$\text{Var (VPC)} = V_z / P_z^2$$

where, VPC = visit rates per capita (V_z/P_z)

V_z = number of visitor groups from zone z

P_z = population size of zone z

In order to balance the variances, we then want to use a weight equal to 1/Var (VPC) and it follows :

$$1/\text{Var (VPC)} = P_z^2/V_z \qquad \text{(Refer to Christensen, 1983)}$$

Hence, to reduce heterokedasticity due to the number of visits originating from zones of unequal population, the visit rates per capita will have to be weighted proportionally to the square of the population size and inversely proportionally to the number of visitor groups. Therefore, in a weighted least squares estimate one would have to weight each observation (both dependent and independent) by the combined weighting factor given above, P_z^2/V_z^2.

Model Specification

There are a priori reasons to believe that the exponential model has distinct advantages over the other forms. Firstly, it is conceptually desirable that any model should be able to predict finite visits at a zero cost per visit. Moreover, evaluation of consumers' surplus is simplified greatly if finite estimate is given by the definite integral above the

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7 A standard derivation shows that under certain mathematical conditions, the number of occurrences of a certain phenomenon in a fixed period of time or a fixed period of space follows a Poisson distribution. (De Groot, 1970, p. 35)

observed cost per visit. In an exponential model the estimate of consumers' surplus approaches a finite limit as the assumed maximum cost becomes indefinitely large. Secondly, at no price is a negative visit rate predicted and neither, therefore, is a negative consumers' surplus. This is a very important feature; other works have used linear regression and have had to ignore negative visit rates or else they have used negative visit rates when calculating total number of predicted visitors for zero additional entrance fee, but ignoring the 'negative' consumers' surplus (Bowes and Loomis, 1980). Thirdly, the exponential demand specification has some interesting and highly relevant site substitution properties (Cesario and Knetsch, 1976). These properties present in the hypothetical model postulated by Cesario and Knetsch are briefly described in Appendix 8.

For reasons given in the preceding discussion, the overall model structure adopted in this study can be expressed by :

$$VPC = \exp a * \exp bc * \exp fX_1 * \ldots * \exp mX_i * \exp e_i \qquad (13)$$

where VPC = zonal visit per capita

c = cost variable

X_1 to X_i = the independent variables

a, b, f and m = coefficients (parameters)

e_i = random error (residuals)

There is, however, a necessity to weight the above model by P_z^2/V_z^2, as previously described. Coincidently and conveniently, the weighting factor we want, P_z^2/V_z^2, is exactly achieved by a logarithmic

transformation of the dependent variable of the exponential model above (which reduces deviation by a factor of V/P, hence variance by V_z^2/P_z^2). This only applies in the case of zone visit rate (weighting P_z^2/V_z) times the weighting $1/V_z$ to allow for repeated insertion of points for the semi-disaggregated analysis (aggregated zonal visit rates and disaggregated explanatory variables). Previous works that used the log transformation for other weighting situations were erroneous. Taking the logarithm of the dependent variable for equation (13) would produce:

$$\ln VPC = a + b*c + f*X_1 + \ldots + m*X_i + e_i \qquad (14)$$

Equation (14) could now be estimated as a linear model where the logarithmic transformation of the dependent variable has straightened the line and eliminated heteroskedasticity.

7.3 REGRESSION RESULTS

Least squares regression was used to derive demand functions. A two-stage procedure was used. Initially, estimation was carried out using a forward stepwise multiple least-squares regression procedure which introduced only variables significant (in terms of the t-statistic) at the 5 per cent level consistent with the overall aim of maximising the value of R^2. The overall significance of each equation was tested by means of the F-ratio. In this way the models could be assessed, not only in terms of their overall predictive power, but also by the confidence which could be placed in forecasts, and their likely stability. The added advantage of this technique is that the statistics derived are invaluable in determining the relative degree of importance attached to each explanatory variable. This procedure was applied for both the derivation of individual participation and use-demand functions.

7.3.1 Estimating Individual Participation Model

Three linear functional forms were tested to observe the differences in estimates. The results of the stepwise regression are given in Tables 75 to 77. It clearly shows that the unweighted and semi-weighted models entered the same explanatory variables into the regression. Most importantly, the double weighted model (the 'proper' weighted least squares) includes other variables, especially in the case of Sungai Lalang and an additional one for Ampang, as compared with the other functional forms. Having ensured that a proper weighting has been used, then the result of the analysis has shown that different predictor variables would enter a regression under different treatments, in this instance, where only the dependent variable is being weighted and where both sides of the equation were weighted.

There remains, however, the question of which functional form is more correct. The use of statistical tests for selecting an appropriate functional form in applied economics is generally reasonable because economic theory provides little guidance on the matter of functional forms (Zarembka, 1974). For example, methods of statistical inference are considered as being necessary in situations where more than one functional form is consistent with a given theoretical model (Gaver and Geisel, 1974). In the simplest case, where competing models differ with respect to the definition of one or more independent variables, Rao and Miller (1971) contend that the empirically appropriate model is obtained by the comparison of their sums of squared residuals. For the more general case of alternative model specifications with the same dependent variable, conventional methods for choosing among them include first, an examination of the 'plausibility' of the regression coefficients, and second, selection

Table 75. Regression Results for Sungai Lalang

Step	Variables Entered	R^2 Contribution	Total R^2
A. Unweighted V_{ij} and explanatory variables			
1	TT_{ij}	0.092	
			0.183
2	DSEXGROUP1	0.091	
B. Weighted V_{ij} and unweighted explanatory variables			
1	TT_{ij}	0.092	
			0.173
2	DSEXGROUP1	0.081	
C. Weighted V_{ij} and weighted explanatory variables			
1	TD_{ij}	0.438	
			0.490
2	FAC_{ij}	0.052	

B.

$$V_{ij} = 0.472 - 0.003\ TT_{ij} + 0.080\ DSEXGROUP1$$

$$(-3.449)^{**} \quad (2.133)^{*}$$

Adjusted R^2 = 0.157

F ratio = 8.569^{**}
S.E. of regression estimate = 0.313
Residual sum of squares = 7.717

C.

$$V_{ij} = 0.454 - 0.028\ TD_{ij} + 2.295\ FAC_{ij}$$

$$(-3.927)^{**} \quad (2.697)^{**}$$

Adjusted R^2 = 0.544

F ratio = 33.216^{**}
S.E. of regression estimate = 0.300
Residual sum of squares = 7.184

** Significant at 1 % level.
* Significant at 5 % level.
( ) T statistics.

Table 76. Regression Results for Ampang

Step	Variables Entered	R^2 Contribution	Total R^2
A. Unweighted V_{ij} and explanatory variables			
1	TT_{ij}	0.043	0.043
B. Weighted V_{ij} and unweighted explanatory variables			
1	TT_{ij}	0.043	0.043
C. Weighted V_{ij} and weighted explanatory variables			
1	T_{Tij}	0.225	
2	FAC_{ij}	0.026	0.251

B.

$$V_{ij} = 0.331 - 0.003\ TT_{ij}$$
$$(-2.467)^{*}$$

Adjusted R^2 = 0.031

F ratio = 6.085*
S.E. of regression estimate = 0.433
Residual sum of squares = 29.779

C.

$$V_{ij} = 1.893 - 0.031\ TT_{ij} + 1.440\ FAC_{ij}$$
$$(-2.327)^{*} \quad (1.095)$$

Adjusted R^2 = 0.236

F ratio = 17.140**
S.E. of regression estimate = 0.432
Residual sum of squares = 29.554

** Significant at 1 % level.
* Significant at 5 % level.

( ) T statistics.

Table 77. Regression Results for Kancing

Step	Variables Entered	R^2 Contribution	Total R^2
A. Unweighted V_{ij} and explanatory variables			
1	PD_{ij}	0.105	
2	DFINCOME4	0.062	0.194
3	DSEG4	0.024	
B. Weighted V_{ij} and unweighted explanatory variables			
1	PD_{ij}	0.105	
2	DFINCOME4	0.062	0.194
3	DSEG4	0.024	
C. Weighted V_{ij} and weighted explanatory variables			
1	PD_{ij}	0.312	
2	DFINCOME4	0.067	0.415
3	DSEG4	0.036	

B.

$$V_{ij} = -0.013 - 0.056\ PD_{ij} + 0.184\ DINCOME4 + 0.328\ DSEG4$$

$$(2.119)^{*} \quad (2.852)^{**} \quad (3.926)^{**}$$

Adjusted $R^2 = 0.176$

F ratio $= 10.600^{**}$
S.E. of regression estimate = 0.295
Residual sum of squares = 11.465

C.

$$V_{ij} = -0.182 + 0.778\ PD_{ij} + 2.566\ DINCOME4 + 4.568\ DSEG4$$

$$(2.119)^{*} \quad (2.566)^{**} \quad (4.568)^{**}$$

Adjusted $R^2 = 0.402$

F ratio $= 23.456^{**}$
S.E. of regression estimate = 0.295
Residual sum of squares = 11.465

** Significant at 1 % level.
* Significant at 5 % level.
( ) T statistics.

of the model specification with the lowest residual variance, or, equivalently, the highest multiple correlation coefficient adjusted for changes in the degrees of freedom. Theil (1957) justifies the 'maximize R^2' rule by claiming that it will lead, 'on the average', to selection of the correct model.

Applying the selection rules as described above has shown that the weighted least squares estimates for the three areas are greatly superior to those of the other two linear forms where no weights were attached to all the variables or where the weights were applied to only the dependent variables. Not only is the R^2 higher for the weighted least squares estimates but also, for the three areas, the differences in R^2 between the semi-weighted and double-weighted forms ranges from more than two to five times. Although the regression for B and C (see Tables 75 to 77) produces plausible signs for the coefficients of all the variables, the value for the travel time coefficient for Ampang is more reasonable in the regression where both the dependent and independent variables are weighted. The residual sum of squares is similar for regressions B and C in the case of Kancing but the residuals for the semi-weighted are never smaller than the double-weighted regression. Overall, the double-weighted regressions provide superior and more accurate estimates.

Several important conclusions can be drawn from the above analysis. This analysis was prompted by the observation that some recreational empirical works failed to apply appropriate (if any) weights to the observations used for their analysis. It was also observed that even if a weight was conceived, sometimes only the dependent variable was transformed by the weights, not the independent variables, as in the analysis by Brown

et al (1983). If the aforementioned model specifications were employed to estimate the consumers' surplus, then by not appropriately weighting the variable, the models are unacceptable. Also, if only the dependent variable was weighted then the estimates generated by these models are not the best and in all instances, erroneous.

7.3.2 Estimation of Semi-disaggregated Use-Demand Model

The result of the stepwise regression using the transformed exponential model (equation 14) is shown in Table 78. It shows that, besides the cost variables (TD_{ij} and TT_{ij}), other variables are significant in predicting visits to the three areas. Obviously, for Sungai Lalang and Ampang, socio-economic profiles of the visitors play a role in determining the number of visits made. Additionally, the perceived condition of recreational facilities at substitute areas affects visits to Ampang and the subjective opinion of travel characteristics determines the visits to Kancing. The values of R^2 are reasonable considering that the independent variables are disaggregated at the individual level.

Not surprisingly, the monetary cost variable (TC_{ij}) was not entered in the regression as a significant variable because it is highly correlated with the travel distance variable (TD_{ij}). Correlation between TD_{ij} and TC_{ij} ranges from $r = 0.674$ to $r = 0.818$ for the three areas. In the estimation of the economic models, the travel distance variable is replaced by the monetary travel cost variable.

Following this, the estimated models are presented in Table 79. Conventional criteria were used to explain the estimates. These were, R^2, the overall F statistics, the standard error of the estimate and the mean squared residuals of the regressions. In addition, particular attention

Table 78 Step wise Regression

Step	Variables Entered	R^2 Contribution	Total R^2
	Sungai Lalang		
1	(1) TD_{ij}	0.528	
2	(2) TT_{ij}	0.076	0.691
3	(13) DINCOME1	0.035	
4	(21) DSEG2	0.052	

TD_{ij} correlated with TC_{ij} (r = 0.674).

	Ampang		
1	(1) TD_{ij}	0.561	
2	(22) DSEG3	0.034	0.636
3	(11) FAC_{is}	0.024	
4	(17) DINCOME5	0.017	

TD_{ij} correlated with TC_{ij} (r = 0.818).

	Kancing		
1	(1) TD_{ij}	0.488	
2	(3) TT_{ij}	0.016	0.518
3	(4) T_{ij}	0.014	

TD_{ij} correlated with TC_{ij} (r = 0.709).

Table 79 Use-Demand Regression results - without value of travel distance

Sungai Lalang

$$\log VPC = -6.492 - \underset{(-4.042)^{**}}{0.141\ TC_{ij}} - \underset{(-4.817)^{**}}{0.024\ TT_{ij}}$$

$$+ \underset{(1.662)}{0.733\ DINCOME1} - \underset{(-3.016)^{**}}{0.960\ DSEG2}$$

$R^2 = 0.593$
S.E. of regression estimate = 1.212
Mean squared residuals = 1.468

F ratio = 20.069^{**}

Ampang

$$\log VPC = -8.838 - \underset{(-8.216)^{**}}{0.119\ TC_{ij}} - \underset{(-3.934)^{**}}{0.007\ TT_{ij}}$$

$$+ \underset{(2.350)^{**}}{0.093\ FAC_{is}} - \underset{(-1.773)}{0.155\ DINCOME5} + \underset{(1.053)}{0.100\ DSEG3}$$

$R^2 = 0.527$
S.E. of regression estimate = 0.455
Mean squared residuals = 0.207

F ratio = 27.579^{**}

Kancing

$$\log VPC = -9.596 - \underset{(-6.390)^{**}}{0.090\ TC_{ij}} - \underset{(-5.910)^{**}}{0.008\ TT_{ij}} + \underset{(3.085)^{**}}{0.332\ T_{ij}}$$

$R^2 = 0.369$
S.E. of regression estimate = 0.627
Mean squared residuals = 0.393
F ratio = 37.041^{**}

** Significant at 1 % level
* Significant at 5 % level
( ) T statistics

was paid to the significance of the cost coefficient. The T statistics and the ratios of the absolute size of the coefficient were compared.

The important cost coefficient (TC_{ij}) is significant at the 1 per cent level and has the appropriate sign. Similarly the travel time (TT_{ij}) coefficient is also significant at the 1 per cent level and participation decreases with increasing travel time. It is possible that travel time, being correlated with travel distance, is acting partly as a surrogate variable for travel distance and hence for substitution possibilities. This occurs for all the three areas. The signs and magnitudes of the estimated coefficients of the cost and travel time variables shown in Table 79 are quite plausible and all estimates are acceptable. The visit rate to Kancing is less elastic with respect to costs as compared with that of Sungai Lalang and Ampang. This means that for a similar decrease in cost to visit the three areas, the increase in the number of visits to Kancing would be smaller than the increase in the number of visits to the other areas. The cost decay coefficient is largest for Sungai Lalang and thus one would expect the largest increase in visit rate here with a decrease in cost of travel. Overall, we would expect most visits to be made to Kancing, followed by Ampang and Sungai Lalang respectively.

It is appropriate to remind ourselves that at this stage travel time is not assigned a monetary value yet. Despite this, the coefficients of the travel time variable reflect the spatial distribution of the recreational areas and its effect on visitation rates. Ampang, being visited more by the people who are within proximity to it, has the lowest coefficient value for travel time and in contrast, Sungai Lalang the highest. Although the cost decay coefficient is least for Kancing, the

coefficient of travel time is lowest for Ampang. Thus, unlike Kancing, the rate of visits to Ampang is affected more by the travel time rather than the travel cost factor.

As for the other predictor variables, although the coefficients of the income (as in Sungai Lalang and Ampang) and socio-economic group category (as in Ampang) are not significant at the 5 per cent level, the inclusion of these variables in the demand estimation is appropriate since in the stepwise regression analysis it is shown that their contribution is significant at the 5 per cent level. In fact the income and socio-economic categories have more to say about the visit rates to Sungai Lalang and, although in lesser magnitudes, about visit rates to Ampang. The signs of the coefficients are as expected. For example, at Sungai Lalang, the survey of the area has indicated that there are significantly more visitors of the higher income groups. DSEG2 represents the higher income group and thus, contrary to DINCOME1, it has the appropriate negative coefficient sign.

With respect to the attitude variable, only the attitude towards the quality of facilities at substitute areas affects positively the visit rates to Ampang and subjective travel characteristics affect visits to Kancing. Similarly, if the facilities at Ampang were improved we would expect more visits to be made to it. As for Kancing, if the area was any further from the population areas the number of visits would decrease. The coefficient signs of the attitude variables reasonably explain their significance in the demand model.

Demand estimation with values for travel time

So far the monetary travel cost and travel time variables have been

treated separately. The estimated regressions in the preceding section are achieved without any values for travel time. The analysis in this section uses the same independent variables as previously, but the monetary travel cost and travel time are combined to form a generalized cost variable :

$$C_{ij} = TC_{ij} + \lambda * TT_{ij}$$

where λ = an assumed value for travel time cost in $ Malaysian per minute.

An assumption has to be made in that the travel time per visit is constant for each visitor. The independent variables as previously used in the latter analysis were included along with the iteration used to derive a value for travel time as outlined in Chapter 3. Different values for travel time were assumed ranging from 0 to 200 Malaysian cents per minute. For each assumed value of travel time, C_{ij} was calculated and a regression run that included this variable. Regressions were inspected and the regression chosen was the one having the smallest mean of the squared residuals of the regression. The chosen regressions are presented in Table 80. The values for travel time per hour for the three areas are quite realistic. At least, in terms of the amount of travel time consumed by the visitors to the three areas, the order of higher travel time values for Sungai Lalang (M$ 9.00 per hour) followed by Kancing (M$ 6.00 per hour) and Ampang (M$ 3.60 per hour) are quite reasonable. It shows that if more visitors travel from further distances the value of travel time is higher, which in this case is reflected by the value for Sungai Lalang.

These values also suggest that there exists a unique relationship between the value of travel time and the varying modes of transport used in order to get to the area. A big time cost results from such a relationship, whereby in attempting to reduce the residuals for the semi-

Table 80 Use-Demand Regression results - with a generalized travel cost

Sungai Lalang

$$\log VPC = -6.492 - 0.152\ C_{ij} + 0.693\ DINCOME1$$
$$(-7.786)^{**} \quad (1.637)$$

$$- 0.960\ DSEG2$$
$$(-3.018)^{**}$$

$R^2 = 0.592$
S.E. of regression estimates = 1.202
Mean squared residuals = 1.445

F ratio = 27.138^{**}

Value of travel time which minimizes the mean of the squared residuals - M$ 9.00 per hour.

Ampang

$$\log VPC = -8.832 - 0.116\ C_{ij} + 0.094\ FAC_{is}$$
$$(-8.216)^{**} \quad (2.371)^{*}$$

$$- 0.153\ DINCOME5 + 0.099\ DSEG3$$
$$(-1.761) \quad (1.048)$$

$R^2 = 0.526$
S.E. of regression estimate = 0.453
Mean squared residuals = 0.206

F ratio = 34.709^{**}

Value of travel time which minimizes the mean of the squared residuals - M$ 3.60 per hour.

Kancing

$$\log VPC = -9.577 - 0.083\ C_{ij} + 0.329\ T_{ij}$$
$$(-9.692)^{**} \quad (3.060)^{**}$$

$R^2 = 0.368$
S.E. of regression estimate = 0.626
Mean squared residuals = 0.392

F ratio = 55.545^{**}

Value of travel time which minimizes the mean of the squared residuals - M$ 6.00 per hour.

disaggregated model, the visits from a particular zone z are pulled towards the demand curve such that the time cost is equal to the time-saving potential of the faster modes (see Figure 31).

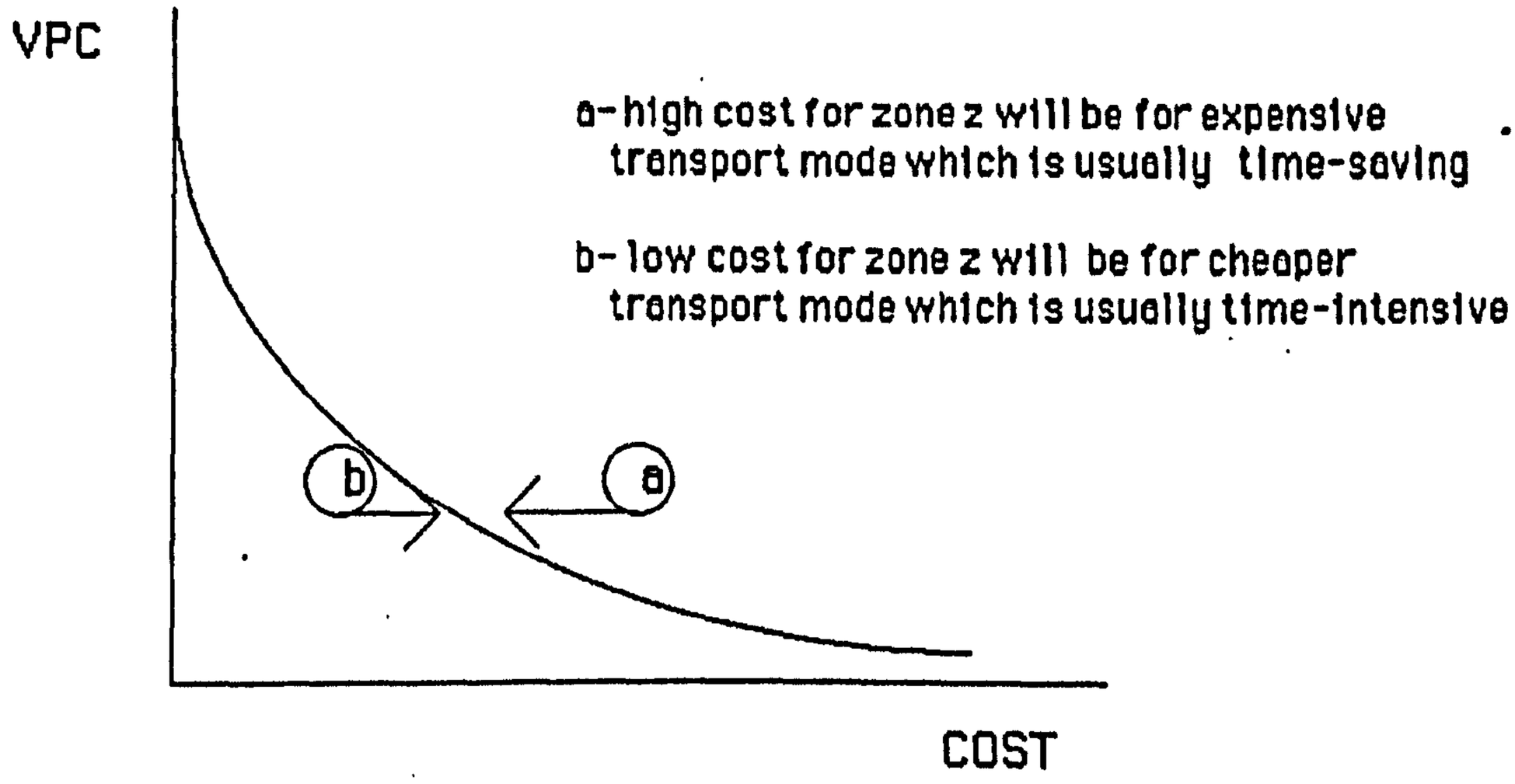

Figure 31. The Effect of Time Cost On the Demand Curve

The relationship above partly explains the big time cost for Sungai Lalang because the majority of the visitors travel by the use of their own private vehicles, which incurs a higher time cost but is compensated by its time-saving potential. This time differential due to modal split exists for all zones. Time cost which may be quite similar on average between zones. Whatever varies between zones may be picked up in the coefficient of financial cost anyway due to collinearity with financial cost[8].

Comparisons of the cost coefficients between the set of regressions in Tables 79 and 80 reveal that there is only a small increase in the values -

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8 This is also a surrogate variable for substitute possibilities.

of the cost coefficients for Sungai Lalang and a small decrease for Ampang and Kancing when a generalised cost variable is used. This can be explained by the fact that adding a constant to all costs will shift the regression constant slightly but not disturb the coefficient (adding $1 reduces VPC by the same proportion throughout the curve). This is the nature of negative exponentials. A slight reduction or increase in the coefficient of the constant also indicates that the effect of time cost in itself would only reduce or increase the visit rates very slightly.

The lower time cost for Ampang and Kancing further reinforces the above contention because here there are more visitors who travel by public buses (lower cost) as compared to Sungai Lalang. Also for Sungai Lalang, the slight increase in the value of the generalised cost coefficient reveals that there is a small negative commodity value of travel time to the area. This could be further revealed in the calculation of consumer's surplus.

On this evidence, it is felt that the regression produced by the inclusion of the value for travel time is slightly more precise than that when no values are attached to travel time. This can be judged by observing the differences in the mean squared residuals between the set of regressions. The regressions in Table 80 produce a slightly smaller estimate of the mean squared residuals with a corresponding negligible reduction of the R^2 values. This is expected when the regression produces a better fit.

Additionally, the description of visitors' attitudes to travel does not indicate a large negative commodity value of travel time. The magnitude of derived travel time costs suggests, however, that the use of say half or

two-thirds of the wage rate would be inappropriate for forest recreational visits. In fact, iterating for different percentages of hourly wage rates as a value of travel time indicates that the proportions of hourly wage rate that represent the value of travel time are in the excess of 200 per cent for Sungai Lalang, 96 per cent for Kancing and 48 per cent for Ampang. However, inspection of the regression equations produced by these values has shown that the coefficients of the cost variable and the constant do not change by any considerable amount and, as such, would not result in substantial differences in the calculation of consumer's surplus. Thus, two important conclusions can be drawn from this additional analysis. Firstly, the surrogate values of travel time as used by Cesario and Knetsch (1976) from the findings of transport studies do not apply to the behaviour of the recreational consumers in this study and secondly, the benefits forgone from earning an income cannot be equated to the benefits gained from participating in this particular type of recreational travel and activity.

In this context it should be appreciated that the purpose of the study is not to derive a value for travel time, rather it is to yield consumers' surplus estimates which are not seriously biased by a failure to include a value for travel time. While an accurate estimate of travel time values leads to a more reliable surplus estimate, if the identification of travel time value was the only objective of this study further explanation and reconciliation of these estimates would be necessary. In this study travel time values have been derived from statistical criteria, and 'other ' values which are statistically inferior cannot be judged to be better or equivalent.

7.4 CALCULATION OF CONSUMERS' SURPLUS

One of the major advantages of using the exponential model is in the calculation of consumers' surplus. Zonal consumers' surplus is calculated as the definite integral of the demand equation upward from the actual trip costs for the zone. Reiterating equation (13) :

$$\frac{V_z}{P_z} = \exp a * \exp bC * \exp fx_i * \ldots * \exp mx_i * \exp e_i$$

Let $(\exp a * \exp fx_1 * \ldots * \exp mx_i * \exp e_i)$ be K

Therefore we have

$$\frac{V_z}{P_z} = K * \exp bC \qquad (15)$$

Integrating gives

$$\text{Consumers' surplus} = \int_{C_i}^{\infty} \frac{V_z}{P_z}\, dC = \left[\frac{K}{b} \exp bC \right]_{C_i}^{\infty}$$

$$= \left(\frac{K}{b} \exp b(\ \ ) - \frac{K}{b} \exp b(C_i) \right)$$

$$= 0 - \frac{K}{b} \exp bC_i$$

$$= \frac{-K}{b} \exp bC_i \qquad (16)$$

when $b < 0$

Since the number of predicted visits is K exp bC_i, then consumers' surplus per visit $= \frac{-K}{b} \exp bC_i \; / \; (K \exp bC_i)$

$$= \frac{-1}{b} \qquad (17)$$

for any value of K.

Equation (17) means that in most cases where the total number of predicted visitors is close to the total number of observed visitors, an easily obtained measure of the consumers' surplus for an area is :

Consumers' surplus of an area $= -n_i \; / \; b$

where, n_i = total number of observed visitors.

Following this procedure consumers' surplus was estimated for the samples of Sungai Lalang, Ampang and Kancing visitors.

Table 81. Estimated Site Consumers' Surplus from the Demand Equation

	Consumers' surplus per visit (Without value of Travel time)	Consumers' surplus per visit (With value of Travel time)	Consumers' surplus for surveyed visitors (With value of Travel time)
Sungai Lalang	M$ 7.09	M$ 6.58	M$ 590.55
Ampang	M$ 8.40	M$ 8.65	M$ 1505.10
Kancing	M$ 11.11	M$ 12.05	M$ 2554.60

The most striking feature of the above table is the reasonableness of consumers' surplus values for the three areas. We would expect that

Kancing would have a slightly higher consumers' surplus because it is a more popular area where visits from further origins are more than for Sungai Lalang. Ampang visitors mostly come from origins closer to the recreation area. On the other hand, due to distance from major population centres, we would expect the consumers' surplus per visit to Sungai Lalang to be small as compared to Kancing. This is however not the case when we know that most visits to Sungai Lalang are made by private motorcar where the financial cost is highest among the other forms of transport. Similarly, the consumers' surplus per visit to Kancing and Ampang cannot be too high compared with that for Sungai Lalang because the cost of travel is balanced by cheaper costs when most visits were made by public buses and motorcycles.

The minimal impact of travel time as described earlier is reinforced when the calculated consumers' surpluses with travel cost added are compared with those when travel cost is omitted. The increase in consumers' surplus per visit when value of travel time is added is only 25 cents for Ampang and 94 cents for Kancing. It suggests that in recreational travel to this type of recreational resource the disutility associated with a journey is very slight. In fact, the slight reduction of consumers' surplus for Sungai Lalang when time cost was added could very well indicate that there is a positive utility for longer distance recreational travel.

One cause of concern is the slight reduction of the explanatory power, as reflected in the R^2, as the distance variable was replaced by the travel cost variable. The reason for this concern is mainly attributed to the close correlation between travel distance, monetary travel cost and travel time cost. Evidently, travel distance seems to explain more of the

variation of visit rates (perhaps because of its correlation with substitution possibilities) and the substitution of travel cost has lowered slightly the explanatory power of the demand equation. On the other hand, the assignment of travel time cost does not substantially alter the slope of the demand curve, as shown by the slight changes to the cost and other coefficients. Taking into consideration the proven unique relationship between travel cost of various modes of transport and time cost a generalized cost variable as used here would have a 'swamping' effect on the derivation of the value for travel time. This can be explained by the fact that a time cost of M$ 6.00 per hour for Kancing only increases the consumers' surplus by a mere 94 cents. It seems that the time cost of M$ 6.00 is a result of a compromise between time-saving and time-intensive modal split and the fact that the differential time costs between zones are correlated with the differential financial costs of travel.

7.5 CONCLUSIONS

From the above account of the scope of the analysis and the estimation procedure adopted, it is clear that the above consumers' surpluses are derived from a 'better', application of the travel cost approach. As a consequence the reliability of these estimates should be regarded as quite acceptable. It is appropriate to review briefly the more important elements which are introduced in this analysis, which in most other studies are ignored. This study has not simply applied the travel cost method in its basic form. Rather the view has been taken that, out of all the sources of bias inherent in a naive application of the technique to single sites, the more significant issues are the confounding effects of multi-stop/purpose trips and the need to incorporate travel time and alternative

sites into the demand equation. The assumption of constant taste and preferences is discarded by the insertion of variables that reflect choices for alternative areas, the disaggregation of the explanatory variables at the individual level and the inclusion of socio-economic characteristics of the visitors.

The choice of functional forms is beset by the problems of theoretical assumptions, which leads to the need for appropriate aggregation and weightings for the observations in hand.In this study, an appropriate weighting was postulated and the negative exponential functional form seems to meet well the theoretical data assumption as revealed by the non-linear observations. Furthermore, the weighting prescribed not only corrects for heteroskedasticity but was achieved by the logarithmic transformation of the dependent variable of the exponential model which in turn allows for the application of least squares method to estimate the regression equation.

Much can be said about previous works where incorrect functional forms were used, when observations were not weighted and where logarithmic transformation of the variables did not necessarily achieve the proper weighting needed. Totally disaggregated demand analysis (where number of visits are not accounted for by population sizes), for example, that of Brown and Nawas, (1973) and others who followed suit, did not take into account zones of zero visits. We can also be suspicious about the results of empirical work where a weighting or transformation was used to correct for the dependent variable but not for the independent variables (as in Brown et al., 1983). An analysis in this study has shown that transformation of only the dependent variable has led to poor results.

Avoiding the above-mentioned pitfalls, this analysis has generated demand equations for the three areas. Travel distances, travel times, income and socio-economic and two attitude variables contributed significantly in determining the visit rates. The inclusion of these variables conforms with earlier results on the independent roles of the explanatory variables. However, due to the close correlation between travel distance and monetary cost of travel, the latter is not entered in the stepwise regression. In order to estimate the consumers' surplus, the travel distance is replaced by the monetary travel cost variable. In doing so some explanatory power is lost because the effect of varying individual travel distances is partly obscured by the diverse travel cost of various modes of transport. A lowering of the travel costs occurs, even though the distance travelled by an individual is further away, when that individual uses the public bus to visit a given area. Similarly, an individual who travels from a shorter distance would encounter a slightly larger cost when he or she travels by a private car. With hindsight, the use of average travel cost per zone (irrespective of travel mode), as in a fully aggregated analysis would achieve better explanatory power but would lead to a loss of precision in the curve fit. Thus, using disaggregated data causes a loss of some explanatory power but the loss is compensated by a more precise estimate.

The iteration process to extract the values of travel time is conducive to deducing reasonable estimates of the values. Any argument against validity of these values is defensible on the grounds that statistical procedures have been used to generate them. One note of caution, however, is with regard to the nature of the values themselves. It was perfectly shown by the analysis here that the generalized cost

variable is an embodiment of both monetary travel and time cost which are greatly determined by the type of transport used to get to an area. Thus the high commodity value of travel time is misleading and only when separate estimations of the consumers' surplus with and without the time cost are conducted would the 'true' nature of the time cost emerge. Conclusively, the financial cost of travel plays a bigger part in determining visit rates.

Evidently, the consumers' surplus is higher when a time cost is added to it. The underestimation of the consumers' surplus without a time cost value is not as large as normally feared. More importantly, the inclusion and derivation of the time cost would provide an idea about the varying cost of travel time due to the effect of modal split associated with a journey.

The estimation of consumers' surplus is a rewarding exercise. It is not merely an estimation of the ex post value of the recreational sites but it also provides information on the rate of visits which has never been available in the past. The order of values, highest for Kancing and lowest for Sungai Lalang conforms to a priori expectations. The values themselves are reasonable. The implications for the future management and planning of the three recreation areas and other similar areas within the region of study, which arise through the quantification of the consumers' surplus, will be elucidated in the last chapter.

In estimating the consumers' surplus of non-priced recreation areas the accuracy of estimates is of great significance. The attempt here could be further improved by more sophisticated sensitivity analysis, such as sensitivity to travel time inclusion and alternative values for travel

time, functional forms, dependent variables, levels of aggregation, etc. In similar vein, it should be appreciated that this study is concerned with more than one site and the objectives of the study are wider than simply the quantification of consumers' surplus or indeed total surplus.

CHAPTER 8

GENERAL CONCLUSIONS AND DISCUSSIONS

Recreation in Malaysia is too important socially for policy makers and managers to continue to rely primarily on intuition to govern most decisions. In the face of increased relative scarcity of our natural resources and with growing problems associated with urbanisation, a more comprehensive set of data is needed to provide better information on what kinds of recreational opportunities need to be provided, and where and how. This thesis has used an on-site questionnaire survey of three forest areas surrounding the periphery of a major urban population centre in Peninsular Malaysia to gather a reasonable amount of information in order to examine and assess the areas' consumption, the associated travel and use patterns and the behaviour of the users of the areas. At the same time, the travel cost method is applied to derive a use-demand model to estimate consumers' surplus. Further, the study has served to illustrate certain facets of use-demand analysis where further work and investigation are required.

This study investigates the features that describe the use of three forest recreation areas within the context of a region. Since most of the visitors to the three areas come from one region, the participation patterns that emerge represent the interactions between the origin and characteristics of regional users and the existing supply within the region. In this respect the conclusions of Chapters 4, 5, 6 and 7 have shown considerable success in achieving the objectives of this study as stated in Chapter 1.

Recreation participation data and their implications could lead to misinterpretation. It is not enough simply to look at what people do and interpret this as reflecting what they want to do; it also reflects what they are able to do. Participation data are important, but they must be interpreted in terms of both supply and demand variables. Here lies the

purpose of this chapter. The conclusions derived so far have to be looked at in the context of how they could best serve the shorter and longer term planning and management of forest recreation areas. The methods that have been used to arrive at the conclusions and the consequent implications for further research should also be examined.

The travel and use patterns for Kancing serves as a good example in showing that it is the interaction of environmentally-related supply factors with demographic, socio-economic and situational variables which generates opportunities to participate in recreation. Kancing is endowed with outstanding natural features, it is easily accessible, quite easily the most popular and well-known area and thus receives the most visits from within the region. Accessibility, environmental qualities and information diffusion thus become key elements in the spatial relationship between recreationists and Kancing.

Travel distance is clearly seen to have an influence on choice of sites and activities. Given the opportunity to travel to other recreation areas within the region, the visitors to Ampang prefer the area because of its close proximity. Better environmental conditions and provision of facilities at other areas are seen as secondary reasons in choosing an area to be visited. Quite clearly, this 'friction of distance' is important in forest recreational travel in this region; the recreation sites situated further away are patronised less.

Recreational planners should take note of these two aspects of recreational travel. If the objective is to satisfy the desires of the users, the forest recreation areas should be sited close to population centres and the areas should preferably possess outstanding natural

features.

Recreational travel also involves various stops at different stages of the journey. Since the stops form an integral part of the recreational experience, attention should perhaps be given to the routes taken to reach a particular area. 34 per cent of the visitors to Kancing reach the area by the use of the public bus. Outstanding natural areas can only be enjoyed equally by everybody if accessibility to the area is well served by the public transportation system. Sungai Lalang, even though relatively more remote from major population centres, could be visited by more people if it were equally accessible by the use of public buses.

Travel cost does not feature as an important factor in hindering recreational visits. When asked if an increase in petrol cost or fares would affect the number of visits made, more than 80 per cent of the visitors to the three areas answered no. In contrast, an increase in travel distance to any area would affect the number of trips made for about 60 per cent of the visitors. Travel cost is not a measure of whether a recreation area is more or less popularly visited. Instead, it appears that the mobility or car ownership of the people is more important. A more distant recreation area, like Sungai Lalang, is visited more by people who have their own private transportation. In considering this dependence of the recreationist on the motor vehicle, it is inappropriate to assume that car ownership is universal. There will always be a social need to provide for the non-motorist in the region, if recreation opportunities for the less mobile are not to be severely restricted.

Predictions regarding recreation behaviour would be of greater reliability if more is known about attitudes and perceptions of the users.

This study, in a modest way, attempted to gather some such information. The results indicate that the choice of recreation activities and location is influenced by an individual's perception of what opportunities are available. In other words, a predisposition for recreation is translated into actual participation through a choice mechanism dependent upon perception of the recreation opportunity and experience on offer. There are some positive links between the recreational setting, the type of visitors it attracts and participation in several activities. Recreationists do not in fact count the number of picnic tables, barbecue facilities or other recreational facilities that are available. What they want is a reasonably convenient place to experience and enjoy a day's picnicking, swimming or jungle walking. In this context, prior knowledge of the area's aggregate visits and activity participation can help enhance the recreational experience of the visitors. In this respect immediate action must be undertaken to upgrade the conditions of the existing facilities presently available at the three sites.

Given that recreational trip making is largely unstructured and discretionary in nature, an effort was made to isolate several common variables which influence decision making. These variables were then used to explain and estimate area use-demand and associated benefits.

The questionnaire surveys undertaken in this study were found to be of value as they facilitated a description and analysis of travel and use patterns and the testing of a number of hypotheses concerning participation in outdoor recreation. Furthermore, they provided information which was useful in the application of the travel cost method to estimate use and the derivation of the consumers' surplus. An elaborate array of information is

needed to ensure that the basic assumptions of the travel cost technique are satisfied before a reasonable amount of accuracy can be achieved in the estimation of use. Collectively, the visits to the three areas are single purpose, the behaviour of the visitors in terms of the length of visits indicates that they are a homogenous entity and the travel involves a certain amount of time cost. The basic requirements of the travel cost analysis are hence satisfied.

The travel cost technique, which is based on the demand statistical model, provides a means of uncovering the significance of and the relationships between the factors that affect the demand for a site. Indeed, even if this method is inadequate as a forecasting technique, the knowledge of such factors which the analysis has generated will be useful for planning and management of recreation areas. The main factors which influence zonal population visits are travel distance, travel time, income and socio-economic and two attitude variables. The inclusion of attributes of alternative areas as perceived by the visitors in the statistical demand model has revealed an important element underlying the choice of areas to visit. Visits to Ampang and Kancing are affected by the characteristics of substitute areas. This implies that visits to an area should not be studied in isolation, rather the entire spectrum of recreation areas should be examined as a series of substitutes and complements which are capable of providing varied kinds of satisfaction and which act as potential trade-offs for one another. The presence of substitution effects implies that recreation preferences and propensities are much more elastic and open to manipulation than is generally and currently thought or assumed. If this is true, the implications are far-reaching and information as to which areas (activities) constitute alternatives will be vital to planners.

The estimation of consumers' surplus for the three areas takes into account the effects of alternative sites, the individual's taste and preferences and socio-economic characteristics of the visitors. Table 78 below shows the estimated consumers' surplus for the total number of visits made at the areas during the course of the survey.

Table 82 Total Estimated Consumers' Surplus

Sungai Lalang	M$ 9,172
Ampang	M$ 16,755
Kancing	M$ 50,031

From the table it is clear that these areas are quite valuable regional assests. Moreover, the value would be higher if yearly visit rates are known. It should be emphasised that these values include time costs and travel costs for those who travel by different types of vehicular transport. In addition, no expenditures for maintaining these areas have been deducted. It would be possible to calculate the net present value through a proper discount rate in order to obtain a value for the use of the forest as a recreational facility.Indeed, assuming that these are reasonably accurate measures, they might be regarded as conservative estimates of the true worth of our recreational forests. This is because only primary benefits have been considered; other secondary sources of value have been ignored.

There are some characteristics of these estimates of consumers' surplus which determine precisely how they may be interpreted and used. Perhaps the most important feature of these estimates is that they are quite deliberately ex post. In other words, they are a measure of the

value realised from the present management system and resource use level. As such they do not provide a direct indication as to the value which would be received under different circumtances. In this context much can be gained from the quantification of these values, considering that these areas are developed based on ill-defined policy objectives and consequently decisions have been based entirely on subjective judgement as to what is desirable and practicable. In an economic climate where there is perhaps pressure to reduce and re-appraise public sector funding, a prime concern is the justification of present resource use levels and benefits.

In the event that funding constraints may be relaxed, a likely event because of the current emphasis on the development of the tourist industry, the allocation of additional resources is unlikely to be seriously considered unless it can be demonstrated that the resources presently allocated are producing sufficient rewards. The concerted effort currently underway to further develop Kancing is justifiable not only because the area is very popular among the visitors from within the region but also because it gives the greatest economic benefits to the consumers. The presence of Sungai Lalang and Ampang is also beneficial because their consumption was explained by equally relevant reasons underlying preference and situational circumstances.

Clearly, the quantification of the magnitude and distribution of existing benefits has a positive role to play in the assessment of the value of forest recreation areas. If it can be used as a predictive tool, then so much the better. In any event, prior to this, the administrators did not have any idea of the benefits gained from the efforts already made to develop these areas. No doubt, judgement made out of empiricism and analysis alone may be equally unreliable as judgement made out of

subjective observations. The important difference, however, is that empiricism and analysis can help to provide a framework within which relevant decision variables and relationships can be identified more easily and handled more objectively.

Finally, the thesis serves to throw light on some aspects within the study of forest recreation where a re-assessment of objectives is required and where further research is necessary. Research work should be oriented towards the investigation and explanation of the basic underlying issues, whilst at the same time attempting to find answers to pressing problems of immediate concern to planners and administrators. Thus a balance should be maintained between studies which have as their prime objectives the refinement of research tools and those which are designed to provide information for decision makers.

At this juncture, a note of caution on the application of the travel cost method to estimate demand and consumers' surplus is appropriate. Its application in this study has proven that the often quoted simplicity of the travel cost technique is illusory if the intention is to yield the best possible estimates. Many issues needed to be resolved before the method could be used. It is also apparent that as yet there has been no 'state of the art' application of the method as most studies have been concerned with particular problems and refinements or have had limitations imposed by the available data set.

Considerable work remains to be done concerning the precise role of a number of other factors affecting recreational activity. The technique used in this study has highlighted the more important factors, and factors that are closely correlated are not clearly explained. Separate, more

specific investigation is required involving the socio-psychological and physical factors affecting demand and the choice of recreational activities. Perhaps the use of the direct interview technique could provide more insight into these factors.

There is also scope for the study of the constraints restricting the supply of forest recreation opportunities. In particular, there is an undisputed need for research work to be carried out on the carrying capacity of different forest environments for different types of recreational activity. The aim here should be to secure optimum use whilst protecting the resources from misuse.

Recreation planning needs to be undertaken on a regional basis and should not be limited by administrative boundaries if it is to satisfy demand, avoid unnecessary duplication of facilities and make optimum use of the resources available. As such, research into recreation should go beyond the limited confines of the forest resources. Ultimately the aim should be to produce a national strategy designed to establish demand patterns, co-ordinate research and oversee provision for all forms of recreation on all types of resources. Nevertheless, as mentioned at the very beginning, future needs are difficult to assess, influenced as they are by changes of fashion and the introduction of complementary and substitutable activities.

Thus a choice has to be made when planning forest recreational opportunities, whether to aim at a maximum flexibility of use or a restricted but unique provision of recreational experiences closely related to and governed by the natural conditions of the forest environment. Increasing our knowledge of factors affecting participation, improving

research methods and developing indigenous planning and management techniques are all vital for future demand to be satisfactorily accommodated. It is the author's intention and hope that the efforts undertaken in this study will succeed in highlighting the signposts for more vigorous and directed work in the field of outdoor recreation research and development in Malaysia.

REFERENCES

REFERENCES

ABAS SAID (1983). Economic Evaluation of Recreation Area Usage in Selangor. B. Sc. (forestry) project report, Faculty of Forestry, Universiti Pertanian Malaysia, Serdang.

ABDUL KADIR DIN (1985). 'The drag up Kedah peak : constraints on the development of a hill resort' in WAN SABRI, W.M. et al. (Eds.), Outdoor Recreation in Malaysia, Serdang, Malaysia.

ALLEN, P.G., STEVENS, T.H. and BARRET S.A. (1981). 'The effects of variable omission in the travel cost technique'. Land Economics, 57:173-179.

AMMETT, I. (1970). 'Sociological Research in Recreation' in BURTON, T.L., (Ed.), Recreation Research and Planning. George Allen and Unwin, London. pp. 65-77.

ANDERSON, F.J. and N.C. BONSOR (1974). 'Allocation, congestion and the valuation of recreational resources'. Land Economics, 50: 51-57.

ANDERSON, L.G. (1980). 'Estimating the benefits of recreation under conditions of congestion : comments and extension'. Journal of Economics and Management, 7: 401-406.

ANDERSON, R.J. (1981). 'A note on option value and the expected value of the consumers' surplus'. Journal of Environmental Economics and Management, 8: 187-191.

ANON.(1977). 'National Parks - the last refuge for nature and mankind'. Nature Malaysiana, 2: pp. 4-9.

ANON. (1977). Malaysia 1977 Official Year Book. Vol. 17.

ANON. (1980). Economic Report 1980-81. Ministry of Finance, Malaysia, Vol. 9, pp. 196.

ANON. (1981). Mid-term review of the third Malaysia plan, 1976 - 1980. Government printer, Kuala Lumpur.

APPLETON, J. (1975). The Experience of Landscape. John Wiley, London.

BARDON, K.S. (1978). The Recreational Use of Selected Inland Water Sites in South Wales. Ph. D. Thesis, University of Wales.

BARDON, K.S. and HARDING, D.M. (1981). 'On site questionnaire surveys in U.K. leisure research'. International Journal of Tourism Management, March: 36-48.

BARON, M. and SHECHTER, M. (1973). 'Simultaneous determination of visits to a system of outdoor recreation parks with capacity limitations'. Regional and Urban Economics, 3: 327-359.

BAXTER, M.J. (1979). Measuring the Benefits of Recreational Site Provision : A Review of Techniques Related to the Clawson Method. London : Sports Council.

BEAMAN, J. (1974). 'Distance and the 'reaction' to distance as a function of distance'. Journal of Leisure Research, 6: 220-231.

BEARDSLEY, W.G. (1969). Evaluation of Recreation Benefits. The Cache La Poudre River Colorado. Ph. D. Utah State University.

BEARDSLEY, W.G. (1971). 'Bias and noncomparability in recreation evaluation models'. Land Economics, 47: 175-180.

BECKER, G.S. (1965). 'A theory of the allocation of time'. Economic Journal, 75: 493-517.

BETTERS, D.R. and RUBINGH J.L. (1978). 'Suitability analysis and wildland clssification : an approach'. Journal of Environmental Management, 7: 59-72.

BISHOP, R.C. and HEBERLEIN, T.A. (1980). 'Simulated markets, hypothetical markets, and travel cost analysis: alternative methods of estimating outdoor recreation demand'. Department of Agricultural Economics Staff Paper No. 187, University of Wisconsin.

BOCKSTAEL, N.E. and K.E. McCONNELL (1980a). 'Estimating and using the household production function approach'. Staff Paper, Department of Resource Economics, University of Rhode Island.

BOCKSTAEL, N.E. and McCONNELL, K.E. (1980b). 'Calculating equivalent and compensating variation for natural resources facilities'. Land Economics, 56: 56-63.

BOCKSTAEL, N.E. and McCONNELL, K.E. (1978). 'The estimation and use of the household production function for wildlife recreation'. Discussion Paper No. 15, Department of Resource Economics, University of Rhode Island.

BORHAN, B.M. (1985). Some aspects of the Silviculture and Management of the hill dipterocarp forest of Peninsular Malaysia, M Sc. Thesis, University of Wales.

BOWES, M.D. and J.B. LOOMIS (1980). 'A note on the use of travel cost models with unequal zonal populations'. Land Economics, 56: 465-470.

BRACKEN TISEN (1984). Socio-economic Characteristics and Behaviour of Outdoor Recreationist in Wilayah Persekutuan. B. Sc. (Forestry) project report, Faculty of Forestry, Universiti Pertanian Malaysia, Serdang, Selangor, Malaysia.

BRITISH TRAVEL ASSOCIATION and UNIVERSITY OF KEELE (1967). Pilot National Recreation Survey, Report No. 1, University of Keele, London.

BROCKMAN, C.F. and MERRAIM, L.C. (1973). Recreational Use of Wildland. Mc Graw Hill, New York.

BROOKSHIRE, D.S., IVES, B.C. and SCHULZE, W.D. (1976). 'The valuation of aesthetic preferences'. Journal of Environmental Economics and Management, 3: 325-346.

BROOKSHIRE, D.S., RANDALL A. and J.R. STOLL (1980). 'Valuing increments and decrements in natural resources service flows'. American Journal of Agricultural Economics, 62: 478-488.

BROWN, W.G. and F. NAWAS (1973). 'Impact of aggregation on the estimation of outdoor recreation demand functions'. American Journal of Agricultural Economics, 55: 246-249.

BROWN, W.G., SINGH, A. and E.N. CASTLE (1964). 'An economic evaluation of the Oregon Salmon and Steelhead sport fishery'. Technical Bulletin No. 78, Agricultural Experiment Station, Oregon State University, Corvallis.

BROWN, W.G., SORHUS, C., YANG, B.C. and RICHARDS J.A. (1983). 'Using individual observations to estimate recreation demand functions : a caution'. American Journal of Agricultural Economics, 65: 154-157.

BURT, O.R. and D. BREWER (1971). 'Estimation of net social benefits from outdoor recreation'. Econometrica, 39: 813-827.

BURTON, T.L. (1971). Experiments in Recreation Research. Allen and Unwin, London.

BURTON, T.L. (1966). 'A day in the country : a survey of leisure activity at Box Hill, Surrey'. Journal of the Royal Institution of Chartered Surveyors, 98: 378-380.

BURTON, T.L. (1967). 'The classification of recreation demand and supplies, planning for research in the West Midlands'. Research Memorandum No. 1, Centre for Urban and Regional Studies, University of Birmingham.

BUTCHER, J. (1979). The British in Malaya 1880-1941. The Social History of an European Community in Colonial South East Asia. Oxford University Press, Kuala Lumpur.

BUTLER, G.D. (1968). Introduction to Community Recreation. Mc Graw Hill, New York.

CASTLE, E.N. and W.G. BROWN (1964). 'The economic value of a recreational resource : a case study of the Oregon salmon - steelhead sport fishery'. Paper presented before the committee on the Economics of Water Resources Development of the Western Agricultural Economics Research Council, San Francisco, California.

CESARIO, F.J. (1969). 'Operation research in outdoor recreation'. Journal of Leisure Research, 1: 33-51.

CESARIO, F.J. (1975a). 'A combined trip generation and distribution model'. Transportation Science, 9: 211-223.

CESARIO, F.J. (1975b). 'A new method of analyzing outdoor recreation trip data'. Journal of Leisure Research, 7: 200-215.

CESARIO, F.J. (1976). 'Value of time in recreational benefit studies'. Land Economics, 52: 32-41.

CESARIO, F.J. (1980). 'Congestion and the valuation of recreation benefits'. Land Economics, 56: 329-337.

CESARIO, F.J. and J.L. KNETSCH (1970). 'Time bias in recreational benefit estimates'. Water Resources Research, 6: 700-704.

CESARIO, F.J. and J.L. KNETSCH (1976). 'A recreation and site demand and benefit estimation model'. Regional Studies, 10: 97-104.

CESARIO, F.J., GOLDSTONE, S.E. and KNETSCH, J.L. (1970). 'Outdoor Recreation Demands and Values'. Battelle Memorial Institute, Columbus, Ohio.

CHAMBERS, T.W. and PRICE C. (1986). 'Recreational congestion : some hypotheses tested in the Forest of Dean'. Journal of Rural Studies, 2: 41-52.

CHEE TONG YIEW (1981). 'The importance of evaluating public response to the development of forest recreational areas' in Silviculture Unit, Forestry Headquarters, Peninsular Malaysia. Report on Amenity Forestry Workshop, Forest Research Institute, Kepong, Malaysia.

CHESHIRE, P.C. and M.H. STABLER (1976). 'Joint consumption benefits in recreational site surplus : an empirical estimate'. Regional Studies, 10: 343-352.

CHEUNG, H.K. (1972). 'A day use park visitation model'. Journal of Leisure Research, 4: 139-156.

CHRISTENSEN, J.B. (1983). An Economic Approach to Assessing the Value of Recreation with Special Reference to Forest Areas. Ph. D. Thesis, University College of North Wales, Bangor.

CHRISTENSEN, J.B. and C. PRICE (1982). 'A note on the use of travel cost models with unequal zonal populations : comment'. Land Economics, 58: 395-399.

CICCHETTI, C.J. (1973). 'Some economic issues in planning urban recreation facilities'. Land Economics, 47: 14-23.

CICCHETTI, C.J. and SMITH, V.K. (1973). 'Congestion, quality determination and optimal use : wilderness recreation on the Spanish Peaks Primitive area'. Social Science Research, 2: 15-30.

CICCHETTI C.J., SMITH V.K., KNETSCH J.L. and R.A. PATTON (1972). 'Recreation benefit estimation and forecasting : implications of the identification problem'. Water Resources Research, 8: 840-849.

CICCHETTI, C.J., FISHER, A.C. and A.V. SMITH (1976). 'An econometric evaluation of a generalised consumer surplus measure: the Mineral King controversy'. Econometrica, 44: 1259-1276.

CLARK, R. N. and STANKEY, G.H. (1979). The recreation opportunity spectrum : a framework for planning, management and research. General Technical Report PNW-98, USDA, Forest Service.

CLAWSON, M. and KNETSCH, J.L. (1966). Economics of Outdoor Recreation. John Hopkins Press, Baltimore.

CLAWSON, M. (1959). 'Methods of measuring the demand for and value of outdoor recreation'. Washington, Reprint No. 10, Resources for the Future.

COLENUTT, R.J. (1969). 'Modelling travel patterns of day visitors to the countryside', Area 2: 43-47.

COLENUTT, R.J. and SIDAWAY, R.M. (1973). Forest of Dean visitor survey. Bulletin 46, Forestry Commission, H.M.S.O.

COLLINGS, J.J. (1974). 'The valuation of leisure travel time : a note'. Regional and Urban Economics, 4: 65-67.

COMMITEE ON ASSESSMENT OF DEMAND FOR OUTDOOR RECREATION RESOURCES (1975). Assessing demand for outdoor recreation. National Academy of Sciences, Washington, D.C.

COMMON, M.S. (1973). 'A note on the use of the Clawson method for the evaluation of recreation site benefits'. Regional Studies, 7: 401-408.

COPPOCK, J.T. and DUFFIELD, R. (1975). Recreation in the Countryside. Macmillan, London.

COSGROVE, I. and JACKSON, R. (1972). The Geography of Recreation and Leisure. Hutchinson University Press library, London.

COUNTRYSIDE COMMISSION (1970). The Demand for outdoor recreation in the countryside. Report of a seminar held in London on 16th January, 1970.

COUNTRYSIDE REVIEW COMMITTEE (1977). 'Leisure and the Countryside'. A Discussion Paper, Topic Paper No. 2, H.M.S.O., London.

CRAIK, K. (1968). Human Responsiveness to Landscape : An Environmental Psychological Perspective. North Carolina State University, Raleigh, N.C.

CRAIK, K. (1972). 'Appraising the objectivity of landscape dimensions' in KRUTILLA, J.V. (Ed.) Natural Environments. John Hopkins Press, Baltimore.

CRANDALL, R. (1976). 'On the use of stepwise regression and other statistics to estimate the relative importance of variables'. Journal of Leisure Research, 8: 53-58.

CRUTCHFIELD, J.H. (1962). 'Valuation of fishery resources'. Land Economics, 38: 145-154.

CURRIE, J.M., MURPHY, J.A. and A. SCHMITZ (1971). 'The concept of économic surplus and its use in economic analysis'. Economic Journal, 81: 741-799.

DAIUTE, R.J. (1966). 'Methods for determination of demand for outdoor recreation'. Land Economics, 42: 327-338.

DAVIDSON, J. (1970). Outdoor Recreation Surveys - The Design and Use of Questionnaire for Site Surveys. Countryside Commission, Cheltenham.

DAVIS, R. K. (1963). 'Recreation planning as an economic problem'. Natural Resources Journal, 3: 239-249.

De GROOT, M.H. (1970). Optimal Statistical Decision. Mc Graw-Hill, New York.

De SERPA, A.C. (1971). 'A theory of the economics of time'. Economics Journal, 81: 828-846.

DEPARTMENT OF STATISTICS (1983). Population and Housing Census of Malaysia, Kuala Lumpur, Malaysia.

DEWAN BANDARAYA (1982). Kuala Lumpur Structure Plan. Kuala Lumpur.

DEYAK, T. A., and V.K. SMITH (1978). 'Congestion and participation in outdoor recreation : a household production approach'. Journal of Environmental Economics and Management, 5: 63-80.

DOTTAVIO, F.D., O'LEARY J.T., and KOTH B. (1980). 'The social group variable in recreation participation studies'. Journal of Leisure Research, 12: 357-367.

DOUGLASS, R.W. (1975). Forest Recreation. Pergamon Press, New York.

DRIVER, B.L. (1972). 'Potential contributes of psychology to recreation resources management' in WOHWILL J.F. and CARSON D.H. (Eds.) Environment and the Social Sciences : Perspective and Application. American Psychological Association, Washington, Washington, DC.

DRIVER, B.L. and BROWN, D.J. (1978). The opportunity spectrum concept and behavioral information in outdoor recreation resource supply inventories : a rationale, in Integrated Inventories of Renewable Natural Resources. General Technical Report RM-55, U.S.D.A., Forest Service.

DRYSDALE, J (1981). Foundation of ASEAN Economic growth - Malaysia. Diary 1981. The Times Organization, Times Publishing.

DWYER, J. F., Kelly, J.R. and Bowes, M.D. (1977). Improved procedure for valuation of the contribution of recreation to national economic development. Water Resources Center, Research report No. 128, University of Illinois.

EBDON, D. (1978). Statistics in Geography - A Practical Approach, Basil Blackwell, Oxford.

EDWARDS, E. (1966). Information Transmission. Chapman and Hall, London.

ELLIS, J.B. (1967). A systems model for recreational travel in Ontario : a progress report. Department of Highways Report RR126, Ontario.

EVERETT, R.D. (1979). 'The monetary value of the recreational benefits of wildlife'. Journal of Environmental Management, 8: 203-213.

FIELD, D.R. and O'LEARY, J.T. (1973). 'Social groups as a basis for assessing participation in selected water activities'. Journal of Leisure Research, 5: 16-25.

FINES, K.D. (1968). 'Landscape evaluation : a research project in East Sussex'. Regional Studies, 2: 41-55.

FISHER, A.C. and J.V. KRUTILLA (1972). 'Determination of optimal capacity of resource-based recreation facilities'. Natural Resources Journal, 12: 417-444.

FLEGG, A. T. (1976). 'Methodological problems in estimating recreational demand functions and evaluating recreational benefit'. Regional Studies, 10: 353-362.

FORESTRY HEADQUARTERS, PENINSULAR MALAYSIA (1978). National Forest Policy. Government printer, Kuala Lumpur.

FREEMAN, A.M. (1979). The Benefits of Environmental Improvement. Resources for the Future, INC, Johns Hopkins University Press, Baltimore.

FREUND, R.J. and WILSON R.R. (1974). 'An example of a gravity model to estimate recreation travel'. Journal of Leisure Research, 6: 241-256.

FREY, J.C. and GAMBLE, H.B. (1967). 'Policy issues and problems in outdoor recreation'. Journal of Farm Economics, 49: 1307-1317.

GAVER, K.M. and GEISEL, M.S. (1974). 'Discriminating among alternative models : Bayesian and Non-Bayesian methods' in ZAREMBKA, D. (Ed.) Frontiers in Econometrics. Academic Press, New York.

GIBSON, J.G. (1978). 'Recreation and land use' in D.W. PEARCE (Ed.) The valuation of social cost, pp. 68-96, London, Allen and Unwin.

GIDDENS, A. (1964). 'Notes on the concept of play and leisure'. Sociological Review, Vol. XII: 73- 91.

GIST, N.P. and FAVA, S.F. (1964). Urban Society. Thomas Y. Cromwell, New York.

GLOVER, F. and ROGOZINSKI, J. (1982). 'Resort development : a network related model for optimizing sites and visits'. Journal of Leisure Research, 14: 235-247.

GORDON, I.M. and KNETSCH, J.L. (1979). 'Consumer's surplus measures and the evaluation of resources'. Land Economics, 55: 1-10.

GOSSE, L.E.H. (1970). 'The demand for outdoor recreation. Ph. D. Dissertation, Cornell University.

GROVES, D.L. and KAHALAS H. (1976). 'Recreational expectations'. Regional Studies, 10: 193-200.

GUM, R. L. and W.E. MARTIN (1975). 'Problems and solutions in estimating the demand for and value of rural outdoor recreation'. American Journal of Agricultural Economics, 57: 558-566.

GUNDERMANN, E. (1976). Economics procedures used in outdoor recreation evaluations throughout the world. Proceedings, Division IV, XVI IUFRO World Congress, Oslo, Norway, pp. 122-142.

HAMMACK, J. and BROWN, G.M., Jr. (1974). Waterfowl and Wetlands : Towards Bioeconomic Analysis. Resources for the Future, Johns Hopkins University Press, Baltimore.

HARUN, I. (1981). 'The compensatory plantation programme' in BORHAN, B.M., 1985 Some Aspect of the Silviculture and Management of the Hill Dipterocarp Forests of Peninsular Malaysia. M Sc. thesis, University of Wales.

HASPEL, A.E. and F.R. JOHNSON (1982). 'Multiple destination trip bias in recreation benefit estimation'. Land Economics, 58: 364-372.

HECOCK, R. D. (1970). 'Recreation behavior patterns as related to site characteristics of beaches'. Journal of Leisure Research, 2: 333-341.

HENDERSON, A. (1941). 'Consumers' surplus and the compensating variation'. Review of Economic Studies, 8: 117-121.

HICKS, J.R. (1943). 'The four consumers' surplus'. Review of Economic Studies, 11: 31-41.

HICKS, J.R. (1956). A Revision of Demand Theory. Oxford, Clarendon Press.

HICKS, J.R. (1946). Value and Capital (2nd Edition). Oxford, Clarendon Press.

HILL, M. and M. SHECHTER (1971). 'Optimal goal achievement in the development of outdoor recreation facilities' in A.G. WILSON (Ed.) Urban and Regional Planning, Pion Press, London.

HIONVILLE, G., JOWELL, R. and ASSOCIATES (1978). Survey Research Practice. Heinemann, London.

HOF, J.G. and D.A. KING (1982). 'On the necessity of simultaneous recreation demand equation estimation'. Land Economics, 58: 547-552.

HOWELL, D.C. (1985). Fundamental Statistics for the Behavioral Sciences. Ouxbury Press, Boston Massachusetts.

HUMPHREYS, K. (1981). The Socio-economic Characteristics of Respondents to Recreation Questionnaires in Gwydr Forest, North Wales. B. Sc. (Forestry) project report, Department of Forestry and Wood Science, U.C.N.W., Bangor, North Wales.

JALIL MD. SOM and CHEE T.Y. (1985). 'Recreation forests in Peninsular Malaysia - concept and implementation' in WAN SABRI, W.M. et al. (Eds.), Outdoor Recreation in Malaysia. Serdang, Malaysia.

JASMI ABDUL (1985). 'National Park as a recreation area' in WAN SABRI, W.M. et al. (Eds.), Outdoor Recreation in Malaysia, Serdang, Malaysia.

JOHNSTON, J. (1984). Econometric Methods (3rd Edition). Mc Graw-Hill, London.

KAMARUZAMAN YUSOF (1981). Recreation Demand : A Case Study of Desaru Resort, Johor. B. Sc. (Forestry) project report, Faculty of Forestry, Universiti Pertanian Malaysia, Serdang, Selangor, Malaysia.

KANDO, T.M. (1975). Leisure and Popular Culture in Transition. C.V. Mosby.

KAVANAGH, N.J. and J.G. GIBSON (1971). 'The measurement of fishing benefits on the River Trent'. Proceedings of Symposium on the River Trent Research Programme, Nottingham University, Institute of Water Pollution Control.

KEITH, J. E. and WORKMAN J.P. (1975). 'Opportunity cost of time in demnad estimates for nonmarket resources'. Journal of Leisure Research, 7: 121-127.

KHALID ABD. RAHIM and MOHD. SHAHWAHID OTHMAN (1985). 'Estimating demand for outdoor recreation' in WAN SABRI, W.M. et al. (Eds.), Outdoor Recreation in Malaysia. Serdang, Malaysia.

KNETSCH, J.L. (1964). 'Economics of including recreation as a purpose of Eastern Water Projects'. Journal of Farm Economics, 46: 1148-1157.

KNETSCH, J.L. (1977). 'Displaced facilities and benefit calculations'. Land Economics, 53: 123-129.

KNETSCH, J.L. (1963). 'Outdoor recreation demands and benefits'. Land Economics, 39: 387-396.

KNETSCH, J.L. (1969). 'Communication on assessing the demand for outdoor recreation'. Journal of Leisure Research, 1: 85-87.

LANCASTER, K.J. (1966). 'A new approach to consumer theory'. Journal of Political Economy, 74: 132-157.

LANCASTER, K.J. (1971). Consumer Demand: A New Approach. Columbia University Press, New York.

LATIFAH MOHD. YATIM (1985). 'Planning for outdoor recreation areas' in WAN SABRI, W.M. et al. (Eds.), Outdoor Recreation in Malaysia. Serdang, Malaysia.

LAURIE I. C. et al. (1976). Landscape Evaluation. University of Manchester Press, Manchester.

LAW, S. (1967). 'Planning for outdoor recreation in the countryside'. Journal of the Town Planning Institute, 53: 383-386.

LAW, S. (1979). 'Introducing demand studies' in COUNTRYSIDE COMMISSION 1970 II, The Demand for Outdoor Recreation in the Countryside, report of a seminar held in London.

LERNER, L.J. (1962). 'Quantitative indices of recreational values'. Water Resources and Economic Development of the West : Economics in Outdoor Recreational Policy, Report No. 11, Conference Proceedings of the Committee on the Economics of Water Resources Development of the Western Agricultural Economics Research Council jointly with the Western Farm Economics Association, University of Nevada.

LEVY, J. (1979). 'A paradigm for conceptualising leisure behavior'. Journal of Leisure Research, 11: 48-60.

LEWIS, R.C. and M.C. WHITBY (1972). Recreation Benefits from a Reservoir. Agricultural Adjustment Unit Research Monograph No. 2, University of New Castle.

LINTON, D.L. (1968). 'The assessment of scenery as a natural resource'. Scottish Geographical Magazine, 84: 219-238.

LUCAS, R. C. (1963). 'Bias in estimating recreationists' length of stay from sample interviews'. Journal of Forestry, 61: 912-914.

MANSFIELD, N.W. (1969). 'Recreational trip generation'. Journal of Transport Economics and Policy, 3: 152-164.

MANSFIELD, N.W. (1971). 'The estimation of benefits from recreation sites and the provision of a new facility'. Regional Studies, 5: 55-69.

MARSHALL, A. (1930). Principles of Economics (8th Edition). London.

MAZLAN MOHD. SALLEH (1983). Some Outdoor Recreation Demand Factors of a Semi-Developed and a Developed Recreational Area. B. Sc. (Forestry) project report, Faculty of Forestry, Universiti Pertanian Malaysia, Serdang, Selangor, Malaysia.

McCLELLAN, K. and MEDRICH, E. (1969). 'Outdoor recreation : economic consideration for optimal site selection and development'. Land Economics, 45: 174-182.

McCONNELL, K.E. (1977). 'Congestion and willingness-to-pay : a study of beach use'. Land Economics, 53: 195-219.

McCONNELL, K.E. (1975). 'Some problems in estimating the demand for outdoor recreation'. American Journal of Agricultural Economics, 58: 598.

McCONNELL, K.E. (1980). 'Valuing congested recreational sites'. Journal of Environmental Economics and Management, 7: 398-394.

McCONNELL, K.E. and I.E. STRAND (1981). 'Measuring the cost of time in recreational demand analysis : an application to sport fishing'. American Journal of Agricultural Economics, 63: 153-156.

McCONNELL, K.E. and J.G. SUTINEN (1979). 'Bioeconomic models of marine recreational fishing'. Journal of Environmental Economics and Management, 6: 127-129.

McCONNELL, K.E. and V.A. DUFF (1976). 'Estimating net benefits under conditions of excess demand'. Journal of Environmental Economics and Management, 2: 224-230.

McCUEN, R.H. (1974). 'Spurious correlation in estimating recreation demand functions'. Journal of Leisure Research, 6: 232-240.

MENDELSON, R.M. and G.M. BROWN (1983). 'Revealed preference approaches to valuing outdoor recreation'. Natural Resources Journal, 23: 607-618.

MENZ, F. C. and D.P. WILTON (1983). 'Alternative ways to measure recreation values by the travel cost method'. American Journal of Agricultural Economics, 65: 332-335.

MEREWITZ, L. (1966). 'Recreational benefits of water resource development'. Water Resources Research, 2: 625-640.

MILAM, R. L. and E.C. PASOUR (1970). 'Estimating the demand for on-form recreational service'. American Journal of Agricultural Economics, 52: 127-131.

MINISTRY OF PRIMARY INDUSTRIES, MALAYSIA (1985). Forestry in Malaysia. Government Printer, Kuala Lumpur. 15 pp.

MINISTRY OF TRANSPORT, PLANNING AND RESEARCH DIVISION (1982). Year Book of Transport Statistics, Malaysia.

MISHAN, E.J. (1948). 'Realism and relevance in consumer's surplus'. Review of Economic Studies, XV: 27-3ecrea3.

MISHAN, E.J. (1981). Introduction to Normative Economics. New York, Oxford University Press.

MISHAN, E.J. (1975). Cost-Benefit Analysis. Allen and Unwin, London.

MOELLER, G.H. and ECHELBERGER H.E. (1974). 'Approaches to forecasting recreation consumption' in Outdoor Recreation Research : Applying the Results. Papers from a workshop held by the U.S.D.A. Forest Service at Marquette, Michigan. North Central Experimental Station, St. Paul, Minnesota.

MOHD. NOR KAILANY (1981). A Study of Recreational Demand at Mimaland. B. Sc. (Resource Economics) project report, Faculty of Resource Economics and Agribusiness, University Pertanian Malaysia, Serdang, Malaysia.

MOLYNEUX, D.D. (1970). A framework for recreation research, in BURTON, T.L. (Ed.), Recreation Research and Planning, George Allen and Unwin, London.

MOSER, C. A. and KALTON, G. (1971). Survey Methods and Social Investigation. Heinemann, London.

MUELLER, E. and G. GURIN (1962). Participation in Outdoor Recreation : Factors Affecting Demand Among American Adults. Study Report 20, Outdoor Recreation Resources Review Commission, Washington, D.C.

NETER, J., WASSERMANN, W. and KUTNER, M.H. (1985). Applied Linear Statistical Models (2nd Ed.). Richard D. Irwin Inc, Homewood, Illinois.

NEUBERGER, H.L.I. (1971). 'User benefit in the evaluation of transport and land use plans'. Journal of Transport Economics and Policy, 5: 52-75.

NORTON, G.A. (1970). 'Public outdoor recreation and resource allocation : a welfare approach'. Land Economics, 46: 414-422.

O'RIORDAN, T. (1971). Perspective on Resource Management. Pion, London.

O'RIORDON, T. (1970). 'Outdoor recreation research' in FOSTER, H.D. and SEWELL, W.R.D. (Eds.), Resources, Recreation and Research. Occasional Papers in geography, 13, Department of Geography, University of Victoria, British Columbia.

O'ROURKE, B. (1974). 'Travel in the recreational experience - a literature review'. Journal of Leisure Research, 6: 140-156.

OPPENHEIM, A.N. (1966). Questionnaire Design and Attitude Measurement. Heinemann, London.

OUTDOOR RECREATION REVIEW COMMISSION (1962). The Quality of Outdoor Recreation : As Evidenced by user Satisfaction, Study Report 5, Washington D.C.

PANKEY, V.S. and JOHNSTON, W.E. (1969). Analysis of recreational use of selected reservoirs in California, Plan Formulation and Evaluation Studies - recreation, Contract Report No. 1, U.S. Army Engineer, Sacromento, California.

PREWITT, R.A. (1949). The economics of public recreation -an economic survey of the monetary evaluation of recreation - the National Parks. National Park Service (memo), Washington, D.C.

STATE FOREST DEPARTMENT KEDAH/PULAU PINANG (1976). 10 Year Plan on Forest Recreation Management - 1976-1985, Sungai Petani, Kedah, Malaysia.

PARNON SAIKON(1979). An Assessment of Recreational Aspects of the Developed public Parks and Gardens in Kuala Lumpur. B. Sc. (forestry) project report, Faculty of Forestry, University Pertanian Malaysia, Serdang, Malaysia.

PATMORE, J.A. (1983). Recreation and Resources : Leisure Pattern and Leisure Places. B. Blackwell, Oxford.

PEARCE, D.W. and C.A. NASH (1981). The Social Appraisal of Projects. A Text in Cost-Benefit Analysis . London, Macmillan.

PEARSE, P.H. (1968). 'A new approach to the evaluation of non-priced recreational resources'. Land Economics, 44: 87-99.

PERLOFF, H.S. and WINGO L.Jr. (1962). Urban growth and the planning of outdoor recreation. Outdoor Recreation Resources Review Commission Study Report 22, Washington D.C., pp. 27-59.

PRICE, C. (1978). Landscape Economics. Mac Millan Press, London.

PRICE, C. (1979). 'Public preference and the management of recreational congestion'. Regional Studies, 13: 125-139.

PRICE, C. (1981). 'Charging versus exclusion : choice between recreation management tools'. Environmental Management, 5: 161-175.

PRICE, C. (1983). 'Evaluation of congestion and other social costs : implications for systems of recreation parks'. Sistem Urbani, 1: 119-139.

RADFORD, A.F. (1985). The Recreational Value of Salmon Fisheries in England and Wales : A case study of Three River Fisheries. M. Phil Thesis, Department of Economics and Economic History, Portsmouth Polytechnic.

RAO, P. and R.L. MILLER (1971). Applied Econometrics. Wadsworth Publishing, Belmont, California.

RODGERS, J.H. (1984). The Application of the Revised Clawson Analysis to Gwydr Forest, Gwynedd, North Wales. B. Sc. (Forestry) project report, Department of Forestry and Wood Science, U.C.N.W., Bangor, North Wales.

RODGERS, B. (1969). 'Leisure and Recreation'. Urban Studies, 6: 368-384.

ROGERS, M.P. (1974). Assessing Public Recreation Needs, Technical Assistance Bulletin No. 1, Bureau of outdoor Recreation, U.S. Department of Interior, Ann Arbor, Michigan.

RUNYON, R.P. and HABER, H. (1967). Fundamental of Behavioral Statistics, Addison-Wesley, London.

SCHULZE, W.D., d'ARUE, R.O. and BROOKSHIRE, D.S. (1981). 'Valuing environmental commodities : some recent experiments'. Land Economics, 57: 151-172.

SECKLER, D.W. (1968). 'Analytical issues in demand analysis for outdoor recreation : comment'. American Journal of Agricultural Economics, 50: 147-151.

SECKLER, D.W. (1966). 'On the uses and abuses of economic science in evaluating public outdoor recreation'. Land Economics, 42: 485-494.

SEELEY, J.H. (1973). Outdoor Recreation and the Urban Environment, Macmillan, London.

SELLER, C., STOLL, J.R. and CHAVAS J.P. (1985). 'Validation of empirical measures of welfare change : a comparison of non-market technique'. Land Economics, 61: 156-175.

SENECA, J. and CICCHETTI, C. (1969). 'User response in outdoor recreation : a production analysis. Journal of Leisure Research, 1: 238-245.

SENECA, J.J. (1968). A generalised approach to estimating recreation benefits. Ph. D. Thesis, University of Pennsylvania University Park, Pennsylvania.

SHECHTER, M. (1977). 'on the use of home and site surveys in recreation research' in State-of-the-Art Methods for Research Planning and Determining the Benefits of Outdoor Recreation. General Technical Report PSW-20, Pacific Southwest Forest and Range Experimental Station, U.S.D.A. Forest Service, Berkeley, California.

SHECHTER, M., ENIS R., REISER B. and TZAMIR Y. (1981). 'Evaluation of landscape resources for recreation planning'. Regional Studies, 15: 373-390.

SHELBY, B. (1980). 'Crowding models for backcountry recreation'. Land Economics, 56: 43-55.

SHUCKSMITH, D.M. (1979). 'The demand for angling at the Derwent reservoir, 1970-1976'. Journal of Agricultural Economics, 30: 25-37.

SIEGEL, S. (1956). Non-Parametric Statistics for Behavioral Sciences. Mc Graw-Hill, New York.

SILLITOE, K.K. (1969). The Pilot National Recreation Survey, Report No. 1, British Travel Association - University of Keele.

SILVICULTURE UNIT, FORESTRY HEADQUARTERS, PENINSULAR MALAYSIA (1981). Report on Amenity Forestry Workshop held at Forest Research Institute, Kepong, Malaysia.

SINDEN, J.A. (1974). 'A utility approach to the valuation of recreational and aesthetic preference'. American Journal of Agricultural Economics, 56: 61-71.

SINDEN, J.A. (1979). Unpriced Values : Decisions Without Market Prices, Wiley, New York.

SMITH, R.J. (1971). 'The evaluation of recreation benefits : the Clawson method in practice'. Urban Studies, 8: 89-102.

SMITH, S.L.J. (1980). 'Intervening opportunities and travel to urban recreation centres'. Journal of Leisure Research, 12: 296-308.

SMITH, V. K. (1981). 'Congestion, travel cost recreational demand models and benefit evaluation'. Journal of Environmental Economics and Management, 8: 92-96.

SMITH, V.K. and R.J. KOPP (1980). 'The spatial limits of the travel cost recreation demand model'. Land Economics, 56: 64-72.

SMITH, V. K. (1975). 'Travel cost demand models for wilderness recreation : a problem of non-nested hypotheses'. Land Economics, 51: 103-111.

SMITH, R.J. and N.J. KAVANAGH (1969). 'The measurement of the benefits of trout fishing'. Journal of Leisure Research, 1: 316-332.

SOCIO-ECONOMIC RESEARCH UNIT (1982). Primary Socio-economic Data for Districts of Selangor and Federal Territory. Prime Minister's Department, Malaysia (unpublished).

STABLER, M.J. (1982). 'Estimation of the economic benefits of fishing : a review note' in J.H. GROVER (Ed.), Allocation of Fishery Resources. Proceedings of the Technical Consultation, Vinchy, France, 1980, pp. 356-365. FAO/AFS.

STANDING CONFERENCE ON REGIONAL PLANNING IN SOUTH WALES AND MONMOUTHSHIRE (1973). Recreation in South Wales, Glamorgan County Council.

STEVENS, J.B. (1966). 'Recreational benefits from water pollution control'. Water Resources Research, 2: 167-182.

STOEVENER, H.H. and W.G. BROWN (1967). 'Analytical issues in demand analysis for outdoor recreation'. Journal of Farm Economics, 49: 1295-1304.

STOEVENER, H.H. and W.G. BROWN (1968). 'Analytical issues in demand analysis for outdoor recreation: reply'. American Journal of Agricultural Economics, 50: 151-153.

STRONG, E.J. (1984). 'A note on the functional form of travel cost models with zones of unequal populations'. Land Economics, 59: 342-349.

SWANSON, D. (1971). 'Public perceptions and resources planning' in SEWELL, W.R.D. and BURTON, I. (Eds.), Perceptions and Attitudes in Resource Management. Proceeding of a symposium on the Role of Perceptions and Attitudes in Decision Making in Resources Management, Policy Research and Co-ordination Branch, Department of Energy Mines and Resources, Ottawa, Canada.

THAYER, M.A. (1981). 'Contingent valuation techniques for assessing environmental impacts : further evidence'. Journal of Environmental Economics and Management, 8: 27-44.

THEIL, H. (1957). 'Specification Errors and the estimation of economic relationships'. International Statistical Institute Review, 25: 41-51.

THOMPSON, B. (1967). 'Recreational travel - a review and pilot study'. Traffic Quarterly, 21: 527-542.

TIEDEMANN, C.E. and D. MILSTEIN (1966). 'Travel models : methods and models'. Michigan Outdoor Recreation Demand Study 1 : Chapter 4.

TOURISM and RECREATION RESEARCH UNIT (1983). Recreation Site Survey Manual - Methods and Techniques for Conducting Visitor Surveys. Countryside Commission, Scotland.

TRAKOLIS, D. (1979). The Concept of Carrying Capacity of Forest Recreation Areas. Ph. D. Thesis, University of Wales.

ULLMAN, E.L. and D.J. VOLK (1962). 'An operational model for prodicting reservoir attendance and benefits : implications of a location approach to water recreation'. Papers of the Michigan Academy of Science, Arts, and Letters, XLVII.

VAN DOREN, C. (1967). An Introduction Travel Model for Projecting Attendance of Campers at Michigan State Parks. Ph. D. Thesis, East Lansing, Michigan State University, Michigan.

VAUGHAN, W.J., RUSSELL, C.S. and M. HAZILLA (1982). 'A note on the use of travel cost models with unequal zonal populations : commnets'. Land Economics, 58: 400-407.

VAUX, H.J. and WILLIAMS N.A. (1977). 'The costs of congestion and wilderness recreation'. Environmental Management, 1: 495-503.

VICKERMAN, R.W. (1974). 'The evaluation of benefits from recreational sites and the provision of a new facility'. Regional Studies, 5: 55-69.

VOORHEES, A. (1955). 'A general theory of traffic movement, Proceedings of the Institute of Traffic Engineers, Washington, D.C., pp. 46-56.

WAN SABRI, W.M. (1983). 'Forests for outdoor recreation in Malaysia'. Paper presented at the First Asean Forestry Congress held at Manila Philippines.

WAN SABRI, W.M., MAMIT J.D., LOH, S.W. and ROSLAN HASSAN (1985). 'An evaluation of park usage and its effects upon planning and management' in WAN SABRI, W.M. et al. (Eds.), Outdoor Recreation in Malaysia, Serdang, Malaysia.

WARD, A.W. (1984). 'Specification consideration for the price variable in travel cost demand models'. Land Economics, 60: 301-305.

WENNERGREN, E.B. (1967). 'Surrogate pricing of outdoor recreation'. Land Economics, 42: 112-115.

WETZEL, J.N. (1977). 'Estimating the benefits of recreation under conditions of congestion'. Journal of Environmental Economics and Management, 4: 239-246.

WETZEL, J.N. (1981). 'Congestion and economic valuation : a reconsideration'. Journal of Environmental Economics and Management, 8: 192-195.

WETZSTEIN, M.E. and J.G. McNEELY (1980). 'Specification errors and inference in recreation demand models'. American Journal of Agricultural Economics, 62: 798-800.

WHITE, J. and DUNN, M. (1974). 'Recreational Use of the Countryside: A Case Study in the West Midlands'. Research Memorandum No. 33, Centre for Urban and Regional Studies, University of Birmingham.

WILKINSON, L. (1985). The System for Statistics, SYSTAT, Inc., Evanston, Illinois.

WILKINSON, P.F. (1973). 'The use of models in predicting the consumption of outdoor recreation'. Journal of Leisure Research, 5: 34-48.

WILLIAMS, S. (1979). Tourism in Inland Wales. Ph. D. Thesis. University of Wales.

WILLIG, R.D. (1976). 'Consumers' surplus without apology'. American Economic Review, 66: 589-597.

WILLMAN, E.A. (1980). 'The value of time in recreational benefit studies'. Journal of Environmental Economics and Management, 7: 272-286.

WINSTON, G.U., and LUQMAN MAHMOOD (1972). 'Forest Recreation in Malaysia'. Paper presented at the Fourth Forestry Conference, Malaysia.

WOHLFARTH, R. (1978). Kancing Forest Reserve and its Development into a Recreation Park. Silviculture Unit, Forestry Headquarters, Peninsular Malaysia, Kuala Lumpur.

WOLFE, R. I. (1972). 'The inertia model'. Journal of Leisure Research, 4: 73-76.

WOOD, D.F. (1961). 'The distances travelled technique for measuring value of recreation areas : an application. Land Economics, 37: 363-369.

WYCKOFF, J.B. (1974). 'Scope for valuation of environmental goods'. Land Economics, 50: 89-92.

ZAINAL ABIDIN MOHD SHARIFF (1972). 'Forest Policy and Legislation'. Paper presented at the Fourth Forestry Conference, Malaysia.

ZAREMBKA, P. (1974). 'Transformation of variable in econometrics' in ZAREMBKA, P. (Ed.) Frontiers in Econometrics. Academic Press, New York, pp. 81-104.

ZEIMER, R., MUSSER, W.N. and R.C. HILL (1980). 'Recreational demand equations : functional form and consumer surplus'. American Journal of Agricultural Economics, 60: 136-141.

ZIMMERMAN, E.W. (1951). 'World Resources and Industries, Harper and Brethen, New York' in COPPOCK, J.J. and DUFFIELD, B.S., 1975, Recreation in the Countryside. Macmillan, London.

APPENDICES

Appendix 1

Population units according to districts and sub-districts within Selangor and the Federal Territory, 1980.

SEPANG

Dengkil	- 23,386
Labu	- 5,030
Sepang	- 18,718
	47,134

GOMBAK

Batu	- 79,619
Rawang	- 36,526
Setapak	- 21,939
Ulu Kelang	- 35,425
	173,509

ULU LANGAT

Ampang	- 75,501
Beranang	- 7,624
Cheras	- 23,133
Kajang	- 45,795
Semenyih	- 16,293
Ulu Langat	- 14,591
Ulu Semenyih	- 1,561
	184,498

KELANG

Kapar	- 86,832
Kelang	- 167,898
Bandar Kelang	- 29,850
	284,580

ULU SELANGOR

Ampang Pechah	- 10,801
Batang Kali	- 7,473
Buloh Telor	- 93
Kalumpang	- 3,826
Kerling	- 4,925
Kuala Kalumpang	- 1,274
Peretak	- 548
Rasa	- 2,743
Serendah	- 12,402
Sungai Gumut	- 644
Sungai Tinggi	- 6,520
Ulu Bernam	23,742
Ulu Yam	- 9,182
	84,174

KUALA LANGAT

Bandar dan Jugra	- 14,363
Batu	- 14,837
Kelanang	- 11,714
Morib	- 3,136
Tanjung Dua Belas	- 38,432
Telok Panglima Garang	- 21,412
	103,894

PETALING

Bukit Raja	- 7,224
Damansara	- 103,324
Petaling	- 79,566
Sungai Buloh	- 112,382
Bandar Petaling Jaya	- 77,910
	380,406

KUALA SELANGOR

Api-Api	- 9,285
Batang Berjuntai	- 13,330
Ijok	- 10,853
Jeram	- 21,237
Kuala Pasangan	- 8,611
Tanjong Karang	- 32,622
Ujung Permatang	- 8,657
Ulu Tinggi	- 422
	105,017

SABAK BERNAM

Bagan Nakhoda Omar	- 11,215
Panchang Bedena	- 34,456
Pasir Panjang	- 25,405
Sabak	- 25,115
Sungai Panjang	- 9,445
	105,636

WILAYAH PERSEKUTUAN

- 977,102

TOTAL FOR REGION : 2,456,087.

(source: Department of Statistics 1980 Kuala Lumpur, Malaysia).

Appendix 2

Population Characteristics of the Region (Figures are for those 15 years old and above, unless otherwise stated).

Age Group	Number	%
15 - 24 years	554241	36.94
25 - 44 years	648489	43.22
45 - 65 years	227033	15.13
over 65 years	70724	4.71
Total	1,500,487	

Sex	Number	%
Male	759249	50.60
Female	741238	49.40
Total	1,500,487	

Marital Status	Number	%
Married	804379	53.61
Single	613390	40.88
Divorced/Separated	11002	0.73
Widowed	71716	4.78
Total	1,500,487	

Ethnic Group	Number	%
Malay	596448	39.75
Chinese	653362	43.54
Indian	240144	16.00
Others	10533	0.70
Total	1,500,487	

con't Appendix 2

Educational level	Number	%
Self-taught	233625	15.57
Primary school	532197	35.47
Secondary school	662750	44.17
College/Polytechnic/ Institude and University	71915	4.79
Total	1,500,487	

Socio-economic groups (for 10 yrs old and above)	Number	%
Professional and technical	81707	5.10
Administrative, executive and management	19056	1.19
Clerical	136229	8.50
Service	101244	8.32
Production	215703	13.47
Sales	60623	3.78
Transport equipment operator and manual work	79624	4.97
Wholesale and retail	34335	2.14
Agricultural, animal husbandry, forestry and fisherman	108219	6.76
Outside labour force	765059	47.76
Total	1,601,799	

Sources : Population and Housing Census of Malaysia, Department of Statistics Malaysia, Kuala Lumpur, 1983.

Appendix 3

SOAL SELIDIK PENDEK
SHORT QUESTIONNAIRE

SURVEY PENGGUNAAN HUTAN REKREASI:
FOREST RECREATION USE SURVEY : SG LALANG/KANCING/AMPANG

Tarikh: _____ Penemubual: _____ Masa mula: _____
Date : Interviewer: Time Started:

Masa akhir:_____
Time completed:

Kediaman Residence		Kediaman/cuti Residence/ holiday	Cara datang Mode of transport	Jumlah dalam kumpulan Number in group
Bandar Town	Daerah District	kod/code k: kediaman residence c: cuti holiday	kod/code: 1 kereta/van car/van 2 motorsikal motorcycle 3 basikal bicycle 4 bas awam public bus 5 bas sewa khas chartered bus 6 berjalan walk 7 Teksi Taxi	

Appendix 4

UNIVERSITY PERTANIAN MALAYSIA
FAKULTI PERHUTANAN

SURVEI PENGGUNAAN HUTAN REKREASI
FOREST RECREATION USE SURVEY

CATITAN PENEMUBUAL
INTERVIEWER'S RECORD

Nama Penemubual
Name of interviewer .....

Kawasan temubual
Interview area .....

Tarikh
Date .....

Masa mula temubual
Time begin of interview .....

Masa akhir temubual
Time end of interview .....

Cuaca
Weather

a. Hujan
Rainy

b. Mendung
Cloudy

c. Kering
Dry

d. Hujan rintik-rintik
Drizzle

Hasil temubual
(Pangkah 'x' nombor yang berkenaan)
Result of interview
(Cross 'x' the number that applied)

1. Selesai
Completed

2. Tidak sempurna
Incompleted

3. Menolak (Isi jumlah sebelum ini)
Refusal (write the number before this)

Beri salam. Nama saya ..... . Universiti Pertanian Malaysia sedang menjalankan suatu survei mengenai pelawat-pelawat ke hutan rekreasi. Bolehkah saudara yang menjadi ketua kumpulan ini menjawab beberapa soalan? Kami berjanji bahawa maklumat yang diberi semasa temubual ini akan dirahsiakan dan akan hanya digunakan untuk tujuan kajian ini. Saudara tidak diperlukan memberi nama dan alamat saudara didalam temubual ini!

INGATAN PADA PENEMUBUAL

1. Baca soalan mengikut aturan yang telah disediakan.
2. Pangkah jawapan mengikut nombor yang disediakan ataupun isikan jawapan di tempat yang telah tersedia.
3. Jangan cuba memberi pendapat sendiri terhadap jawapan seseorang yang sedang ditemubual, kecuali bagi soalan yang berkenaan sahaja.
4. Pastikan semua soalan telah dijawab.

Give greetings! My name is ..... The Agriculture University is conducting a survey on the visitors to forest recreation areas. Can you please answer some questions? All answers will be treated with strict confidence and will be used only for this reasearch project. You don't even have to give your name or address during this interview.

REMINDERS TO INTERVIEWERS

1. Read the questions accordingly.
2. Record the answers following the numbers indicated or write the answers verbatim in its correct space.
3. Do not try to give your own opinion towards any answers given by a respondent, clarification of the question is, however encourage where necessary.
4. Ensure that all question receive an answer.

BAHAGIAN 1: CIRI-CIRI PERJALANAN DAN DEMOGRAFI
PART 1: TRAVEL AND DEMOGRAPHIC CHARACTERISTICS

1.1 Bagaimanakah saudara datang ke sini?
How did you arrive here today?

a. Motorkar/Van/Jip
Car/Van/Jeep

b. Motorsikal
Motorcycle

c. Basikal
Bicycle

d. Bas awam
Public bus

e. Bas khas
Chartered/Private tour bus

f. Berjalan
Walked

g. Bas mini
Mini bus

h. Teksi
Taxi

1.2 Bolehkah saudara memberitahu saya kelas enjin kenderaan saudara
Could you tell me the engine size of your

a. Motokar/Van/Bas mini/Jip
Motorcar/Van/Mini bus/Jeep ..... c.c.

b. Motorsikal
Motorcycle ..... c.c.

1.3 Adakah saudara datang bersama
Did you come to this area

a. Keluarga bersama anak-anak sendiri
As a single family with children

b. Keluarga tanpa anak-anak sendiri
As a single family with no children

c. Dua atau lebih daripada dua keluarga
With two or more families

d. Keluarga bersama saudara mara
With families plus friends and relatives

e. Kawan atau kawan-kawan
With friend (s)

f. Kumpulan (sperti kumpulan sekolah, pandu putri, kelab dll)
With an organised group (school party, club, scouts etc)

g. Bersendirian
Alone

1.4 Jumlah orang dewasa dalam kumpulan:
Number of adults in your party: .....

1.5 Jumlah kanak-kanak dalam kumpulan: (di bawah umur 15 tahun)
Number of children in your party: (under 15 years old) .....

1.6 Adakah saudara datang ke sini dari rumah sendiri?
Did you come from your home today?

a. Ya
Yes ---------- (KE SOALAN 1.13)
(GO TO Q. 1.13)

b. Tidak
No ---------- (KE SOALAN 1.7)
(GO TO Q. 1.7)

1.7 Adakah saudara sedang bercuti daripada tempat asal sebelum datang ke sini?
Are you on holiday away from your home before you come here today?

a. Ya
Yes ---------- (KE SOALAN 1.8 - 1.11)
(GO TO Q. 1.8 - 1.11)

b. Tidak
No ---------- (KE SOALAN 1.12)
(GO TO Q. 1.12)

1.8 Jikalau ya, dimanakah tempat tinggal biasa saudara?
If yes, where is your home?

a. Bandar:
Town: .....

b. Daerah:
District: .....

1.9 Berapa jauhkah rumah saudara daripada tempat bercuti saudara?
How far is your home from the holiday base?

batu
..... miles

1.10 Di manakah saudara tinggal semasa bercuti di kawasan ini?
Where were you staying while on holiday in this state?

a. Hotel
Hotel

b. Rumah rehat kerajaan
Goverment's rest house

c. Rumah saudara/kawan
Friend's / Relative's house

d. Berkhemah
Camping

e. Lain-lain (nyatakan)
Others (please state) .....

1.11 Bolehkah saudara beritahu saya bayaran sehari tempat tinggal saudara semasa cuti ini?
Would you mind telling me how much you spend on your accomodation per day?

$ ..... (KE SOALAN 1.13)
(GO TO Q. 1.13)

1.12 Jika tidak, dari mana saudara bertolak untuk datang ke sini hari ini?
If no, where did you set out from today?

a. Bandar:
Town: .....
b. Daerah:
District: .....

1.13 Berapa jauhkah jarak di antara tempat saudara bertolak dengan tempat ini? (satu arah saja)
What is the distance from where you started off today to this area? (one way)

batu
..... miles

1.14 Adakah saudara bersinggah di mana-mana semasa perjalanan ke mari?
Did you stop anywhere while on the way to this area today?

a. Ya
Yes ---------- (KE SOALAN 1.15 - 1.17)
(GO TO Q. 1.15 - 1.17)
b. Tidak
No ---------- (KE SOALAN 1.18)
(GO TO Q. 1.18)

1.15 Jikalau ya, nyatakan tempat persinggahan
If yes, place of stop

a. Bandar
Town

b. Stesyen
Stations

c. Kawasan rekreasi
Recreation area

d. Rumah kawan/saudara
Relative's/friend place

e. Lain-lain (nyatakan)
Others (please state) .....

1.16 Tempoh bersinggah
Length of stop

..... jam ..... minit
hours mins

1.17 Sebab bersinggah
Reason of stop

a. Untuk berehat
To rest

b. Untuk rekreasi
To recreate

c. Untuk membeli-belah
To shop

d. Lain-lain (nyatakan)
Others (please state) .....

1.18 Adakah saudara akan bersinggah di mana-mana semasa perjalanan pulang nanti?
Will you be stopping anywhere else on the way home from this area today?

a. Ya
Yes ---------- (KE SOALAN 1.19 - 1.21)
(GO TO Q. 1.19 - 1.21)

b. Tidak
No ---------- (KE SOALAN 1.22)
(GO TO Q. 1.22)

1.19 Jikalau ya, apakah jenis tempat persinggahan itu?
If yes, place of stop

a. Bandar
Town

b. Stesyen
Stations

c. Kawasan rekreasi
Recreation area

d. Rumah kawan/saudara
Friend's/relative's place

e. Lain-lain (nyatakan)
Others (please state) .....

1.20 Tempoh bersinggah
Length of stop

..... jam ..... minit
hours mins

1.21 Sebab bersinggah
Reason of stop

a. Mematah perjalanan pulang
On transit

b. Untuk membeli-belah
To shop

c. Lain-lain (nyatakan)
Others (please state) .....

1.22 Berapa lamakah tempoh perjalanan saudara ke sini dari tempat bertolak? (satu arah)
How long did it take you to travel to this area from where you started out today? (one way)

Masa: ..... jam ..... minit
Time: hrs mins

1.23 Berapakah agaknya perbelanjaan yang digunakan untuk perjalanan ke sini?
How much money did you think you spend on the mode of transport during the journey to this area?

a. Minyak $
Petrol $ .....

b. Tambang bas $
Public bus fare $ .....

c. Tambang bas khas $
Chartered bus fare $ .....

d. Tambang teksi $
Taxi fare $ .....

e. Tidak tahu
Don't know

1.24 Apa anggapan saudara, semasa perjalanan ke sini, adakah ianya (tunjukkan kad)
Did you find your journey to this area (show card)

1. Paling membosankan
   Very boring

2. Membosankan
   Boring

3. Tidak membosankan tetapi tidak juga menyeronokkan
   Neither particularly interesting nor particularly boring

4. Menyeronokkan
   Interesting

5. Paling menyeronokkan
   Very interesting

1.25 Pada anggapan saudara, jarak perjalanan di antara tempat tinggal saudara dengan kawasan ini adalah (tunjukkan kad)
In your opinion the travel to this area is (show card)

1. Terlampau jauh
   Too far

2. Jauh
   Far

3. Berpatutan
   Just alright

4. Dekat
   Near

5. Terlampau dekat
   Too near

1.26 Pada anggapan saudara, kemudahan jalan raya dari rumah saudara ke kawasan ini adalah (tunjukkan kad)
In your opinion the accessibility to this area is (show card)

1. Sangat tidak memuaskan
   Very poor

2. Tidak memuaskan
   Poor

3. Sederhana
   Satisfactory

4. Memuaskan
   Good

5. Sangat memuaskan
   Very good

1.27 Adakah ini lawatan saudara yang pertama ke sini tahun ini?
Is this your first visit to this area this year?

a. Ya
   Yes ---------- (KE SOALAN 1.29)
   (GO TO Q. 1.29)
b. Tidak
   No ---------- (KE SOALAN 1.28)
   (GO TO Q. 1.28)

1.28 Jikalau tidak, pada tahun ini, berapa jumlah lawatan saudara ke sini terdahulu daripada lawatan ini?
If no, how many times have you visited this area this year?

..... kali
times

1.29 Adakah saudara pernah melawat kawasan ini pada tahun lepas?
Did you visit this area last year?

a. Ya
   Yes ---------- (KE SOALAN 1.30)
   (GO TO Q. 1.30)
b. Tidak
   No ---------- (KE SOALAN 1.31 - 1.35)
   (GO TO Q. 1.31 - 1.35)

1.30 Jikalau ya, berapa kali saudara pernah melawat ke kawasan ini pada tahun lepas?
If yes, how many times did you visit last year?

..... kali
times

1.31 Sekiranya harga minyak atau tambang naik, adakah ianya akan menjejas jumlah lawatan saudara ke tempat-tempat seperti ini?
If there is an increased in petrol cost or public transportation fares will it affect the number of trip you make?

a. Ya
   Yes ---------- (KE SOALAN 1.32)
   (GO TO Q. 1.32)

b. Tidak
   No ---------- (KE SOALAN 1.33)
   (GO TO Q. 1.33)

1.32 Jika ya, adakah lawatan saudara akan
If yes, will your visit be

a. Lebih
Increased

b. Kurang
Less

c. Seperti biasa
As usual

1.33 Jika kos perjalanan meningkat dua kali ganda berbanding dengan tingkat gaji, adakah saudara masih akan membuat jumlah lawatan yang sama ke sini?
If travel cost doubled in relation to wages, would you still make the same number of trips?

a. Ya
Yes

b. Tidak
No

1.34 Jika tempat ini lebih jauh daripada tempat kediaman saudara adakah ia akan menjejas jumlah lawatan saudara ke sini?
If travel distance is increased, would this make any change to the number of trips you would make?

a. Ya
Yes ---------- (KE SOALAN 1.35)
(GO TO Q. 1.35)

b. Tidak
No ---------- (KE SOALAN 2.1)
(GO TO Q. 2.1)

1.35 Jika ya, adakah lawatan saudara akan
If yes, will your visit be

a. Lebih
Increased

b. Kurang
Less

c. Seperti biasa
As usual

BAHAGIAN 2: PENGLIBATAN/KECENDERUNGAN AKTIVITI DAN GAMBARAN KAWASAN
PART 2: ACTIVITIES PARTICIPATION/PREFERENCE AND AREA DESCRIPTION

Terdapat beberapa hutan rekreasi di Selangor, Negeri Sembilan dan Wilayah Persekutuan, tetapi anda memilih untuk melawat kawasan ini. Saya ingin mendapatkan pandangan anda terhadap beberapa kemudahan di kawasan ini untuk dibandingkan dengan kemudahan di kawasan lain.

There are several forest recreation areas in Selangor, Negeri Sembilan and Wilayah Persekutuan, but you chose to visit this area. I would like your opinion on several aspects of the facilities provided and the condition of the area so as to enable me to make comparison with other areas of similar type.

2.1 Apakah tujuan saudara melawat kawasan ini hari ini?
(Sebutkan tujuan yang terutama sekali dan disusuli dengan tujuan-tujuan seterusnya mengikut taraf keutamaan 1 hingga 3)
What is your purpose of visiting this area today?
(Rank in order of priority, from 1 to 3 only)

Susunan tujuan
Ranking of reasons

a. Berehat
Resting

b. Berhenti sekejap dalam perjalanan ke tempat lain
Stop over on the way

c. Untuk melarikan diri daripada Kesibukan kehidupan bandar
To escape the city life

d. Untuk menikmati kemudahan yang disediakan
To enjoy the facilities provided here

e. Bercuti
On holiday

f. Untuk menikmati keindahan alam semulajadi
To enjoy the scenic beauty

g. Bersiar-siar
Sightseeing

h. Suka melawat tempat baru dan bergaul dengan orang ramai
Get to know a new place and people

i. Lain-lain (nyatakan)
Others (please state) .....

2.2 Apakah kegiatan-kegiatan rekreasi yang anda telah libatkan diri semasa berada di kawasan ini?
(Untuk penemubual - 1 untuk kegiatan yang dijalankan dan 0 jika tidak)
What have you participated in while you were here today?

2.3 Daripada senarai kegiatan-kegiatan rekreasi yang ditunjukkan nyatakan lima kegiatan yang anda cenderung sekali mengambil bahagian, jikalau diberi segala peluang untuk berbuat demikian. (Sila pilih yang saudara cenderung sekali sebagai '1' dan seterusnya hinnga '5'). (Tunjukkan kad)
From the list of activities below, indicate which five (5) activities you would most likely prefer to participate, given all the chance to do so. (Please put '1' for the activity prefer most, '2' for the next, till to fifth with number '5'). (show card)

a. Berkelah
Picnicking

b. Memburu
Hunting

c. Memerhati burung
Bird watching

d. Memancing ikan
Bank fishing

e. Berehat-rehat
Relaxing

f. Mengambil gambar
Photography

g. Berenang/mandi
Swimming/bathing

h. Berkhemah
Camping

i. Berjalan kaki ke tempat yang menarik
Walking to scenic points

j. Memerhati atau mengumpul tumbuh-tumbuhan, logam dll.
Looking at or collecting plants, mineral etc.

k. Bermain permainan yang tak formal (seperti bermain bola dengan anak, terup dll)
Informal games (like playing a ball with children and cards, etc)

l. Menjelajah ke dalam hutan
Hiking

m. Memanjat bukit atau gunung
Hill climbing

n. Menikmati keindahan alam semulajadi
Sit and enjoy the view

o. Lain-lain (nyatakan)
Others (please state) .....

2.4 Apakah pendapat saudara mengenai kemudahan yang disediakan di kawasan ini? (Tunjukkan kad)
What is your opinion on the facilities provided in this area? (Show card)

	Sangat tidak memuaskan Very poor	Tidak memuaskan Poor	Memuaskan Satis-factory	Bagus Good	Tidak tahu Don't Know
a. Jamban/ Bilik air Toilets	1	2	3	4	9
b. Kemudahan meletak kenderaan Parking facilities	1	2	3	4	9
c. Perkhidmatan peta kawasan dan maklumat kawasan Map and area information service	1	2	3	4	9
d. Kawasan perkhemahan Camping sites	1	2	3	4	9
e. Lorong jalan kaki di dalam kawasan hutan rekreasi Forest trails	1	2	3	4	9
f. Jalan masuk ke kawasan rekreasi Road entering recreation area	1	2	3	4	9
g. Tempat membuang sampah Litter bins	1	2	3	4	9

h. Pondok persinggahan kerusi/meja berkelah
Shelter huts/ tables/benches for picnicking 1 2 3 4 9

i. Kawasan berenang/mandi
Swimming and bathing spots 1 2 3 4 9

j. Lain-lain (nyatakan)
Others
(Please state) .....

2.5 Apakah pendapat saudara mengenai jumlah pelawat yang berada di kawasan ini? (Tunjukkan kad) hari ini
What do you think of the number of people visiting this area today? (Show card)

1. Terlalu ramai
   Too many

2. Ramai
   Many

3. Sedang elok
   About right

4. Tidak ramai
   Few

5. Terlalu sedikit
   Too few

2.6 Dari segi kesesakan, pada pandangan saudara adakah tempat ini (tunjukkan kad)
How would describe the level of congestion at this area (show card)

1. Terlalu sesak
   Packed

2. Sesak
   Crowded

3. Tidak sesak
   Comfortable

4. Lengang
   Deserted

5. Terlalu lengang
   Too deserted

2.7 Pada keseluruhannya adakah saudara berpuas hati terhadap lawatan saudara hari ini? (Tunjukkan kad)
How would you describe your visit here today? (Show card)

1. Paling tidak memuaskan
   Very poor

2. Tidak memuaskan
   Poor

3. Seperti biasa saja
   Ordinary

4. Bagus
   Good

5. Sangat memuaskan
   Excellent

2.8 Berapa lamakah saudara berada di sini?
How long did you stay?

..... jam
hrs

2.9 Mengapakah saudara memilih untuk melawat kawasan ini hari ini? (Susunan mengikut keutamaan - tunjukkan kad)
Why did you choose to visit this recreation area today? (Rank in order of priority - show card)

a. Kawasan terdekat sekali untuk dikunjungi.
   Closest place to visit.

b. Tidak tahu kawasan lain.
   Do not know other areas.

c. Tidak menggunakan perbelanjaan banyak.
   Cheapest place to visit.

d. Kemudahan di sini memuaskan hati.
   Satisfactory facilities available here.

e. Ada kemudahan bas awam dan senang datang.
   Good public transportation and easy to come here.

f. Datang secara kebetulan saja.
   I came here by chance.

g. Tempat ini sudah terkenal.
This is a well known place.

h. Saya memiliki kenderaan sendiri.
I own a car.

BAHAGIAN 3: KESAN ADANYA KAWASAN LAIN
PART 3: EFFECTS OF SUBSTITUTE AREAS

3.1 Pernahkah saudara mengunjungi kawasan hutan rekreasi lain di Selangor, Negeri Sembilan atau Pahang?
Have you ever visited other forest recreation areas within Selangor, Negeri Sembilan or Pahang?

a. Ya
Yes

b. Tidak
No

3.2 Kalau ya, di mana?
If yes, where?

a. Taman Rimba Templer
Templer Park

b. Kancing
Kancing

c. Bukit Belacan
Bukit Belacan

d. Sungai Lallang
Sungai Lallang

e. Lain-lain (nyatakan)
Others (please state) .....

Arahan kepada penemubual

Kalau Ya, diminta menjawab soalan No. 3.3 ke No. 3.12.
Kalau Tidak, diminta menjawab soalan No 4.1 dan seterusnya.

If Yes, please answer question No. 3.3 to 3.12
If No, please answer question No. 4.1 onwards.

3.3 Pada anggapan saudara jarak perjalanan dari tempat kediaman saudara ke ..... (rujuk kepada jawapan yang telah diberi pada soalan 3.2, pilih satu sahaja tempat yang telah dilawati. Tunjukkan kad) adalah

In your opinion, the travel from your home to ..... (from answer given above, ask respondent to choose only one if they visited more than one place. Show card) is

1. Terlalu jauh
   Too far

2. Jauh
   Far

3. Sederhana sahaja
   Just alright

4. Dekat
   Near

5. Tersangat dekat
   Too near

3.4 Apakah anggapan saudara terhadap kemudahan yang disediakan di kawasan itu (tunjukkan kad)
What is your opinion on the facilities provided in that area (show card)

	Sangat tidak memuaskan Very poor	Tidak memuaskan Poor	Memuaskan Satis-factory	Bagus Good	Tidak tahu Don't Know
a. Jamban/ Bilik air Toilets	1	2	3	4	9
b. Kemudahan meletak kenderaan Parking facilities	1	2	3	4	9
c. Perkhidmatan peta kawasan dan maklumat kawasan Map and area information service	1	2	3	4	9
d. Kawasan perkhemahan Camping sites	1	2	3	4	9

e. Lorong jalan kaki di dalam kawasan hutan rekreasi Forest trails	1	2	3	4	9
f. Jalan masuk ke kawasan rekreasi Road entering recreation area	1	2	3	4	9
g. Tempat membuang sampah Litter bins	1	2	3	4	9
h. Pondok persinggahan kerusi/meja berkelah Shelter huts/ table/benches for picnicking	1	2	3	4	9
i. Kawasan berenang/mandi Swimming and bathing spots	1	2	3	4	9

j. Lain-lain (nyatakan)
Others
(Please state) .....

3.5 Pada anggapan saudara, semasa perjalanan ke situ, saudara merasa (tunjukkan kad)
Did you find your journey to that area (show card)

1. Paling membosankan
   Very boring

2. Membosankan
   Boring

3. Tidak membosankan tetapi tidak juga menyeronokkan
   Neither particularly interesting nor particularly boring

4. Menyeronokkan
   Interesting

5. Paling menyeronokkan
   Very interesting

3.6 Pada anggapan saudara kemudahan jalan raya daripada rumah saudara ke kawasan tersebut adalah (tunjukkan kad)
In your opinion the accessibility to that area is (show card)

1. Sangat tidak memuaskan
   Very poor

2. Tidak memuaskan
   Poor

3. Sedang elok
   Alright

4. Memuaskan
   Good

5. Sangat memuaskan
   Very good

3.7 Apakah pendapat saudara mengenai jumlah pelawat yang berada di kawasan tersebut semasa saudara di sana waktu itu?
What do you think of the number of people visiting that area at the time you were there? (Show card)

1. Terlalu ramai
   Too many

2. Ramai
   Many

3. Sedang elok
   About right

4. Tidak ramai
   Few

5. Terlalu sedikit
   Too few

3.8 Dari segi kesesakan, pada pandangan saudara adakah tempat tersebut (tunjukkan kad)
How would describe the level of congestion at that area then (show card)

1. Terlalu sesak
   Packed

2. Sesak
   Crowded

3. Tidak sesak
   Comfortable

4. Lengang
   Deserted

5. Terlalu lengang
   Too deserted

3.9 Pada keseluruhannya, adakah saudara berpuas hati terhadap lawatan saudara ke tempat tersebut? (Tunjukkan kad)
How would you describe your visit to that area? (Show card)

1. Paling tidak memuaskan
   Most unsatisfactory

2. Tidak memuaskan
   Unsatisfactory

3. Seperti biasa saja
   Ordinary

4. Bagus
   Good

5. Sangat memuaskan
   Excellent

3.10 Apakah yang istimewa yang terdapat di tempat tersebut yang tidak terdapat di kawasan ini?
What is so special about that area that cannot be seen in this area?

3.11 Apakah yang menarik mengenai tempat ini yang tidak terdapat di tempat itu?
What is so interesting in this area that is not present in the other area?

3.12 Mengapakah saudara membuat keputusan untuk datang ke sini hari ini dan tidak ke sana?
What make you decide to come here instead of going to the other area

BAHAGIAN 4: CIRI-CIRI SOSIO EKONOMI
PART 4: SOCIO-ECONOMIC CHARACTERISTICS

4.1 Di manakah tempat kediaman saudara?
Where is your home, please?

a. Bandar:
Town: .....

b. Daerah:
District: .....

4.2 Sila nyatakan di kategori mana letaknya umur saudara
Please indicate which of the following age categories you are in

Umur (tahun) Age (years)	a. Lelaki Male	b. Perempuan Female
a. 15 - 24		
b. 25 - 44		
c. 45 - 65		
d. Melebihi 65 Over 65		

4.3 Berapa ramaikah anggota kumpulan saudara, termasuk saudara sendiri mengikut jantina dan kategori yang tersebut di bawah ini?
How many people in the party, including yourself, are in each of the following sex and age categories?

Umur (tahun) Age (years)	a. Lelaki Male	b. Perempuan Female
a. Di bawah 5 tahun Less than 5 years		
b. 5 - 14		
c. 15 - 24		
d. 25 - 44		
e. 45 - 65		
f. Melebihi 65 Over 65		

4.4 Bolehkah saya tahu taraf perkahwinan saudara?
Can we know your marital status?

a. Sudah berkahwin
Married

b. Masih bujang
Single

c. Sudah bercerai/berpisah
Divorced/separated

d. Janda/Duda
Widowed

4.5 Bangsa (dicatitkan oleh penemubual)
Ethnic group (to be filled by interviewer)

a. Melayu
Malay

b. Cina
Chinese

c. India
Indian

d. Lain-lain
Others

4.6 Apakah tingkat tertinggi persekolahan saudara?
What is the highest level of education you have attained?

a. Belajar sendiri
Self-taught

b. Sekolah rendah
Primary school

c. Sekolah menengah rendah
Lower secondary school

d. Sekolah menengah atas
Upper secondary school

e. Kolej/Institut/Politeknik
College/Instituto/Polytechnic

f. University

4.7 Adakah saudara
Are you

a. Bekerja dengan kerajaan
Government-employed

b. Bekerja sendiri
Self-employed

c. Bekerja dengan pihak swasta
Employed in the private sector

d. Telah pencen
Retired

e. Suri rumahtangga
A housewife

f. Seorang penuntut (a - e :
A student KE SOALAN 4.8 - 4.10)
(GO TO Q. 4.8 - 4.10)

g. Tidak ada kerja (f dan g :
Unemployed KE SOALAN 4.11 DAN 4.12)
(GO TO Q. 4.11 AND 4.12)

4.8 Boleh saya tahu jenis pekerjaan utama saudara? (Tunjukkan kad)
Can I know your main occupation? (Show card)

a. Professional, teknikal dan pekerja-pekerja yang berkaitan.
Professional, technical and related works.

b. Pentadbiran, eksekutif dan pengurusan.
Administrative, executive and management.

c. Kerja perkeranian.
Clerical work.

d. Kerja perkhidmatan.
Service work.

e. Pekerjaan pengeluaran dan kerja yang berkaitan.
Production and related works.

f. Kerja penjualan.
Sales work.

g. Kerja operasi alat-alat pengangkutan dan kerja tangan.
Transport equipment operators and manual works

h. Pemborong, penjual runcit dan kerja berkaitan.
Wholesale, retail and related work.

i. Suri rumahtangga.
Housewife.

4.9 Berapakah lamakah saudara telah menjalankan pekerjaan itu?
How long have you had held this job?

..... tahun
years

4.10 Bolehkah saudara beritahu saya pendapatan kasar sebulan seisi keluarga anda (tunjukkan kad kumpulan gaji)
Can you please tell me the take-home pay per month of yourself and others in the family (show range card)

	a. Pekerjaan utama Primary job	b. Pekerjaan sambilan Part-time job
a. Responden Respondent		
b. Isteri Wife		
c. Anak Children		
d. Lain-lain anggota keluarga (yang tinggal bersama) ..... Other member of family (staying with respondent)		

4.11 Sekiranya saudara tidak datang melawat kawasan ini apakah aktiviti lain yang saudara mungkin lakukan?
If you decide not to come here, what would you do instead?

a. Menjalankan perkerjaan rumahtangga
Will carry out housework

b. Menjalankan pekerjaan sambilan
Will carry out part-time job

c. Melawat kawasan rekreasi lain
Will visit other recreation areas

d. Berehat di rumah saja
Will rest at home

e. Tidak tahu/tidak begitu pasti apa yang akan dilakukan
Don't know/not sure

4.12 Berapa banyakkah saudara belanja untuk makan/minum dan untuk kemudahan rekreasi pada kali ini (tidak termasuk bayaran untuk perjalanan dan penginapan)?
How much have you spent on food/drink and other needs to recreate in this area today (not including the cost of travel and accommodation)?

a. $.....

b. Tidak tahu
Don't know

Sekian, terimakasih di atas kerjasama anda!
Thank you very much for your help!

Appendix 5

ANSWER FORM.

FOREST RECREATION USE SURVEY.
SURVEI PENGGUNAAN HUTAN REKREASI.

Nama Penemubual ..... Name of interviewer	Cuaca Wheather condition	Hasil temubual Result of interview
Kawasan temubual ..... Area of interview	Masa mula ..... Time started	Menolak Refusal
Tarikh ..... Date		Sebelum ini .....
	Masa akhir	Number of refusals before this

BAHAGIAN I
SECTION I

1.1		1.19	dll ..... others
1.2	a. ..... c.c. b. ..... c.c.	1.20	..... minit/jam minutes/hours
1.3		1.21	dll ..... others
1.4	..... orang people	1.22	..... jam ..... minit hrs. mins.
1.5	..... orang people	1.23	$ .....
1.6		1.24	
1.7		1.25	
1.8	a. ..... b.	1.26	
1.9	..... batu/km miles/km	1.27	
1.10		1.28	..... kali (times)
1.11	$	1.29	
1.12	a. ..... b.	1.30	..... kali (times)

1.13	..... batu/km miles/km	1.31	
1.14		1.32	
1.15	dll ..... Others	1.33	
1.16	..... minit/jam minutes/hours	1.34	
1.77	dll ..... Others	1.35	
1.18			

BAHAGIAN 2
SECTION 2

2.1	
2.2	---------- ---------- dll ..... others
2.3	-------- -------- -------- -------- -------- -------- -------- -------- -------- -------- dll ..... others
2.4	---------- ---------- ---------- dll ..... others
2.5	
2.6	
2.7	
2.8	..... jam (hour)
2.9	-------- -------- -------- -------- -------- -------- -------- -------- -------- -------- dll ..... others

BAHAGIAN 3
SECTION 3

3.1	
3.2	dll ..... others
3.3	
3.4	dll ..... others
3.5	
3.6	
3.7	
3.8	
3.9	
3.10	
3.11	
3.12	

BAHAGIAN 4
SECTION 4

4.1 a. .....
b. .....

4.2

4.3

/j	Lelaki Male	Perempuan Female
a		
b		
c		
d		
e		
f		

4.4

4.5

4.6

4.7

4.8

4.9 ..... tahun (years)

4.10

	Utama Primary	Sambilan Secondary
a		
b		
c		
d		

4.11

4.12

M$ .....

Appendix 6

Visitor Population Data

	The Survey			1982 Population Census	
	Sungai Lalang	Ampang	Kancing	All Three Areas	The Region
	(Figures in %)				
Sex					
Male	81.72	81.03	88.68	84.55	50.60
Female	18.28	18.97	11.32	15.45	49.40
Marital status					
Single	69.89	51.15	75.00	34.24	40.88
Married	30.11	48.85	24.06	65.34	53.61
Divorced/ separated	0	0	0.47	0.21	0.73
Widowed	0	0	0.47	0.21	4.78
Ethnic group					
Malay	88.17	95.40	81.13	87.68	39.75
Chinese	8.60	2.87	9.91	7.10	43.54
Indian	3.23	1.72	7.08	4.38	16.00
Others	0	0	1.89	0.84	0.70
Age (years)					
15 - 24	59.14	48.85	66.98	58.87	36.94
25 - 44	37.63	44.25	31.60	37.37	43.22
45 - 65	2.23	6.90	1.42	3.76	15.13
Over 65	0	0	0	0	4.71
Education level					
Self-taught	0	0.57	0.94	0.63	15.57
Primary school	4.30	6.90	4.72	5.43	35.47
Secondary school	69.90	82.18	76.42	77.24	44.17
Higher educational institutions	25.80	10.34	17.92	16.70	4.79

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Visitor Population Data

	The Survey			1982 Population Cencus	
	Sungai Lalang	Ampang	Kancing	All Three Areas	The Region
	(Figures in %)				
Employment type					
Government sector employed	41.94	31.61	25.47	30.90	NA
Self-employed	7.53	14.37	8.02	10.23	NA
Private sector employed	18.28	31.61	35.85	30.90	NA
Retired	1.08	1.72	0.47	1.04	NA
Housework	3.23	1.72	0.47	1.46	NA
Student	24.73	13.22	27.36	21.71	NA
Unemployed	3.23	5.75	2.36	3.76	NA
Socio-economic group					
Professional and technical	26.87	10.49	14.67	15.28	5.10
Administrative ,executive and management	13.43	9.09	12.00	11.11	1.19
Clerical	11.94	21.68	17.33	18.06	8.50
Service	17.91	21.68	24.67	22.22	8.32
Production	5.97	11.19	16.67	12.50	20.14
Sales	10.45	13.99	8.00	10.83	3.47
Transport equipment operators and manual work	2.99	4.90	3.33	3.89	4.97
Wholesale and retail	5.97	3.50	2.67	3.61	2.14
Housewife and no answers	4.48	3:50	0.67	2.50	47.76

con't Appendix 6

Visitor Population Data

Income group (total family income in M$)	The Survey			1982 Population Cencus	
	Sungai Lalang	Ampang	Kancing	All Three Areas	The Region
	(Figures in %)				
Less than 399	11.94	11.97	14.77	12.56	NA
400 - 599	22.39	26.06	30.87	27.37	NA
600 - 799	8.96	11.97	12.08	11.45	NA
800 - 999	10.45	12.68	12.08	12.01	NA
1000 - 1499	25.37	19.01	14.09	18.16	NA
1500 - 2999	17.91	12.68	10.74	12.85	NA
Over 3000	2.99	5.63	5.37	5.03	NA

NA - Not Available

Appendix 7

Zonal Population and Number of Observed Visits

Ampang

Zone	Population (Pz)	Observed Visits (Vz)
1	231632	45
2	468336	15
3	388474	6
4	380406	21
5	977102	75

Kancing

1	335526	17
2	294827	12
3	79619	24
4	36526	15
5	21939	9
6	35425	3
7	284580	12
8	110548	4
9	191948	12
10	77910	12
11	977102	74

Sungai Lalang

1	47134	2
2	7624	2
3	98634	6
4	45795	33
5	16293	9
6	14591	2
7	1561	4
8	468336	2
9	284580	1
10	103894	3
11	380406	5
12	977102	14

Appendix 8

The Exponential Demand Specification

(from Cesario and Knetsch, 1976)

They hypothesised the following visitation equation :

$$V_{ij} = \left[g\ X_i\ K_i^{(a+1)} \right] \left[\frac{Y_j \exp\ (dc_{ij})}{K_i} \right] \qquad (1)$$

where

$$K_i = \sum_{k=1}^{m} Y_k \exp\ (dc_{ik})$$

and V_{ij} is the number of visits per unit time made to site j from population centre i; X_i is a measure of the combined effects on recreation trip making of characteristics of population centre i, such as population size and median income; Y_j is a measure of the combined effects on recreation trips making of characteristics of recreation site j, such as land and water acreage and car-parking spaces; and C_{ij} is the generalised cost of travel from i to j; g, a and d are parameters. Cesario and Knetsch describe K_i as a 'competing opportunities' or 'accessibility' term.

In the visitation equation above there are two distinct components. The first term in square brackets represents a trip generation component with the number of recreation trips as a function of origin characteristics and accessibility. Examination of the K_i term shows that it is assumed that an increase in available sites will have a positive generation effect provided a is greater than -1. No restraint is placed on the parameter value a, but the range $-1 < a < 0$ will also give the effect of a diminishing marginal effect of accessibility on recreation trip making, and

is expected a priori by Cesario and Knetsch. The second term in square brackets represents a trip distribution component and is the probability that a trip from centre i will go to site j, and this is given by the ratio of accessibility of j to the total accessibility of all sites.

Not only does this equation have a positive generation effect, but it also has the desirable feature that recreation sites are imperfect substitutes with negative cross-price elasticities, and thus, can cope sensibly with the introduction of new sites. A new site, n, increases accessibility by $Y_n \exp(dc_{in})$ and the increase in the size of the first term will show new visits to the recreation site (generated visits), and the decrease in shares at existing sites caused by the increase in K_i in the distribution component will represent diverted trips.

The above ideas were applied to visit data collected by on-site surveys at eighty-four state parks in Pennsylvania, parts of New York and New Jersey, and amounted to a test area of twenty-three contiguous counties and thirty-eight recreation sites. The precise models specification tested was :

$$V_{ij} = b_0 P_k^{b1} A_j^{b2} \exp(b_3 C_{ij}) \sum_{k \neq i}^{n} A_k^{b2} \exp(b_3 C_{ik})^{b4} + E_{ij} \qquad (2)$$

where

V_{ij} = number of trips per season made from county i to park j

P_i = population of county i

A_j = attractiveness of park j

C_{ij} = generalised cost of travel from i to j (specified in two different ways)

E_{ij} = error term

$(b_0, ..., b_4)$ = parameters, in the above, b_3 and b_4 correspond to d and a in model (1)

The parameters were estimated using the Marquadt 'compromise' procedure which searches for the minimum using a least-squares criterion. This was necessary because there was no simple transformation of the above model because it was non-linear in parameters. The signs and magnitudes of all the parameters were plausible, and for a multiplicative model of the travel cost variable gave $b_3 = -0.944$ and $b_4 = -0.575$. Especially encouraging was the fact that this model succeeded in explaining 87 per cent of the variance in visits, which was impressive at this level of aggregation.