MICHIGAN STATE UNIVERSITY LIBRARIES
3 1293 01024 0012

THESIS
2

This is to certify that the

thesis entitled

Recreational Expenditures in Gede Pangrango National Park and Their Regional Economic Impacts

presented by

Adi Susmianto

has been accepted towards fulfillment
of the requirements for

Masters degree in **Forestry**

Larry A. Leefers
Major professor

Date **January 4, 1995**

O-7639

MSU is an Affirmative Action/Equal Opportunity Institution

LIBRARY
Michigan State
University

REMOTE STORAGE RSF

PLACE IN RETURN BOX to remove this checkout from your record.
TO AVOID FINES return on or before date due.

DATE DUE	DATE DUE	DATE DUE
MAR 2 4 2018		

2/17 20# Blue FORMS/DateDueForms_2017.indd - pg 5

RECREATIONAL EXPENDITURES IN GEDE PANGRANGO NATIONAL PARK AND THEIR REGIONAL ECONOMIC IMPACTS

By

Adi Susmianto

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Forestry

1995

ABSTRACT

RECREATIONAL EXPENDITURES IN GEDE PANGRANGO NATIONAL PARK AND THEIR REGIONAL ECONOMIC IMPACTS

By

Adi Susmianto

Recreational economic impacts of the Gede Pangrango National Park (GPNP) have been recognized, but not quantified. An analytical framework and related data are needed to estimate the impacts. To accomplish this, an input-output model was explored for analyzing the impacts. A non-survey technique, the simple location quotient (SLQ), was used to regionalize Indonesia's 1990 66-sector input-output model for estimating the regional output multipliers (Type I multipliers). On-site interviews were conducted in early 1994 to collect primary data for twenty-eight trip-related spending categories. Then, eight domestic visitor segments were developed for assessing the spending profiles and the impacts (output, income, and employment). Three districts surrounding the park, Bogor-Cianjur-Sukabumi (B-C-S), were defined as the impacted region. By segment, the estimated total average trip-related spending varied from Rp 6,889 to Rp 21,812 per person per day (U.S. $ 1.0 = Rp 2,150 in early 1994). Based on GPNP records, over 58,000 visitors came to the park between April 1, 1993 and March 30, 1994. Thirteen sectors were affected by the spending with impacts totaling Rp 470,769,881 of output or sales, Rp 80,115,334 of income, and 155 persons employed. The economic impacts were minor within the region and did not reflect the GPNP's social and ecological importance.

ACKNOWLEDGMENTS

This study was accomplished due to immense contributions of several dedicated persons. I am especially indebted to Professor Larry A. Leefers who served as my major professor and mentor throughout my years in graduate school for providing inspirations, a variety of subjects in resource economics, academic and technical guidance on research issues, and editorial assistance. He also imparted much wisdom, patience, and sacrifice on directing me in writing this study. His visit to Indonesia where I was conducting the survey expressed his wise responsibility for enabling me to do the research. Professor Daniel J. Stynes and Professor Dennis B. Propst, my committee members, deserve special acknowledgment for providing many useful materials or references associated with input-output methods and economic impact analyses. Their support, constructive criticism, and thorough correction improved the quality of this thesis. I would like to express my gratitude to all of them.

This study was also facilitated through cooperation from Wahyudi Wardojo, Gede Pangrango National Park Manager, with his subordinates. Special thanks go to my research assistants (enumerators) who worked hard in the data collection. This acknowledgment is also due Colin MacAndrews (Chief of the Indonesian Natural Resources Management Project) and Patricia S. Link (Manager of Training Programs, Institute of International Education), who provided financial support during my study in the U.S. My generous companion, Herr Soeryantono, is also deserved of this dedication for his assistance and gift of computer use.

Finally, the persons to whom I owe a great debt for making it all possible are my parents, my wife (Nina), and my daughter (Gita). To all, thanks and may God bless you.

TABLE OF CONTENTS

Page No.

TABLE OF CONTENTS (cont'd.)

Page No.

TABLE OF CONTENTS (cont'd.)

Page No.

LIST OF TABLES

Page No.

LIST OF TABLE (Cont'd.)

Page No.

INTRODUCTION

Background

Two of the purposes in the fifth Five-year Development Plan of Forestry (1989/1990-1993/1994) in Indonesia are: (1) to increase national income, employment and business opportunities including the benefits of value-added production and (2) to improve the prosperity and development of income sources for people who live within and around the forests. These purposes still strongly underlie the direction of forestry development policies addressed in its sixth Development Plan (1994/1995-1998/1999). Through the fifth plan, timber production has been and is one of the country's leading sectors providing income and generating employment. About 60 million ha (hectares) of production forests (out of 144 million ha of forest lands) have been utilized for timber production. So far, many efforts have focused on this sector rather than on the roles of non-timber resources as other valuable assets.

Recognizing that, aside from 60 million ha of production forests, the country has set aside almost 19 million ha as terrestrial parks and reserves, about 30 million ha as permanent protection forests, and another 30 million ha as designated (23 locations) and proposed (200 locations) marine conservation areas. The sixth Development Plan of Forestry tries to give higher priority to utilizing non-timber products as other alternative resources upon which, in fact, so many of the country's economic activities depend. Properly managed, these areas will be sufficient not only to protect Indonesia's biological diversity and its critical ecosystems, but also to encourage economic development (World Bank, 1994). Regarding protected areas management, one suggestion by the World Bank, for the medium term, is to accelerate national parks management and develop feasible options for income-generating activities related to the areas, such as tourism and recreation activities, in the context of ICDPs (Integrated Conservation and Development Projects).

This approach seems to be relevant recognizing that presently Indonesia has 31 designated national parks (part of 303 terrestrial conservation areas) and proposes an additional 9 national parks in the next five years. It is also relevant realizing that a large number of people, depending much on the existence of the areas, live near (or even within) park boundaries. Tourism and recreation industries might elevate local people's concerns about protected areas because local people could participate in businesses generated by the visitor's activities. Thus, the approach is in line with the initiative of ICDPs, that is, to ensure the conservation of biological diversity by reconciling the management of protected areas with the social and economic needs of local people (Wells and Brandon, 1992).

The roles of tourism and recreation in national parks in Indonesia have been recognized since the 1980s for their contributions to economic development. Tourist visitations to the parks have increased through the years. The average increment of annual visits between 1984/1985 and 1988/1989 for domestic tourists was 18%, whereas, for foreign tourists it reached an average annual increment of 47% (Ministry of Forestry of Indonesia, 1989). It is now clearly recognized that the tourism industry can generate income through expenditures brought by tourists to the areas and that these expenditures benefit local people and the region. As a result, the Ministry of Forestry of Indonesia (MFI) has tried to implement a strategy for accelerating development of national parks through establishment of concessions at 20 national parks; however, it has not been well implemented and reasons for this are unclear. The World Bank (1994) indicates that the economic benefits of tourism activities in national parks in Indonesia are difficult to assess due in part to the lack of information on their market values. This, in turn, results in difficulties for both planners and the managers in making decisions.

This study focuses on the problem of assessing economic role of a national park and its possible effects on a region due to recreationists' activities. To be specific, this study focuses on the analysis of the Gede Pangrango National Park (GPNP) located in West Java, Indonesia (see map in Appendix C, Figure 1).

The Importance of the Study Site

The GPNP, with a total area of 15,196 ha, is one of the first five national parks in Indonesia; it was designated in 1980. As a protected area, the GPNP fits in at least two management categories defined by the IUCN (International Union for Conservation of Nature and Natural Resources) in 1985: (1) strict nature reserve, and (2) national park (Wells and Brandon, 1992). These categories are based on various laws and regulations governing protected areas, and on the roles provided by the areas. In the case of the GPNP, there are at least four important roles characterized by the area (GPNP, 1994):

(1) **Biodiversity reserve.**-- The area is dominated by a mountain tropical rain forest ecosystem which is claimed as the representative in Java island. A mountain swamp ecosystem is also found in the area. The exact number of flora and fauna species is not well recorded yet; however, it is reported that about 900 native and 30 exotic plant species, 245 bird species, 4 primate species, 2 wild boar species, 1 big predator (*Panthera pardus*), and other mammals are found in the area.

(2) **Hydrological reserve.**-- Due to the mountainous character of the area, in which 9 mountains with the elevation of more than 2,000 m above sea level exist, the GPNP forms a good water catchment area from which about 60 big and small rivers flow. Also, it is reported that the area generates subsurface run-off. This hydrological system altogether provides vital water resources for the districts directly surrounding the area (Bogor, Cianjur and Sukabumi) and even for the country's capital (Jakarta).

(3) **Natural features or sceneries reserve.**-- The primary natural features found in the area consist of waterfalls (20 sites), lakes (2 sites), caves (3 sites), volcanic craters (3 sites), and high flat open spaces in between of two mountains (2 sites). Not all of these sites are open for public use.

(4) **Scientific, educational and recreational use.**-- The natural heritage of the area provides many advantages to the people, especially to the local people. The area is

strategically located in populous districts (three-angle region: Bogor, Cianjur and Sukabumi) and in between two big cities (Jakarta and Bandung); GPNP is very attractive to people. In terms of recreational use, the GPNP might be able to contribute to the regional economic development by attracting tourists in the region.

As one of the most popular national parks in Indonesia, the GPNP is gaining recognition for the role it presently plays and the future promise it offers to the region's economy. Based on five years of data (Appendix B, Table B-1), it was reported that at least about 50,000 visitors annually entered the park. The highest visitation occurred in the year of 1991/1992 in which 76,565 visitors were recorded at the park. Of these, 98% were domestic visitors and 2% were foreign visitors (GPNP, 1994). Scientific research to estimate recreational expenditures in GPNP and its impact to the region is not yet available (Bogor Agriculture University, 1986). The same situation is also reported by the World Bank (1994) for other protected areas in Indonesia. A recent study conducted by Purwita (1993), however, does focus on the identification and the possibility of ecotourism business in the GPNP. An important finding of his study is the attractiveness of the park is the key for generating more visitors and, in turn, more spending in the region.

One measure of the park's contribution is the amount of recreational expenditures made by visitors. These visitor expenditures, in turn, may stimulate a considerable amount of local economic activity that affects output, income, and/or employment in the economic region around the park. To ensure the achievement of the policy objectives addressed previously, quantitative information on recreational expenditures and their economic effects to the region are necessary. Moreover, Bergstrom et al. (1990) stated that information on the economic value of outdoor recreation is useful not only for assessing economic effects to the region, but also for gaining increased political support for outdoor recreation management programs and alternatives.

The Problem Statement

Most Indonesians still depend on agriculture and agro-industry for their livelihood; these are two particularly important sectors of the Indonesian economy. This phenomenon also occurs in the region of the GPNP where about 75% of the population surrounding the park depends on agriculture and agro-industry sectors as the source of their livelihood. About 40% of them are landless farmers; they work as laborers in agricultural sectors. The average farm size is less than 0.25 hectare per household (GPNP, 1994). On the other hand, total farmland has been decreasing because of conversion to other purposes (Bogor Agriculture University, 1986). Without attempts to create alternatives, the unemployment and loss of income generation in the region may become problematic in the future.

Outdoor recreation activity associated with the existence of the GPNP may be an important alternative for encouraging economic growth due to the trend of increasing visitors. The increase will bring revenues to the region in particular sectors/industries that, in turn, will generate output, income, and/or employment. These may benefit both the local people and the park as the protected area. Nonetheless, the existence of the GPNP would also generate costs of development such as traffic congestion, crowding at recreation and tourists' facilities, environmental degradation, higher housing costs, crowding of public services, and a general increase in the cost of living (these are beyond the scope of this study). Therefore, estimating the nature and the magnitude of the economic effects of the recreational visits to GPNP on the regional economy as an element in regional planning is important to determine.

To encourage economic growth, regional planning should be accomplished with full recognition of the linkages and interdependencies between the many sectors represented in the economic region. In the case of the GPNP, planning for economic development of the region may be seriously handicapped by a deficiency in available analytical information, a data set of recreational expenditures and the corresponding

economic effects of recreational visits to the park. This study helps address these problems by developing an exploratory investigation which provides findings for improved regional planning.

The Study Area

Local governments often face the difficult decision of how best to use their scarce natural areas. Also, there is often substantial pressure to convert and exploit these natural areas. The GPNP is an example of a scarce natural areas, and because of its important roles, the GPNP is designated as a protected area. Based on regulations (Act of the Republic of Indonesia No. 5 of 1990: Conservation of Living Resources and Their Ecosystems), the uses of this protected area are: (1) keeping the area relatively intact, thus ensuring the survival of the living organisms it contains, (2) providing opportunities for recreation and tourism, and (3) maintaining other roles such as watershed protection. This may be a reasonable land use for those who want the area protected and the local people who have limited economic stakes in other land uses.

Economics is often defined as the study of the allocation of scarce resources among competing ends to produce goods and services (Nicholson, 1985). To economists, recreation is a part of the overall economic problem of how to manage people's activities so as to best meet their needs and wants with scarce resources (Walsh, 1986). This implies that recreation economics is concerned with allocating limited resources for recreation activities. On the basis of this definition, many studies focus on how to measure the outputs of recreation industries stemming from recreationists' expenditures injected into a region. For instance, what portion of the expenditures is for the recreation use of a particular park and other recreation sites? Recreation activities involve many characteristics of tourists (occupations, group sizes, etc.), activities (sports or entertainment), sites (indoors or outdoors), purposes of visits (primary or secondary), and visit times. Recreation expenditures cover the payment for transportation services, food

and beverages, lodging, equipment, attraction fees, insurance, and a variety of other products and services.

To regional decision makers, the ripple effect of recreation expenditures is an interesting subject to explore since this, in turn, may affect the economy in their regions. Economists often study regional economic impacts, which are defined as the regional economic activities generated by the recreation use of resources.

> "It is a measure of the secondary effects of the actual expenditures by individual consumers and managers of private and public recreation resources (Walsh, 1986; p. 373)".

Specifically, primary (direct) expenses to recreationists become secondary (indirect) gains, in part, to the regional suppliers of recreation goods and services. These impacts could affect business output or sales, employment, and net income. Knowledge of the regional economic impacts and much quantitative information could be provided by the use of appropriate methods. The information includes, for example, the magnitude of the impacts, how sectors relate to the activities, interdependencies among the sectors, which sectors receive more gains than others, and which sectors contribute more to sales, employment and income in the region.

Measuring regional economic impacts also requires the definition of a geographic region since the magnitudes of the impacts relate to the size of the relevant regional economy associated with a particular site. In addition, regional economic impact applies not only the benefits (gains) side, but also the costs (losses) side; social and environmental disturbances are part of these costs.

An ideal study pertinent to recreational economic activities should consider all issues described above. However, it requires tremendous effort, time, and resources. This study only takes a part of those issues covering the following aspects:

(1) It is concerned only with economic effects of recreationists' expenditures related to their recreation activities.

(2) It concentrates on one protected area, that is, Gede Pangrango National Park (the GPNP area).

(3) The region of interest is the three districts surrounding the park: Bogor, Cianjur and Sukabumi (the B-C-S region).

(4) It accounts for domestic visitors only.

(5) It includes only trip-related expenditures of visitors and ignores durable goods spending. Also, government's expenditures for park operations and local costs associated to the park are not included.

(6) Impact estimates (output, income and employment) are based on the Type I (direct and indirect) multipliers derived from the national input-output model.

The reasons for dealing only with these aspects are presented in Chapter 3, Research Methods.

Objectives of the Study

The overall purpose of this study is to provide an analytical framework for estimating impacts of GPNP visitors' trip-related expenditures in the B-C-S region. To address this overall purpose, this study's objectives are:

(1) Estimate spending profiles generated by visitors to the park resulting in a set of spending averages by categories, and

(2) Calculate regional economic impacts of this spending.

Definitions

To facilitate the readers' understanding of this study, the following important definitions are used:

(1) **Domestic visitors**.-- These are visitors who live within Indonesia.

(2) **Visitor segment**.-- This connotes a subgroup of visitors based on their actions or similarities so as to distinguish their spending patterns.

(3) **Spending profile**.-- This represents a vector of the amount spent by an average visitor across a set of spending categories.

(4) **Direct (technical) coefficient**.-- This quantifies input requirements to be purchased by a given sector from all other sectors within the processing sector of an input-output table to produce a unit of output.

(5) **Direct and indirect (interdependence) coefficient**.-- In an input-output table this is the total value of input from each sector required to provide $1.00 (in this study is Rp 1.00) of output to the final demand for sectors of concern.

(6) **Economic multiplier**.-- This provides information on the total amount of output, income or employment generated by each sector of the regional economy when its final demand is increased by one dollar (or in this study, by one rupiah).

(7) **Final demand**.-- This term is defined as the consumption expenditure on goods and services made by GPNP's visitors (usually measured on an annual basis).

(8) **Economic impact**.-- This term is defined as the output, income and employment effect of the rupiahs spent by GPNP's nonresident visitors on the economy of the region.

(9) **Economic significance**.-- Contribution of visitors' spending to the local economy including spending of both resident and nonresident visitors within the region.

(10) **Employment**.-- The term employment is defined as the number of people (citizens) 10-years old or older who work, full or part-time, at least one hour continuously per day during the previous week.

(11) **Employment coefficient**.-- This coefficient represents the number of employees in a sector needed to produce one unit of its output.

(12) **Total employment coefficient**.-- This coefficient represents the total number of additional employees needed as a result of a one unit change of its final demand in a given sector.

(13) **Gross value added**.-- In an input-output table, this represents the primary input of a sector which is equal to the difference of its output and intermediate input. In this study, value added consists of wages and salaries, business surpluses, depreciation, indirect taxes, and subsidies.

Organization of Thesis

Chapter Two summarizes various literature related to this study. The flow of topics described in this chapter follows the study's objectives sequentially. To clarify the use of theories, some examples and related studies are also addressed in this chapter. The third chapter deals with research methods and covers topics such as data collection procedures, instruments and analytical tools used, and data analysis procedures. Reasons of using or applying those subjects are also presented in this chapter. The next chapter is devoted to the presentation and discussion of the study's results. The last chapter, Chapter Five, summarizes the findings, draws conclusions, addresses possible recommendations for the regional planners, and makes suggestions for future research.

LITERATURE REVIEW

Introduction

To facilitate the readers' understanding of this study, the topics presented in this chapter are sequentially developed corresponding with the study's objectives. The part on recreational expenditures includes its roles and characteristics in a region's economy, the profiles, and the market segments from which the expenditures are generated; these are addressed in the first part of this chapter. The next part, measurement of economic impacts, presents general information on several approaches or methods commonly used to estimate economic impacts. Topics of the input-output model are the following part. These cover general overviews of the model, input-output modeling, and regional input-output models. Prior to a summary the linkage of the topics, as the last part of this chapter, topics related to defining the impacted region are described.

Recreational Expenditures

Tourism, recreation development, and related businesses are often regarded as particularly attractive investments and means of economic support for communities (Clawson and Knetsch, 1966). In some countries, the tourism industry has grown rapidly in recent years following a prolonged period of little or no growth. A recent study (Hannigan, 1994) showed that the tourism industry has been identified by many European governments and within the European Community as a means of job creation and regional development; the industry has grown rapidly since 1987. Similarly, the tourism industry in New Zealand seems to be the most appropriate economic alternative to agricultural products due to the reduction of farm subsidies that resulted in an economic depression in most rural areas (Oppermann, 1994). From the standpoint of the local economy tourism is

an export industry; that is, it engages in the export of goods and services being marketed and sold to non-resident consumers rather than sales to local residents.

> "The incomes of those so engaged form part of the local economic base, just as a manufacturing payroll does, thereby serving to stimulate that sector of the economy which provides goods and services to local residents (Garrison, 1974; p. 8)".

The economic impacts of recreation in an area are the gross additions to residents' income and wealth resulting from the spending of recreationists. Normally, this employment and related income as well as rising real property values will result from recreationists' expenditures in the area (Frechtling, 1987). To count, the expenditures should truly occur in the area under study. These expenditures include major consumer durables such as recreational vehicles and vacation homes and minor items such as tennis rackets and camping equipment, transportation, accommodation, food consumption, entertainment and recreation, and incidental purchases such as souvenirs. There is no agreement about what specific expenditure categories should be included in a given study. A typical tourist expenditure profile from a simple travel spending survey might only include lodging, food and beverages, transportation, recreation and miscellaneous expenses, but other tourist expenditures could cover more than the 5 categories. Stynes and Propst (1992) suggested that it will generally be more efficient to measure spending in more categories, generate detailed profiles, and then aggregate into larger groupings after the survey, if necessary.

In terms of regional development studies, knowing the profile of these expenditures is very important. However, notions as to what happens to the recreationists' money are often sketchy. For a better understanding it is important to know how much of the expenditure stays in the local area, who in the area receives it and who benefits most from recreation expenditures, and probably of most concern, communities are interested in

the employment and wages that are generated by these expenditures (Clawson and Knetsch, 1966).

One common deficiency of most studies about tourism expenditures is that market segmentation analyses of the spatial effects of the various markets are rarely performed (Oppermann, 1994). Therefore, in order to expand their usefulness for regional planners, expenditure profiles and associated final demand estimates should ideally be developed according to a number market segments. Recreation activities, types of accommodation used, recreationists' residency status, and, preferably, substate regions and season are potential segmentation variables (Pedersen, 1990).

For economic impact analyses (EIA), market segments should be easily interpreted, reasonably homogenous in their spending patterns, and relevant to the purposes of management, planning, and marketing decisions (Tyrrell, 1985; Stynes and Propst, 1992). Stynes and Propst (1992; p. 39) described three important roles of segments in an EIA system:

> "First, segments are the means by which an analyst identifies who is affected by a particular action. The more precisely a user can identify impacted market segments, the more the economic impact estimates can be tailored to the particular situation. Second, by forming segments that are relatively homogenous in their spending patterns, we reduce variations and sampling errors in survey-based estimates of spending. Finally, segments are the primary vehicle for explaining why one site or region may generate a different pattern of spending and impacts than another".

More detail in defining spending categories is suggested to spread tourist expenditures across detailed sectors (Stevens and Rose, 1985). There are at least four advantages of detailed spending categories; they: (1) allow selective choice and adjustment of a set of profiles to fit a particular application, (2) permit flexibility in the level of aggregation, (3) facilitate the process of bridging tourist spending data to sectors of an

input-output model, and (4) reduce aggregation errors in applying input-output models (Stynes and Propst, 1992).

In order to estimate recreational expenditures, several approaches (direct or indirect) are suggested in the literature. For example, the direct estimation of final demand in recreation and tourism economic impact studies traditionally takes one or both of two approaches: (1) demand related (expenditures by consumers), or (2) supply related (receipts of firms in the industry). The two approaches should give identical results and, in practice, one approach may provide a cross-check on the accuracy of the other (Tyrrell, 1985). In the demand-related approach, Frechtling (1987) offered three methods: (1) actual observation of purchasing goods or items by following recreationists around, (2) survey of recreationists while traveling or in their home, or (3) household surveys. Of these methods, he claimed, the second is the most popular method since the result from questions on expenditures can then be projected to produce estimates of business receipts in various types of businesses. Furthermore, he mentioned that surveys of travelers can be conducted as they enter the area (entry surveys), as they leave the area (exit surveys), or while in the area under study (on-site survey). Previous studies such as Garrison (1974) and Stynes and Propst (1992) have applied the on-site survey method. In the case of hunting or fishing surveys, Stevens and Rose (1985; p. 21) recommended that:

> "..... it is preferable to conduct the survey at the destination of trips, both to increase the probability that respondent will be able to provide accurate estimates of expenditures (at least up to that point in the trip) and to provide accurate information on where the expenditures were made".

Besides the demand-related approach, Brown and Connelly (1992) used a supply-related approach for their study on Assessing Changes in Tourism in the Northeast, that is,

by the use of lodging receipts as the index of tourism. They claim the rationale for this is that: (1) of all the Standard Industrial Codes (SIC) of economic sectors pertaining to tourism, only the lodging sector has an insignificant amount of trade from local residents, and (2) most tourism studies find lodging receipts to be a significant portion of total trip expenditures.

Indirect approaches of assessing tourism expenditures are usually based upon databases prepared by other institutions. In the U.S., some studies on tourism used data derived from the Census of Selected Services or Census of Retail Trade, publications of the Bureau of the Census, U.S. Department of Commerce. To gain appropriate analyses, users usually make some adjustments due to the differences or changes in the rate of inflation, definition of services, classification of related sectors, time period of data, etc.

Measurement of Economic Impacts

One characteristic of recreational expenditures is that it has a number of implications for the economic impact on individual areas located near a recreation site. In relation to recreation activities, regional economic impact is defined as the economic activity generated by recreational use of resources. Regional economic impact is a measure of both primary and secondary effects of the actual expenditures by individual recreationists and managers of recreation resources (Walsh, 1986). Randall (1981) stated that an increase in economic activity in one or more business and industrial sectors, will typically increase activity in every sector of the local and regional economy. Thus, in general, regional economic impact analysis is concerned with the consequences generated by dollars injected (e.g., visitor expenditures) to a region in terms of the level of sales or outputs, income or employment in a region.

There are several methods offered or suggested in the literature to analyze and estimate how impacts originating in one or more sectors are transmitted throughout the economy. However, so far there is not widespread agreement about what the ideal method for economic impacts assessment is. Review of journal articles and other literature indicates that each method offered has its own problems, whether conceptually or technically. The three methods most frequently used in assessing economic impacts are: (1) economic base models, (2) econometric models, and (3) input-output models (Pleeter, 1980). Since about 1980s, shift-share analysis, linear programming, and simulation methods are also alternatives suggested (Propst and Gavrillis, 1987).

The study by Clawson and Knetsch (1966) titled "Economics of Outdoor Recreation" was one of the earliest publications addressing recreation economic impacts using the economic base model (Pedersen, 1990). Kalter and Lord (1968) analyzed the impacts of recreation investment on the local economy by using the "From-To" model (a derivative of an input-output analysis). The basic difference between this and input-output analysis is the transactions matrix developed by this method only shows the inputs from area industries to other area industries and final demand sales handled by the firms in the region. The model represents, directly, purely regional flows and focuses attention on local impacts caused by changes in final demand.

Garrison (1974) attempted to estimate the local economic impacts of recreation activities at Norris Lake with three counties (Campbell, Claiborne and Union) and a portion of a fourth (Anderson) as the impacted region. His study used a combination of three methods to estimate the impacts. The direct effect was based on published data on recreation expenditures provided by the Tennessee Valley Authority which were presented by type of expenditure and residence of visitors. The indirect effect estimation was based upon relationships reported in input-output studies of other small rural areas (in Oklahoma) since no input-output data existed for the Norris Lake area. Finally, the

calculation of the induced effect relied upon the construction of a local income multiplier which was estimated by the use of economic base theory.

Given the use of input-output models to estimate economic impacts, the following two research reports are interesting to review due to the methodology used. The first is by Diamond and Chappelle (1981) in the case of Manistee County, Michigan. This study applied an input-output model based on secondary data. For the purpose of estimating the impacts in the county level, the authors developed the county 15-sector input-output model derived from the State of Michigan's 87-sector input-output model by omitting sectors not found in Manistee County and by further aggregating the less important sectors. The reason for taking this approach was that Manistee County had a strong manufacturing and service base similar to the State of Michigan (presented by comparing the percentage of earnings of the industrial and service sectors). The second study is by Chappelle et al. (1986) on the case of Michigan Forest Industries. The study applied an input-output model based on a partially survey-based input-output study. Even though the study used a combination of primary and secondary data, tremendous efforts were still needed. To construct forest industry sectors of the input-output transaction matrix, questionnaires were sent to approximately 1,600 forest industry establishments in Michigan during the survey. The selection of sectors was based on importance to the state economy in terms of number of firms and value of production and employment.

A recent study concisely described a system to estimate regional economic impacts of recreation and tourism (Stynes and Propst, 1992). The lack of consistency in procedures and measures of previous economic impact studies provided the background for developing the study. The authors attempted to estimate the impacts of recreation and tourism activities in the Upper Mississippi River System (UMRS) with the use of an input-output model derived from the micro-computer based input-output modeling system, called IMPLAN (IMpact analysis for PLANning), developed by the Land Management

Planning Systems Group of the USDA Forest Service. The authors developed five elements as the basic system for estimating the economic impacts: (1) market segments, (2) spending profiles, (3) margining and bridging tables, (4) local input-output models, and (5) impact estimation procedures. Among these elements, developing market segments and spending were the most important steps and were described in detail. The authors stated that the more precisely impacted market segments can be identified, the more economic impact estimates can be tailored to a particular situation. In addition, more detailed spending profiles permit flexibility in the aggregation process and facilitate the process of bridging tourist spending data to IMPLAN sectors. For their study, the authors defined trip-related spending and durable goods spending for 6 and 4 market segments, respectively. Furthermore, they classified trip-related spending and durable good spending into 33 and 32 detailed categories. Two important findings of the study that can be addressed here are: (1) the use of consistent spending categories (assembled for appropriate segments), units of analysis, and measurement procedures allows spending estimates or impacts that are comparable across studies, and (2) the careful estimation of spending patterns of visitors to different sites/regions, and especially the estimation of spending profiles for homogeneous subgroups of visitors is encouraged.

Aside from the IMPLAN model, other computerized models for measuring the economic impact of recreation and tourism have also been developed. Two examples are RIMS II (Regional Input-Output Modeling System, version II) and REMI (Regional Economic Models, Inc.). RIMS II used the 1972 national input-output model (developed by the Bureau of Economic and Analysis (BEA) of the U.S. Department of Commerce) for the development of regional coefficients. The coefficients were modified by the use of the Location Quotient technique. Similar to RIMS II, the REMI model was based on the latest national input-output model prepared by the BEA. The difference is that the REMI used a technique called Regional Purchase Coefficients to develop a regional coefficients

matrix. Detailed reviews of these computerized models were presented in Bushnell and Hyle (1985).

Input-Output Model

General Overview of Input-Output Model

The input-output model, pioneered by Professor W.W. Leontief in the early 1930s, has become quite commonly used to analyze the regional economic impacts in many developed as well as developing countries (Furukawa, 1986). Input-output analysis aids in providing a procedure or technique whereby the interactions within the regional economy can be modeled, and the effect of expansion in one or more sectors upon employment, output, and income in other sectors and the whole economy can be projected (Randall, 1981). Diamond and Chappelle (1981) described the input-output technique as a tool of economic analysis which can be used to estimate economic impacts of changes in final demand given complete quantitative input-output accounts which express intersectoral linkages. Furthermore, they described it as an aid in providing quantitative accounting of regional economic interdependencies if data are organized into sectors representing the important economic sectors of the region. This accounting system, where the economy is divided into processing, final demand, and value-added or payment sectors, is a flow system that includes all monetary transactions occurring in the region over a certain period of time, usually a year (Chappelle et al., 1986).

An input-output model covers all production, both final and intermediate, and provides a detailed understanding of the linkages among industries that we can not obtain from analysis of the value of final production sold to the final buyers alone (Ritz, 1979). More specifically, in recreation economics, an input-output model provides information on

the direct and indirect impact of recreationists' spending on the output or sales of each industry in the local economy.

> "This provides a more precise calculation of the regional recreationist multiplier as a weighted average of the multipliers for each local industry where recreationists purchase goods and services (Walsh, 1986)".

Leontief (1953) stated that an input-output model is based on two sets of basic conditions: (1) there are balance requirements, i.e., the combined inputs of each commodity or service must equal its total product, and (2) there is a definite relationship between quantities of all the input absorbed by one particular industry and the level of its total output. Randall (1981) noted that input-output analysis for a regional economy is based on a detailed accounting of the flow of goods and services. Part of this flow is among industries within the regional economy, part may be between the region and other regions, and the remainder flows to an exogenously defined "final demand" sector.

Schaffer (1980) mentioned that in input-output models used for regional impact analysis, economic change can take two forms: structural change or change in final demand. Structural change can be interpreted as changes in regional production coefficients which is caused by changes in technology or changes in marketing patterns. Furthermore, he stated that accounting for this change requires deep familiarity with the details of an input-output table which is not the case when accounting for the effect of final demand changes. Changes in government expenditure patterns and changes in the demand by other areas for the goods produced in the region are the basic form of the final demand change.

Input-Output Modeling

Flow or Transaction Table

There are some steps that should be carried out when doing an input-output analysis. Hushak (1987) noted that the first step is to produce the flow table. This table describes the demand and supply relationships of an economy in equilibrium by showing final demand for goods and services and the interindustry transactions required to satisfy this demand. This is called the transaction table; that is, accounts form which indicates the dollar value of transactions between each sector and every other sector of the state's or region's economy over the period of time covered by the table. Rows in the transactions table indicate distribution of sales by sectors and can be represented by the following equation:

$$X_i = x_{i1} + x_{i2} + \ldots\ldots\ldots\ldots + x_{in} + Y_i = \Sigma\, x_{ji} + Y_j \qquad (1)$$

where X_i = total output of sector i, x_{ij} = sector i output that is delivered as input to sector j, Y_i = sales to final demand for sector i, and n = number of sectors in the transactions table. Columns of the transactions table indicate distribution of costs expended by sectors to other sectors for inputs and can be presented by following equation:

$$X_j = x_{1j} + x_{2j} + \ldots\ldots\ldots\ldots + x_{nj} + V_j = \Sigma x_{ij} + V_j \qquad (2)$$

where X_j = total outlay of sector j, and V_j = charges against final demand or payments to a factor of production in sector j. Input-output theory maintains that $\Sigma X_i = \Sigma X_j$ which is the sum of all inputs in the economy should be equal to the sum of all outputs (Chappelle et al., 1986).

To clarify and get an easier exposition of the flow or transaction table, a brief simplified table is presented in Table 1. This table and the following explanation are summarized from John P. Blair's book entitled "Urban & Regional Economics" (1991; pp. 174-179). Each row in this table shows the annual dollar value of output that each sector listed in the left-hand column sold to each of the sectors listed across the top. For

instance, the table indicates that agriculture sold $350 of output to itself, $350 to firms in the manufacturing sector, $350 to firms in the service sector, $950 directly to local households, and $670 to businesses and households in the rest of the world as exports. The columns show where the sectors listed across the top purchased their input. In this example, regional manufacturing firms purchased $350 from agriculture, $200 from each other, $850 from regional service firms, $350 from regional households (factors of production, especially labor), and $900 in the form of imports from individuals and businesses outside the region.

In addition to the interindustry sectors (i.e., what agriculture, manufacturing, and service sell to each other), Table 1 shows two final-demand sectors. The household column reflects purchases by residents of the region, and the export column reflects goods and services that are sold to nonresidents. The table also shows two primary-supply sectors: households and imports. Households provide labor, entrepreneurship, capital, and land as inputs, and each of the values in the household row reflects compensation for these services. The import row shows the dollar value of all commodities imported yearly. For instance, shown in the table, the service sector was the largest importer, importing $1,900 worth of goods.

Table 1. A simplified transaction table (in U.S. dollars)[a].

Supplied by	Sold to			Final Demand		Total Output
	Agriculture	Manufacturing	Service	Household	Exports	
Agriculture	350	350	350	950	670	2,670
Manufacturing	100	200	650	300	1,400	2,650
Service	550	850	600	750	900	3,650
Primary Supply:						
Households	970	350	150	50	1130	2,650
Imports	700	900	1900	600	0	4,100
Total	2,670	2,650	3,650	2,650	4,100	15,720

[a] Modified from Blair (1991; pp. 174-179)

The final demand (in this case representing sales outside the region) and primary-supply sectors are often further disaggregated in more detailed transaction table than Table 1. Exports and imports could be disaggregated to specify exactly who purchased the exports and who sold the imports. A sector for government purchases and gross capital formation could also be included. Note that since the total value of output must be paid to intermediate suppliers or to the primary factors of production, total gross output must equal the value of the inputs used in production. Related to recreation, changes in final demand (export to tourists) mean changes in affected tourists' spending associated with their characteristics or actions (usually defined as market segments).

Technical or Direct Coefficient Table

The second step in doing an input-output analysis is to understand the technical or direct coefficient table. The technical coefficient table shows the fixed-coefficient production function for each of the processing or production sectors, that is, the amount of input required to produce a unit of output (Hushak, 1987). Direct coefficients are formed by dividing each cell value in a column of the transaction table by total outlays for that sector, which is simply the sum of column figures (Chappelle et al., 1986). This operation may be expressed as follows:

$$[A] = a_{ij} = x_{ij}/X_j \qquad (3)$$

where a_{ij} = direct coefficient that quantifies input requirements to be purchased from sector i by sector j, and $[A]$ = matrix of a_{ij}. The matrix of $[A]$ may be considered a quantification of technical production relationships. That is, reading down a column of this table indicates the percentages of total expenditures that are transacted to each sector of the regional economy on the first transaction (hence the term "direct").

By using the transaction table presented in Table 1, direct coefficients can be calculated (Table 2). In this case, the manufacturing sector purchased $850 of inputs from the service sector in order to produce $2,650 of total gross output (see the transaction table). Thus, for each dollar of output, the manufacturing firms purchased $0.321 (850/2,650) from firms in the service sector. The direct coefficient for the manufacturing column and service row, $0.321, is the strongest linkage among the three industries in the model economy. Agriculture requires the most resources from local households; $0.363 of household inputs is required for each dollar of agricultural output.

Thus, Table 2 illustrates interindustry linkages. For example, if the agricultural sector were to produce an extra dollar of output, using the same input proportions that were used when the input-output table was constructed, it would need to purchase $0.131 from other agriculture producers, $0.037 from the manufacturing sector, $0.206 from services, and $0.363 would go to households to pay for input such as labor. In addition, $0.262 would be spent on imported inputs of all types. All manufacturing goods, services, agricultural products, and direct inputs from households that are purchased outside the region are included in the $0.262 of imports.

Table 2. A simplified table of direct coefficients (purchases over dollar of output)[a].

Supplied by	Sold to			
	Agriculture	Manufacturing	Service	Households
Agriculture	0.131	0.132	0.096	0.358
Manufacturing	0.037	0.075	0.178	0.113
Service	0.206	0.321	0.164	0.283
Households	0.363	0.132	0.041	0.019
Imports	0.262	0.340	0.521	0.226

[a]Modified from Blair (1991; pp. 174-179).

Direct and Indirect Coefficient Table

The direct coefficient table expresses only initial transactions by producing sectors as they purchase inputs from other sectors of the regional economy, and it accounts for only first-round spending effects. Normally we are interested in quantifying the stream of transactions as the successive rounds of re-spending occur that are initiated by these initial transactions. Sectors providing inputs to other sectors will require additional output from their suppliers; suppliers of suppliers will purchase more from their suppliers and so forth (Blair, 1991).

Continuing the example above (see Table 2), if the manufacturing sector increases its output by $1, $0.1320 of additional output will be required from the local agricultural sector. But, if agriculture is to increase its output by $0.1320, agricultural firms must purchase $0.0173 (0.131 x $0.1320) from other agricultural firms, $0.0049 (0.037 x $0.1320) from manufacturing firms, and $0.0272 (0.206 x $0.1320) from service firms. Household income will increase by $0.0174 (0.132 x $0.1320) because of the primary factors of production needed to produce the extra output required by manufacturing. But household income also increases because of the increases in agricultural and service output created by the initial increase in manufacturing output. In theory, these ripples would continue forever. The cumulative size of the various rounds of spending (direct and indirect) can be calculated mathematically.

Chappelle et al. (1986) noted that the total of direct and indirect purchases can be represented by the series:

$$I + A + A_2 + A_3 + A_4 + \ldots\ldots\ldots\ldots + A_n \qquad (4)$$

where I = an identity matrix. This series is the power series approximation of the inverse of the Leontief matrix (I-A). The inverted Leontief matrix (i.e., $[I-A]^{-1}$) is a table of direct and indirect coefficients or a total-requirements table (Schaffer, 1976). In our example, the

results of using the inverted Leontief matrix are presented in Table 3. It shows the total dollar amount of output that would be required from each sector listed on the left in order to accommodate a dollar's increase in output from each sector listed across the top. For instance, if manufacturing increased its output by $1, the total effect on the agricultural sector would be to increase output by $0.422. Bromley (1972) mentioned that the matrix of direct and indirect coefficients indicates how a change in the final demand of one sector affects the level of output of its suppliers after all the intermediate adjustments have been made.

Table 3. A simplified table of direct and indirect coefficients[a].

Supplied by	Sold to			
	Agriculture	Manufacturing	Service	Household
Agriculture	1.530	0.422	0.300	0.694
Manufacturing	0.274	1.281	0.321	0.340
Service	0.697	0.717	1.467	0.760
Households	0.633	0.359	0.216	1.354

[a]Modified from Blair (1991; p. 174-179).

Input-Output Multipliers

The regional policy makers may be interested in the answers to questions such as: How much additional output will be produced? How much additional income will be generated by a given program or activity in the economy? How many jobs will be created? Which industries in the economy will be affected most? Multiplier analysis is a tool that can help answer such questions, because it can be used to make forecasts and to perform impact analyses (DiPasquale and Polenske, 1980; Blair, 1991; Block, 1977; and Stevens and Rose, 1984).

Impact coefficients or multipliers are quantitative summary measures of the total effects that a change in the final demand for a particular sector has on the output, personal income, or employment of the regional economy (Hushak, 1987). Normally in economic development analysis, calculating multipliers will indicate magnitudes of impacts likely to occur in the regional economy if a certain strategy is pursued instead of some other strategy. For each dimension of economic life in which we are interested, a multiplier may be calculated for each sector to measure economic impacts on the regional economy resulting from an increase of one dollar in final demand for the product mix of the particular processing sector (Chappelle et al., 1986). Some studies indicated that multipliers can be based on various economic measurement scales or dimensions of economic life such as output or sales, income, and employment.

The sales or output multiplier indicates the increases in output per dollar increase in final demand or, more clearly, the amount of economic activity generated in the economy by an additional dollar of final demand for the products of the specific sector. The magnitudes of output multipliers for each sector can be calculated directly from the inverted Leontief matrix $(I - A)^{-1}$ because this matrix is basically multiplier matrix itself. This calculation is accomplished by simply adding coefficients in a given column of this matrix for a processing sector or the sum of each column of the inverted matrix (Shaffer, 1976; Block, 1977; and Chappelle et al., 1986). The magnitudes of output multipliers also indicate the degree of interdependence among industries. The higher the multiplier, the greater is the interdependence among industries. Furthermore, by using the inverted matrix, it is possible to form the basis for a projection model such as forecasting production required to satisfy forecasted final demands, because the following relation holds:

$$X = [I - A]^{-1} Y \qquad (5)$$

where X is a vector of output or column of the gross outputs of industries and Y is the vector of final demands for goods in the future year under consideration (Shaffer, 1976; and Chappelle et al., 1986).

Income multipliers indicate the amount of income generated in the region for each additional dollar of final demand for sector's output. In the same fashion, employment multipliers indicate the number of jobs generated in the region for each additional dollar of final demand for sector's output (Diamond and Chappelle, 1981). Another author stated that:

> "..... employment multipliers are derived from output multipliers simply by converting from an output to an employment base through the use of employee/output ratios. These multipliers are to be interpreted as showing the number of jobs created by a $10,000 export in their industry (Shaffer, 1976; p. 62)".

Employment multipliers are frequently included in regional analysis to evaluate impacts on employment of industrial expansion. This is reasonable because employment is a function of income since changes in employment reflect changes in final demand.

In most cases, there are two frequently used types of multipliers (both for income and employment) to consider. The first, the Type I multiplier, is based upon the direct and indirect results of an exogenous change in final demand when the household is part of final demand (exogenous sector); this means that the household consumption function (shown in the household column of the direct coefficients table) remains fixed and unaffected by changes in other sectors as an additional dollar of final demand reverberates through the economy. The second, the Type II multiplier, is based upon the direct, indirect and induced results of an exogenous change in final demand when the household is part of the endogenous system of interdependency (like any other endogenous sector); that is, the expenditure level changes as the production level changes, and final demand consists of government spending, investment expenditures and foreign purchases (Bradley and

Gander, 1969; and Chappelle et al., 1986). The term "induced" means caused by household consumption (Shaffer, 1976).

Multipliers have many limitations. In relation to the recreation and tourism sector(s) of the regional economy, Chappelle (1985; p. 2) described three limitations of multipliers as follows:

1) "Although multipliers can be derived for each recognized internal sector of the regional economy, they essentially apply to the average establishment of the sector at the time the data were collected for the region being studied. It is not possible to measure differences in impact that vary with scale of proposed expansion of a sector's capacity. Also, there is no reason to expect that multipliers necessarily can be extrapolated to other situations".
2) "Multipliers strictly apply only to the next incremental change in the region's economic structure. This means, theoretically at least, that once a change is introduced into the economic structure, multipliers may change in magnitude. Since the input-output model is a static model, it is not sensitive to change. Multipliers can not reflect changes in economic structure except by recalculating them after changes have been introduced into the transaction table or direct coefficients table".
3) "From the standpoint of economic development planning, it would be desirable to be able to apply weights to the various multipliers in order to rank prospective opportunities. However, since measurement units differ from one multiplier to another (e.g., output, income, and jobs), it is not possible to apply weights and add their products".

The Strengths and Limitations

Input-output analysis has been widely used because of its major advantages. Propst and Gavrilis (1987) described two major advantages of input-output analysis as: (1) it analyzes sectoral linkages (the production and distribution) at a level far more detailed than economic base or shift-share analysis, and (2) input-output tables can be produced by data reduction techniques, such as non-survey or semi-survey methods (by the use of secondary data). Schaffer (1985) more clearly mentioned that:

> "Input-output analysis is the most popular tool for regional impact analysis simply because it is the most consistent and logical way to trace secondary benefits

> through a regional economy. Economic-base models and econometric models suffer from all of the noted deficiencies; in addition, they are grossly aggregated. Input-output analysis forces us to pay attention to detail; artfully used, it not only focuses on the issue of measurable secondary economic effects, but it also leads us to consider environmental and social effects".

By using input-output analysis, the export-base theory can be operationalized in a manner that shows the interindustry repercussions in detail, which is a useful tool for regional economic planners. In addition, input-output analysis could also help a community determine which industries it should promote in order to maximize the total economic impact (Blair, 1991).

Aside from these advantages, input-output analysis can help show distributional or equity impacts of an economic change, aids in developing a regional growth plan by providing a framework for organizing data, and provides a framework for testing alternative policies to gain knowledge of their prospective impacts in terms of regional production of goods and services, regional income and regional employment. Input-output analysis has also been extended to integrate economic and environmental systems, since the inclusion of ecological sectors into the accounting system permits analysis of environmental impacts flowing from changes in the structure of the regional economy (Isard, 1975; and Diamond and Chappelle, 1981).

Although a powerful tool for regional impact analysis, input-output analysis is not free from shortcomings, both conceptually and technically. Production functions for each industry are modeled using linear models in input-output analysis, which implies that any changes introduced in the system must consequently cause an equiproportionate increase or decrease in existing levels of resource use. It also implies the absence of scale economies, which ignores the important theoretical arguments for the existence of cities, namely agglomeration and urbanization economies. Other criticisms involve the static nature of the input-output model; that is, its direct coefficients implies a fixed-input (no substitution) production function which means there is only one recipe for producing the

output of each sector. These criticisms take two forms: (1) inputs do not increase in fixed proportions as output increases, and (2) the coefficients change over time. There are a number of reasons why direct coefficients may vary as output changes. Relative price or technological changes may encourage an establishment to substitute a relatively cheaper input or change the production technique (Armstrong, 1978; Pleeter, 1980; Frechtling, 1987; and Blair, 1991).

Other drawbacks concerning regional input-output analysis were addressed by Hamilton et al. (1991). They stated that because it traces each sector's purchases from other sectors of the region's economy, it captures only the portion of secondary impacts caused by backward linkages from the event being studied. They also criticized that input-output models are usually based upon political boundaries such as counties or states, while the fact that the functional economic areas within which impacts occur often cross political boundaries. Furthermore, Blair (1991) described that internal improvements in productivity, technology, and other sources of growth are usually ignored in input-output analysis. This is because input-output models are based on the export-base theory of growth, in which changes in output are normally driven by exogenous changes in exports.

Assumptions in Input-Output Analysis

Knowing the possible shortcomings of input-output models, there are several assumptions that should be considered in applying input-output analysis. Hushak (1987) and Pleeter (1980) described some important assumptions in input-output analysis as: (1) fixed-coefficient production function (the rate of technological change is slow enough by only small amounts from year to year), (2) constant relative wages and prices of inputs and outputs, (3) no supply constraints exist, and (4) production of homogenous output in each sector (each industry or sector produces only one product) so that economies and diseconomies of scale are disallowed. In addition, Diamond and Chappelle (1981)

described two basic assumptions in input-output analysis: (1) the level of technology is stable over time, and (2) fixed rates of substitution between inputs imply that relative use levels of resources do not change over time.

Regional Input-Output Models

The major problem in constructing interindustry flow tables for regional input-output analysis is that it requires a considerable amount of cost, time, and effort. Therefore, to avoid the substantial fieldwork, many studies use national input-output models or derive models from other regional input-output models as a short-cut method. The drawbacks of using surrogate coefficients are rather obvious.

Czamanski and Malizia (1969) pointed out the sources of divergence between national and regional input-output: (1) differences in the industrial mix, (2) differences in relative importance and structure of foreign trade; foreign trade is more sensitive at regional level, (3) national coefficients are often several years old, and (4) differences in technology and in the relative prices of inputs between regions within a country. To eliminate these drawbacks, a method was suggested for identifying sectors requiring surveys which would supplement regional matrices otherwise derived via adjusted national coefficients. This method needs only information of regional income and product accounts disaggregated by sectors, and national technical input-output coefficients. The regional row-and-column totals could be obtained when total regional output is multiplied by adjusted national technical input-output coefficients.

Other techniques, which are called non-survey input-output methods, have been developed lately to avoid a complete survey-based input-output analysis. To modify national coefficients to the regional level, employment or output data are often used because of the availability and readiness of the data. Among those techniques, the following section is brief description of three non-survey techniques frequently used

(i.e., location quotients, supply-demand pooling, and regional purchase coefficients). To get more detail and complete information or review of the techniques, see Schaffer and Chu (1969), Leigh (1970), Schaffer (1976), Stevens et al. (1980), Bushnell and Hyle (1985), Miller and Blair (1986), Garhart and Giarratani (1987), and Blair (1991).

Location Quotient Technique

The Location Quotient (LQ) is a technique for assessing a region's specialization in an industry or other economic base. The LQ is expressed as a number comparing the relative share of an industry in the region to its relative share in the nation. To do this, there are, at least, three variants of using location quotients: (1) the Simple Location Quotient (SLQ), (2) the Purchase-Only Location Quotient (POLQ), and (3) the Cross-Industry Quotient (CIQ) approaches. For the SLQ, LQ is generally specified as follows:

$$LQ_i = (x_i / x) : (X_i / X) \qquad (6)$$

where LQ_i: location quotient for sector i,

x_i: regional output (or employment) in sector i,

x: total regional output (or employment),

X_i: national output (or employment) in sector i, and

X: total national output (or employment).

The general idea behind this technique is that outputs of sector i must be imported if the industry has less relative share locally than it has nationally (defined as $LQ < 1$). On the other hand, excess output is assumed to be exported if the industry has a large relative share locally (defined as $LQ > 1$). A location quotient equal to one ($LQ = 1$) means that the region is self-sufficient in the industry in question; that is, it has its proper share. This interpretation is based on the assumption that regional production processes are the same as national production processes. If the $LQ_i \geq 1$, then we set $a_{ij} = A_{ij}$, where a_{ij} are the

regional input-output coefficients (defined as x_{ij} / x_j) and A_{ij} are the national production coefficients (defined as X_{ij} / X_j). Thus, we may easily define regional interindustry flows as:

$$x_{ij} = (a_{ij}) (x_j) = (X_{ij}) (x_i / X_j) \qquad (7)$$

If $LQ_i < 1$, then the a_{ij} for the industry are adjusted downward by the value of location quotient. Thus, the regional production coefficients in row i may now be computed as:

$$a_{ij} = (LQ_i) (A_{ij}) \qquad (8)$$

and regional interindustry flows as:

$$x_{ij} = (a_{ij}) (x_j) = (X_{ij}) (LQ_i) (x_j / X_j) \qquad (9)$$

Similar to the SLQ, the POLQ for sector i in a region relates regional to national ability to supply sector i inputs, but only to those sectors that use i as an input. Thus, slightly different from the procedure identified in Formula *(6)*, in estimating POLQ for sector i, the devisors x and X are defined as the total regional and national output, respectively, of only those sectors that use i as an input instead of total gross output as applied in SLQ. POLQ is used in the same way as LQ to uniformly adjust a national coefficients table.

In the third variant, the CIQ allows cell-by-cell adjustments rather than uniform adjustments along each row of the coefficients table as applied in the SLQ and the POLQ. CIQ is measured as the relative importance of both selling sector i and buying sector j in the region and the nation. The formula is defined as:

$$CIQ_{ij} = (x_i / X_i) : (x_j / X_j) \qquad (10)$$

The idea of this method was clearly stated by Miller and Blair (1985) that:

> ".... if the output of regional sector i (x_i) relative to the national output of i (X_i) is larger than the output of regional sector j (x_j) relative to the national output of sector j (X_j) ($CIQ_{ij} > 1$), then all of j's needs of input i can be supplied from within the region. Similarly, if sector i at the regional level is relatively smaller than

sector j at the regional level ($CIQ_{ij} < 1$), then it is assumed that some of j's needs for i inputs will have to be imported".

Supply-Demand Pool Technique

The Supply-Demand Pool technique is derived from the concept of regional commodity balances to regionalize the national coefficients. This technique follows from the assumption that, given transportation costs, demand will first be met by local production. In this manner, sales of regional output will first go to satisfy local demand. Imports will occur after local production is exhausted and exports will only occur after local demand is met (Pedersen, 1990).

For application, some steps that should be taken are as follows (summarized from Miller and Blair (1985; p. 300)):

(1) Take the national technical coefficients (A_{ij}) as the first approximation to regional coefficients,

(2) Calculate the regional intermediate outputs by sector by multiplying each of these coefficients by the appropriate actual output of that sector ((A_{ij})(X_j)),

(3) Similar to step 2), calculate also for the regional final demand sectors by using the national final-demand input proportions ((c_{if})(Y_f)),

(4) Summing the results of step 2) and 3) to get estimated gross regional output by sector ($\bar{X}_i$). That is,

$$\bar{X}_i = \sum_j A_{ij} X_j + \sum_f c_{if} Y_f \qquad (11)$$

where c_{if} is the national final-demand input proportions, and Y_f is the total national purchases of final-demand sector f.

(5) Then, calculate the regional commodity balance (b_i) as $b_i = X_i - \bar{X}_i$, where X_i is the regional actual gross output of sector i.

Interpretation of this technique is that if b_i is positive (or zero), using national coefficients as estimates of regional coefficients does not generate an overestimate of regional production, then we apply A_{ij} and c_{ij} for regional level estimates. However, if b_i is negative, then A_{ij} and c_{ij} should be adjusted or balanced for regional level estimates by using a multiplicator called the "balance ratio" which is defined as $X_i / \bar{X}_i$. For more detail about this technique, see Schaffer and Chu (1969), Schaffer (1976), and Miller and Blair (1985).

Regional Purchase Coefficient (RPC) Technique

An RPC has been defined by several originators of RPC as the proportion of a good or service used to fulfill intermediate and/or final demands in a region that is supplied by the region to itself rather than being imported (Stevens et al., 1980; and Bushnell and Hyle, 1985).

> "Unlike the location quotients which are applied to the inverted technical coefficient matrix, the RPCs are applied to the technical coefficients directly, after which the technical coefficient matrix is inverted in the normal way (Bushnell and Hyle, 1985; p. 47)".

Mathematically, the regional purchase coefficient for a good in regional L is defined as:

$$R^L = S^{LL} / (S^{LL} + S^{UL}) \qquad (12)$$

where S^{LL} is the amount of a good shipped from region L to itself, and S^{UL} is the amount of the same good shipped from the rest of the nation to region L. Another alternative definition used as a basis for fitting an estimating equation for RPCs is defined as:

$$R_i^L = (Q_i^L / D_i^L) P_i^L \qquad (13)$$

where Q_i^L: the amount of i produced in L,

D_i^L: the total use of i in L, and

P_i^L: the proportion of i produced in L which is shipped to destination in L.

To proceed in estimating equations for RPCs in the form of a regression analysis, several steps should be developed. Following several systematic assumptions related to comparative delivered costs which are dependent upon relative production costs, industrial concentration, weight-to-value ratios, and spatial density of suppliers, we come up with an estimating equation defined as (an example in the United States):

$$R_i^L = K(w_i^L / w_i^U)^{b1}(e_i^L / e_i^U)^{b2}(W_i^U / [e_i^U w_i^U])^{b3}(LQ_i^L)^{b4}(A^L / A^U)^{b5} \qquad (14)$$

where w_i^L, w_i^U: average annual wages per worker in industry i in region L and in the US,

e_i^L, e_i^U: total employment in industry i in region L and in the US,

$_i^U$: total tonnage of i shipped domestically in the US,

A^L, A^U: land area of region L and the US,

LQ_i^L: employment location quotient for industry i in region L,

bj: the elasticity of response of R to a change in the ratio for variable j, and

K: a constant.

Procedures of estimating RPCs are not as simple as those described above. There are at least two important steps must be taken before proceeding the regression analysis (Stevens et al., 1980): obtaining a sample of RPCs to use as the dependent variables, and revising the right-hand side of the equation in order to take into account of data availability for the independent variables. However, the details of these steps need not be given in this study.

Once the RPCs are obtained, then the regional technical coefficients can be directly estimated by multiplying these RPCs by the national technical coefficients. That is, $A^r = \bar{\bar{RPC}}\, A^n$, where A^r and A^n are the regional and the national technical coefficients

matrix, respectively, and $\bar{\bar{RPC}}$ is an n-element vector of regional purchase coefficients. For detailed information and reviews of the regional purchase coefficient technique, see Stevens et al. (1980), Miller and Blair (1985), Bushnell and Hyle (1985), and Stevens et al. (1986).

Of all non-survey methods described above, so far, there is no agreement among experts on what method is the best to use for regionalizing the national models. Pertinent to this study, the author uses the Simple Location Quotient technique to adjust the national coefficients for regional analysis. The reason is based largely on the availability of secondary data to support the use of the method.

Defining Regions

Economists look at the behavior of business enterprises, consumers, and financial and governmental institutions mostly from a national standpoint, and prefer to analyze an economy as if it were located at a point. They usually neglect the spatial arrangement of the social order or the order of the economy. Regional economists, on the other hand, examine households, retail stores, wholesale outlets, manufacturing plants, banks, farms, and mines located in a region as an order and pattern that can be studied and understood (Nourse, 1968). More broadly, Isard (1975) mentioned that the regional scientist is concerned with all of these topics and others only when they relate to locations, local areas, cities, and regions. To regional scientists or economists, then, a region is not merely an arbitrarily demarcated area; rather it is an area that is meaningful because of one or more problems associated with it which they want to examine and solve.

Concerning regional economics, Blair (1991) described how regional economists distinguish among types of regions. The first is "functional regions", which are distinguished by the degree to which they are integrated or the extent that their component

parts interact. The second is "homogenous regions", which are defined on the basis of internal similarity such as economic similarities (e.g. common economic development problems), cultures, climates, or other common activities. The third is "administrative regions", which are formed for managerial or organizational purposes. Compared to functional or homogenous regions, administrative regions are normally more clearly delineated because they are formed to clarify spheres of activity for businesses or governments, and they frequently become the basis for policy. However, administrative regions may not be distinct from homogenous or functional regions.

Similarly, Hoover (1975) distinguished two different types of regions, the homogenous and the nodal. A homogenous region is demarcated on the basis of internal uniformity. What is true for one part of the region is true for the other parts, and the various part resemble each other more than they resemble areas outside the region. In a nodal region, functional integration is the basis of the correlation or community of interest within such a region. For instance, a city and its surrounding commuting and trading area make a nodal region. The parts with the main concentration of business and employment are in sharp contrast to the residential areas, but they are tightly linked to them by flows of labor, goods, and services. Typically, in a nodal region, there is a single main nucleus, perhaps some subordinate centers, and the rural remainder of the territory in which the internal change of goods and services is very tight. By contrast, in a homogenous region, the usual basis is common exportable outputs; the whole region is a surplus supply area for such an output, and consequently its various parts have little or no reason to trade extensively with one another.

In reviewing economic impact studies of recreation and tourism, defining the impacted region has become a practical issue. Most studies define their impacted regions in administrative or political terms, such as one of the standard regions or a local authority area, even though they show some economic rationale (Johnson and Thomas, 1990; and

Diamond and Chappelle, 1981). The study by Kalter and Lord (1968) selected Walworth County as the impacted region. The reason was that the county possesses a diversified economy sufficient in size to encompass a wide range of economic activities and because recreational services were mostly exported (users of recreational facilities are largely from other regions). Theoretically, these delineations impose a slight arbitrariness because the economic impact of a project is normally one of diminishing geographical response rather than a sudden cut-off at some boundary. The size of the multiplier will, of course, vary with the size of the reference region; the smaller the region the larger are the import leakages and the smaller the multiplier (Johnson and Thomas, 1990).

Stevens and Rose (1985) provided more detail on this topic. They mentioned that the delineation of the impacted region depends greatly on the policy issues being examined and the hierarchical rank of the policy maker, and should consider characteristics of the region. A region is typically specified according to a single or a mix of major characteristics in the physical, political, or economic realm. In the case of assessing economic impacts of recreation and tourism, they defined an impacted regions into five hierarchical levels. The first is a "recreation site", the smallest area, distinguished primarily on the basis of physical attributes (a lake, forest, ski slope, etc.). The second level is an "economic support area", an area in which most expenditures take place in close proximity to the recreation site (this area covers both direct and indirect impacts). To establish a meaningful cutoff point, the authors suggested two possible descriptions for support area. One is the "trading area", an area in which the majority of economic transaction occurs between any of its subareas. Another delineator is the "labor service area", an area in which the majority of the pertinent labor force, including commuters, resides. The third hierarchical level is the "travel corridor", an area from the consumer residence to the recreation site in which the impacts along travel route take place. The fourth is the "consumer residence area", an area of recreationists' origin. Typically, it is larger than the

support area, however in the case of smaller sites, it need not be. The fifth level is the "extended region" or national level, the ultimate source for all the goods imported into any of the other areas. A similar discussion of this topic was also presented by Propst et al. (1985).

In defining a region in economic impact analysis, it is important to consider that:

> "..... any attempts at regional delineation and aggregation must consider the additivity problem. That is, there are sometimes differences between impacts derived from summing over numerous small areas versus an overall large area impact (the whole may not be the sum of its parts) (Propst et al., 1985; p. 57)".

The Linkage Between Recreational Expenditures and Input-Output Analysis.

To estimate regional economic impacts of tourism or recreation activities, basically there are two tasks that should be accomplished: (1) estimating visitor expenditures or spending, and (2) estimating regional economic models (this study uses an input-output model). One of the objectives of estimating visitor spending is to develop a final demand vector. In this case, tourism spending bridged to the input-output model is treated as a final demand sector. The problem is how to convert visitor spending which is estimated in broad categories into a final demand vector relevant to the sectors present in the region. The step is known as "margining" and "bridging" processes (Stynes and Propst, 1992). The basic idea behind this step is to delineate the impacted sectors in order to get a suitable bridge table containing sectors appropriate to the input-output model of the region for transforming spending categories to specific sectors. The economic impacts, then, are obtained by applying the final demand vector to the input-output model for the region being studied.

Accurate estimation of visitor spending profiles for recreation or tourism market segments is very important, because it critically underlies the level of direct, indirect,

induced sales, value-added, income or employment impacts generated by the spending in the region. Related to this, Pedersen (1990; p. 6) mentioned that:

> "..... in light of the importance of the final demand estimates for input-output analysis, the reliability of recreation participation levels and spending profiles may be at least as important and in need of review as is the input-output model used to generate the economic impacts estimate".

Using the models constructed by Stynes and Propst (1992), total spending can be estimated as follows:

$$S_j = N * \sum_{i=1}^{m} M_i * s_{ij} \qquad (15)$$

where S_j: total spending in category j, $j = 1, ...J$,

N: total number of visitors,

m: number of segments,

M_i: segment i's share of total visits, $i = 1,...m$, and

s_{ij}: average spending of a member of segment i on category j. These are the "spending profiles".

When using an input-output model, the final demand vector and the impacts are formulated as:

$$FD_k = S_j * B_{jk} \qquad (16)$$

$$I = R * FD_k \qquad (17)$$

where FD: a final demand vector of spending changes,

B: a bridge table to convert from spending categories j to sectors k,

R: represents an input-output model multipliers (formally R would be the Leontief inverse matrix), and

I: impacts, expressed as changes in output, income, or employment resulting from the change in final demand.

Recognizing the strengths, limitations, and requirements of procedures or techniques addressed above, and realizing the availability of data and information pertinent

to the expected study's objectives, this study is directed at applying the input-output analysis to the Gede Pangrango National Park. The Simple Location Quotient (SLQ) technique is utilized for regionalizing the national input-output model. Furthermore, based on the characteristics of the study area, the on-site or direct interview is applied for primary data collection involving visitation and spending profiles. Details of these procedures are sequentially explored in the next chapter.

RESEARCH METHODS

Introduction

In estimating recreational spending as well as the corresponding impacts, several steps involved in this chapter are developed sequentially with the study's objectives. Therefore, describing procedures for estimating spending profiles and their appropriate requirements are presented in the first part of this chapter. These steps consist of: (1) developing visitor segments, (2) developing spending categories, (3) developing instruments used in the survey, (4) defining the region, (5) data collection procedures covering primary data collection, secondary data collection, and enumerators recruitment, and (6) developing spending profiles. Then, in the last part of this section, a procedure for estimating the economic impacts in the B-C-S region based upon an available input-output model is addressed. This involves converting and matching the spending profiles to the final demand vector (i.e., bridging and margining process) and applying this final demand vector to the input-output model to estimate the impacts.

Visitor Segments

The purpose for developing visitor segments in this study is to get relatively homogeneous spending patterns within the aggregates of visitors. Furthermore, spending patterns developed properly for visitor segments will facilitate selectively choosing and adjusting a set of profiles to fit a particular application (Stynes and Propst, 1992). This study assumes that spending patterns will vary across the residencies, the occupations and the types of activities among the visitors. To be appropriate for spending profiles analysis as well as impact analysis, the visitors were separated:

(1) By residency: residents and nonresidents,

(2) By occupation: students and nonstudents, and

(3) By activity: hiking, recreation, and other activity.

Such segments were developed to get linkage between primary and secondary data used in this study. Residents are the visitors who come from the B-C-S region, and nonresidents are those who come from outside the B-C-S region. The term "student" means anyone who has been in formal education until the time of the survey and does not have employment yet.

Visitor segments by activities were derived and adjusted from categories used by the park management in its visitors' registration process. In the process of getting a permission document, visitors were registered into 1 of 4 categories based on their activities which were: (1) hiking, (2) recreation, (3) education/research, and (4) other activities. The "hiking" category covers the visitors whose activities takes place in the area of 2,000 m above sea level or more (including those who hike to the top of the park). The "recreation" category represents the visitors whose activities include sightseeing (diversity of flora and fauna), photographing, visiting the lakes and waterfalls, relaxing/pleasure, and picnicking. These activities take place in the area lower than 2,000 m above see level. This study combined "education/research" and "other" categories into one category, called "other" category, because of small portion of visitors participating in education/research activities (approximately of 1.4 % during 1993/1994). Thereby, in this study, the "other" category included activities such as camping, researching/studying, visiting holy places, making movie films, and other activities.

Realizing that visitors may visit more than one recreation site, besides the park, during their trips, this study also grouped the visitors based upon the purpose of visit (primary or secondary visit). Visitors' expenditures were divided by the number of sites visited. Thus, only a portion of the multi-site expenditures were attributed to GPNP. By combining those four visitor categories, a preliminary set of 24 visitor segments was resulted.

Spending Categories

Developing and recording detailed spending categories permits flexibility in the process of data aggregation and facilitates the process of bridging spending data to an input-output sector. This study accounted for trip-related spending (Table 4), which covers spending at home, en route, and at the destination. Twenty-eight categories were combined into 5 major groups: (1) transportation expenses (7 categories), (2) lodging expenses (2 categories), (3) food and beverage expenses (2 categories), (4) outside market expenses (5 categories), and (5) other expenses (12 categories). Outside market categories represent expenses on agricultural products (fruits, vegetables, other food crops, fishes, and plants) purchased outside the marketplaces. These expenses are not uncommon in the vicinity of the park. The amount of trip-related spending for each category recorded during the survey is the sum of spending made before and after leaving the destination (on the return home).

Survey Instrument

Though used extensively in the United States, a mailback questionnaire is not commonly used in the area of the study. The author predicted the survey responses would be very low with the use of an unfamiliar mailback questionnaire approach. Instead, this study used a five-page on-site questionnaire for primary data collection. Seventeen questions in the questionnaire focused on getting information about types of visitors, types of activities, origins, occupations, trip characteristics, and trip-related spending made by the visitors (see questionnaire in Appendix A). With direct interviews, it took approximately 10 minutes to fill out the questionnaire. The questions were structured in such a way that there was no possible open-ended answers besides spending amounts. The questions were also constructed in a manner to meet the requirements of developing visitor segments, spending profile estimates, and impact analysis. To capture detailed information on spending for each category, respondents had to identify type of spending

Table 4. The 28 detail spending and their 5 aggregate categories, GPNP.

Detail spending categories	Aggregate categories
1. Gas and oil	Transportation Expenses
2. Repairs and washing	
3. Spare parts	
4. Parking fees and toll (road, bridge, etc.)	
5. Fares/tickets	
6. Rent	
7. Fares for recreation vehicles	
8. Hotels, motels, rental homes, cottages, etc.	Lodging Expenses
9. Campgrounds (outside the park)	
10. Grocery stores, convenience, liquor, vendor, soft drink, and other food and beverage stores (for eating and drinking off-premises)	Food and Beverage Expenses
11. Restaurant, diners, catering, bars, and other eating and drinking places	
12. Fruits	Outside Market Expenses
13. Vegetables	
14. Other food crops	
15. Plants (including ornamental plants)	
16. Fishes (including ornamental fishes)	
17. Rental fees for recreation equipment, rental horse, etc.	Miscellaneous Expenses
18. Cigarettes	
19. Insurance fees	
20. Fees for guide services	
21. Admission to recreation sites	
22. Admission to tourist attraction	
23. Other recreation expenses (billiard, golf, movie, fishing)	
24. Camera film or video tape purchase	
25. Film developing or video tape processing	
26. Souvenirs or gifts	
27. Clothing (including footwear)	
28. Other expenses	

(group or individual spending), the spending within the region being studied, and the spending outside the region.

Besides the questionnaire, a brief map and a list of spending categories were distributed to the respondents during interviews to assist them in locating places where they make expenditures and in tracking systematically the categories being asked. In addition, these instruments were pretested and evaluated before the survey was conducted. This took place in the main entrance gate (Cibodas) and involved the author, a middle staff of the GPNP, and four enumerators (one from each entrance gate where the survey would be conducted).

Defining the Region

Spending profile estimates and impact analysis require the development or delineation of the region of interest. GPNP is located in West Java province (similar to a state in the US.) and surrounded by three districts: Bogor, Cianjur and Sukabumi (B-C-S). These districts, with the total area of about 1,094,120 hectares (West Java, 1992), are located in three out of seven different regional development areas defined by the province's government. Bogor, whose population was 3,953,521 in 1990, is a part of the Botabek (Bogor, Tangerang and Bekasi) regional development area; Cianjur, whose population was 1,662,067 in 1990, is a part of the Bandung Raya (Bandung and Cianjur) regional development area; and Sukabumi with a 1990 population of 1,968,190 is in Sukabumi regional development area. For these three regional development areas, the province's government focuses outdoor recreation development on B-C-S districts (Bogor Agriculture University, 1992).

In terms of outdoor recreation, the B-C-S districts have similar natural resources for supporting tourism development. The B-C-S is also known as a popular area because in part of its good accessibility and of its strategic location, that is in between of two populated big cities (Jakarta with 8,222,515 of population and Bandung with 5,258,247 of

population; both are in 1990). Another characteristic of the region is that it also provides diverse opportunities such as hotels or motels, restaurants, grocery stores, transportation agencies or services, and souvenir shops for supporting recreation and tourism activities.

The B-C-S region was selected as the region concerned in this study. Thus, the terms "residents" or "nonresidents" and spending "within" or "outside" the region refer to the region defined in this section. Related to literature reviews described in the previous chapter, this region refers to "homogenous region" categorized by Blair (1991) and Hoover (1975). However, the term "administrative region" also applies to this region because its border is demarcated on the basis of its administrative geography.

Procedure of Data Collection

Primary Data

To obtain demographic, trip characteristics and trip-related spending data, on-site interviews were conducted at four main entrance gates to the park (Cibodas, Situgunung, Selabintana, and Gunung Putri) simultaneously between January 22 and April 17, 1994. Interviews were conducted on every week-end day (Saturday and Sunday) and on a selected week day (Monday through Friday). Using a systematic random sampling technique, individual visitors (the sampling unit) to the park were selected. The reasons for this approach are: (1) to get a linkage with secondary data used in this study (visitor data basis), (2) to capture the direct portion of tourism expenditures related to the recreation site (GPNP); tourism expenditures can be collected by using business receipts from the establishment's owners; however, then techniques to separate proportionately expenditures stemming from recreationists and non-recreationists, or recreationists of a particular recreation site and those of other sites are required, and (3) this study is concerned only with recreation impacts of a small geographic area stemming from a

particular recreation site (see detailed explanations in Frechtling (1987) and Brown and Connelly (1992)).

The selection of sampling units (respondent) was divided into two procedures. For the weekend days' survey, each tenth visitor to the park was selected as a respondent. However, for the weekdays' survey, the selection was developed based upon group size: (1) if the group consisted of 50 persons or more, every tenth person was selected, (2) between 10 to 49 persons, every fifth was selected, and (3) less than 10 persons, every second person was selected. The reason of developing such procedures is because of different participation patterns of visits during weekend days and weekdays. In the case of GPNP, the visitation is very low during weekdays (approximately 10%) and high on weekend days.

The advantages of using the on-site interview technique in this study are: (1) the respondents still remember the activities and trip-related spending that has been made (at least up to the interview); (2) if the spending was made in group, respondents could easily get the information, in the case the respondent did not recall, because the group was still there; (3) the technique could reduce problems with respondent illiteracy; and (4) problems of blank responses (in the questionnaire) could be eliminated. Thus, the on-site interviews could increase the probability that the respondents would be able to provide accurate estimates of spending and information on where the spending was made.

During the interviews, the respondents were asked to answer questions provided in the questionnaire. A brief map and a list of spending categories were also distributed to the respondents to facilitate them in tracking the subjects being asked by the enumerators. To meet the needs of impact analysis, the respondents were requested to report the purpose of visit as primary, secondary or unimportant. In addition, they were also asked to provide information on a regional basis. For instance, the respondents were asked to report if the trip-related spending was being made within or outside the B-C-S region. They were also asked, for example, if they were students or nonstudents to assist in

segmenting visitors. To estimate detailed categories of trip-related spending, the respondents were requested to differentiate some spending information into separate categories. For example, spending for food and beverages was tallied separately for restaurants and grocery stores. Furthermore, group and individual spending was separated.

Secondary Data

The survey only covers data on the first quarter of the year (1994). Thus, the survey period does not allow for reporting of results on an annual or multi-seasonal basis. To estimate trip-related spending on an annual basis, annual visitation data are required. These data were derived and recorded from visitor registration documents for 1993/1994 (April 1, 1993 to March 30, 1994) administered by the GPNP office. Information recorded from the documents contained the dates, purposes of visit, places of residence, occupations, group sizes, and the gates through which the visitors enter the park. Using these secondary data, the total number of visitors (on annual basis) by origins, occupations, and primary activities was developed. Thus, there was a linkage between primary and secondary data in terms of visitor segments. Other secondary data such as visitation data in other recreation sites surrounding the park, demographic and economic data of the region, and development policies of the park were also collected to support this study.

Enumerators Recruitment

For conducting the survey, thirteen GPNP staff members were recruited as enumerators (8 of them are permanent enumerators and the rest are additional enumerators), and they were distributed at the four gates where the survey was conducted. The additional enumerators were utilized in case of the permanent enumerators could not handle the interviews during peak visitation times. The recruitment was based upon

consultations with and recommendations from the park manager, Mr. Wahjudi Wardojo, M.Sc. Several staff members had experience in conducting this kind of survey, and in addition, some of them were certified to do so. In these circumstances, intensive training was not really needed. The location of survey was also the place where they work so they were extremely knowledgeable about the local situation. In addition, the enumerators also live very close to the survey location so that transportation costs did not handicap the conduct of the survey. Another advantage was that the supervision could be very effective because the park manager was also involved.

Regardless of these benefits, detailed explanations about the survey and the survey instrument were presented. To test and evaluate the capability of the enumerators as well as the effectiveness of the survey instruments, a pretest was conducted a week before actual survey work started. Also, the author did supervise and evaluate the results weekly to identify opportunities for improvement. Finally, given their dedication, a certificate was presented to each enumerator after the survey was completed. As staff members, this certificate is very valuable for their careers because it means an additional credit point they save in pursuing the next rank.

Developing Spending Profiles

To develop trip-related spending profiles, the unit of measure used in this study is rupiahs (the Indonesian currency: US. $1.00 equal to Rp 2,150.00 in April 1994) per visitor per day. There are four units of measures commonly used to develop spending profiles: (1) dollars per party per trip, (2) dollars per person per trip, (3) dollars per party per day, and (4) dollars per person per day (Stynes and Propst, 1992; and Chadwick, 1987). The use of rupiahs per visitor per day as the unit of measure is based upon the following rationale:

(1) Visitors who come to the park are mostly day users (approximately 85%), so that fewer visitors spend nights during a trip to the park.

(2) Most visitors depend less on private transportation than on public transportation. Thus, transportation costs more likely relate to transportation fares than to gasoline expenses.

(3) Group types of visitors are more likely dominated by friends or business associates than by families or relatives. This implies that the trip-related spending is more likely shared by individuals rather than an individual paying the group expenses.

(4) Few young children (six years old or less) participate in the trips. In this case, the effect in calculating spending per person basis due to children participation would not be a big problem. Moreover, children are free from admission ticket charges for entry into the park.

To develop trip-related spending profiles and spending totals, the step-by-step procedure undertaken in this study is summarized below:

(1) Calculate the spending per visitor per day for each spending category by dividing reported spending by group members and nights spent.

(2) To take account for expenditures spent by the visitors whose visits to the park are as secondary purpose, their reported spending was divided by the number of sites visited to get the spending per visitor per day associated with the GPNP.

(3) Determine the average spending for spending categories by dividing the sum spent by all respondents by the total number of respondents.

(4) Determine the average spending for a member of each segment for each spending category. The calculation resulted from dividing the spending for a segment by the number of segment members. These calculations yielded the spending profiles (average spending by segment and by spending category).

(5) Find the total spending by segment for detailed spending categories. This resulted from multiplying the appropriate segment spending profile (step (4)) by the number of segment members in the population. Here, visitor segmentation for the population relied on the secondary data derived from visitation data administered by the park

management (annual basis). In case that segmentation could not be calculated from the secondary data, the estimation was done by utilizing the proportions of segments (segment's market share) in the sample (i.e., weighted averages). Summing the total spending (annual basis) across segments provides an estimate of total final demand vector by spending category. This vector can be used in impact analysis for the region (described in next section).

Available Input-Output Models

An input-output model for the B-C-S region is not yet available. In addition, constructing a regional model or adjusting available input-output models still requires related data which are beyond the possible time and budget of this study. Therefore, for estimating regional economic impacts, this study relied on secondary data provided in the 1990 Indonesian Input-Output Model (national level). Of course, the results would not be the true values or measures of the impacts; however, they provided estimates of the relative magnitudes of the impacts. The estimates were calculated by the use of an allocation technique described below.

The 1990 input-output model (published in March 1994) is the fifth table produced by the Central Bureau of Statistics (CBS) of Indonesia. The previous tables were produced in 1971, 1975, 1980 and 1985. The characteristics of the 1990 input-output model are as follows:

(1) It represents two transaction matrices of 66 sectors and 19 aggregated sectors.

(2) It treats imports as both competitive and non-competitive sectors (there are two different transaction tables).

(3) The transaction tables are developed based upon both consumer prices and producer prices.

(4) Output multipliers developed in this model is Type I output multipliers.

(5) The sector classification is based on KLUI (the Indonesian version of industry classification) and KKI (the Indonesian version of commodity classification). KLUI, constructed by CBS, is a modified version of the ISIC (International Standard Industrial Classification). Two main criteria are considered in classifying sectors: (a) a commodity unit grouping which is based on the criterion of physical similarities of goods and services, and (b) an activity unit grouping which implies a notion that goods and services produced by similar activities are grouped in the same sector.

For the purpose of this study, to gain estimates of output multipliers appropriate for the B-C-S region, the adjustment process relied on the 66-sector transaction table at consumer prices in which imports were treated as competitive sectors.

Impacts Estimate Procedures

One of the many applications of spending profiles developed in this study is to estimate the economic impacts to the region. The spending profiles can be applied either in total or by segment to generate the impacts. To get more accurate impact estimates, several additional steps (extending from the steps to estimate spending profiles) are developed as follows:

(1) **Adjusting the spending profiles**.-- This step involves differentiation of spending generated by resident and nonresident visitors, and spending within and outside the region. To derive spending profiles applied to impacts estimates, this study used trip-related spending within the region generated by visitors from outside the region (nonresidents).

(2) **Margining process**.-- This process is to identify the proportion of the spending that is associated with the goods that are produced locally (within the region of concern) as many goods that are purchased by visitors may not be produced within the region. Only the margin associated with these purchases are included in the impact estimates. Since there are not available data for estimating this proportion, this study used

margins for comparable sectors in the U.S. (Stynes and Propst, 1992). These proportion were estimated by using the percentage shares of national (the U.S.) personal consumption expenditures in the category "other recreation" published by the Bureau of Economic Analysis, U.S. Department of Commerce (1984).

(3) **Developing a bridge table**.-- This step provides a table containing sectors affected by tourism activities. The table was derived from the national input-output model currently available.

(4) **Developing a final demand vector by sector**.-- The spending profiles from step (1) above contain spending in broad categories. By matching these spending data with the bridge table, a vector representing spending profiles by sectors is created; it is the final demand vector by sector. In this case, the final demand vector expresses the additional nonresident visitors' spending in the region in terms of sectors in the input-output model or sectors as defined by the model.

(5) **Determining appropriate multipliers**.-- Since there is not an input-output model available for the B-C-S region, for estimating proportional multipliers appropriate for the region, an adjustment (non-survey) technique was utilized. This study applied the Simple Location Quotient (SLQ) technique to regionalize the national model in order to estimate the regional multipliers. Relevant to the characteristics of the national model, the regional multipliers developed herein are the Type I output multipliers for the 66 producing sectors. Due to the availability of data, this study used gross domestic products (GDP) by sector as the weighted factor instead of gross output or employment by sector usually used. As noted by Miller and Blair (1985), instead of gross outputs, other economic indicators such as employment, value added, income, and so on, by sector can also be utilized to estimate the location quotient (LQ) values. Thus, procedures utilized to estimate the regional output multipliers from adjusting the national model include:

(a) Calculation of the location quotient by sector.-- This was done by applying Formula *(6)* in previous chapter, where x_i is a regional GDP in sector i, x is the total regional GDP, X_i is a national GDP in sector i, and X is the total national GDP. The result was a vector of the location quotients for the 66 producing (row) sectors.

(b) Calculation of the regional technical coefficients matrix.-- This table was estimated by multiplying the national technical coefficients matrix by the vector of location quotients from step (a). However, as described in previous chapter, for the sectors with $LQs \geq 1$, we apply the national technical coefficients of those sector directly for the corresponding regional sectors. For the sectors with $LQs < 1$, the national technical coefficients should be adjusted by multiplying these coefficients by the LQs of corresponding sectors from step (a) to get the regional coefficients.

(c) Calculation of the total regional output multipliers.-- Prior to the calculation, a Leontief matrix should be calculated; that is, by subtracting the regional technical coefficients matrix (step (b)) from an identity matrix which is a matrix with *1* in its diagonal and *0* in its other cells. Then, the estimated total output multipliers (direct and indirect effects) by sector are the column totals of the inverted Leontief matrix itself. This step resulted in a vector of the total output multipliers for 66 sectors. There was no aggregation or disaggregation made in this step.

(6) **Estimating impacts**.-- There were three regional economic impacts estimated in this study: output, income, and employment, which were measured by sectors. The procedures are as follows:

(a) Impacts on outputs ($X_{i(r)}$).-- The values of these impacts represented the total output (direct and indirect effects) of each sector in the B-C-S region due to the changes in its final demand. To obtain the measures, the final demand vector by sectors from step (4) was multiplied by the vector of total output multipliers for the region developed in step (5).

(b) Impacts on income ($I_{i(r)}$).-- These values indicate the total payment (direct and indirect effects) paid by each producing sector to households to satisfy the changes of its final demand. To estimate the impacts, the study follows an assumption of linearity relationship of income and outputs, which means that change in outputs will be followed proportionally by changes of income. To satisfy this relationship for estimating the impacts, the income-output ratio by sectors should be determined. These magnitudes represent the amount of payment should be paid by each sector to household in order to produce one unit of its output. Technically, the ratios were gained simply by dividing the row cell of wage and salary by the row cell of the total output addressed in the input-output table. Since these ratios are not available for the B-C-S region, this study assumes that the national ratios are appropriate for the B-C-S region, though these probably are not entirely true. Then, the impacts on income were estimated as:

$$I_{i(r)} = i_{i(r)} \times X_{i(r)} \qquad (18)$$

where $I_{i(r)}$: total income generated by sector i in region r (B-C-S),

$i_{i(r)}$: income-output ratio of sector i in region r, and

$X_{i(r)}$: total output (direct and indirect) of sector i in region r from step (a).

(c) Impacts on employment ($E_{i(r)}$).-- These values imply the total employment needed by each sector in order to fulfill the changes of its final demand. To estimate the impacts, this study also follows an assumption of linearity relationship of employment and outputs, which means that change in outputs will be followed proportionally by changes of employment. To satisfy this relationship for estimating the impacts, the employment-output ratio by sectors should be determined. These ratios represent a number of employees needed by each sector in order to produce one economic unit of its output. Similar to the income-output ratios, the employment-output ratios for the B-C-S region are also not available. To estimate these ratios, this study also assumes that the national ratios are

representative for the B-C-S region. The ratios were calculated by dividing the number of employees by the total output derived from the input-output table for each corresponding sector. Then, the impacts on employment were estimated as follow:

$$E_{i(r)} = e_{i(r)} \times X_{i(r)} \qquad (19)$$

where $E_{i(r)}$: total employment generated by sector i in region r (B-C-S),

$e_{i(r)}$: employment-output ratio of sector i in region r, and

$X_{i(r)}$: total output (direct and indirect) of sector i in region r from step (a).

Additional assumptions for applying the procedures used to estimate the impacts are that the level of technology and the productivity level of sectors are the same for both in the nation and the region, and the ratios (income-output and employment-output ratios) remain stable over time.

RESULTS AND DISCUSSION

Introduction

This chapter is divided into two parts: results and discussion. The results are divided into six major sections. The first section provides information and discussion about sample sizes and response rates. The second section discusses selection and development of visitor segments and their distributions, both in the sample and in the population. Section three describes how the findings correlate to trip-related spending followed by their distributions in the visitor segments. The next section reports the process for developing output multipliers for sectors in the region of interest (derived from the national input-output model). Section five presents the results of margining and bridging processes pertaining to estimation of the impacted sectors. And the last section presents the regional economic impact estimates by sector stemming from visitors' trip-related spending. Additional results are summarized in Appendix A, A-3. The second major part of the chapter, the discussion, focuses on additional aspects of the results and the overall conduct of the study.

Results

Sample Sizes and Response Rates

A total of 934 respondents, defined as an individual visitors, were interviewed at the park from January 22 to April 17, 1994 (Table 5). Nine hundred and twenty-six visitors (99.1%) participated, while eight visitors (0.9%) declined to participate during the survey. Because of unreliable responses, forty-five out of 926 samples were not usable, leaving a sampling frame of 881 samples (questionnaires). In total, the author believes that this high response rate indicates the effectiveness of direct or on-site interviews used in the survey. Mailback interviews would receive a lower response rate; they are uncommon in Indonesia.

Table 5. On-site interview sample sizes and percentage distributions, GPNP.

Description	Number of respondents (n)	%
Usable interviews	881	94.3
Nonusable interviews	45	4.8
Interview refusals	8	0.9
Total	934	100.0

Distributions of the sample were observed across visitors' activity (hiking, recreation, and other activity), occupation (student and nonstudent), and residency (resident and nonresident) categories (Table 6). The "recreation" activity was the highest (68.3%) as compared to the "hiking" and the "other activity" which were similar in magnitude. By occupation, the "student" occupation was 52.6% whereas the "nonstudent" occupation comprised 47.5% of the usable responses. Furthermore, the "resident" and the "nonresident" categories were 40.9% and 59.1%, respectively.

Population data were derived from the annual visitation data from April 1, 1993 to March 30, 1994 collected by the GPNP management. "Recreation" had the highest percentages (65.6%) among the activity categories whereas the "student" was more than three times (71.9%) than the "nonstudent". Furthermore, the "nonresident" percentages were almost twice the "residents" (61.1% and 38.9%, respectively). The general distribution pattern within the sample was similar to those of the population.

Compared to the last five years of annual data, the total population in 1993/1994 was higher than that in 1992/1993. However, this was lower than the other four recorded years (Appendix B, Table B-1a). Currently, there is no explanation for the fluctuations. This may have more to do with the accuracy of data recording conducted by the GPNP management than with wide changes in visitation. Total visitation was also lower as compared to the total visitation in two recreation sites near the park in 1993. They were

Table 6. Sample and population distributions by visitor category, GPNP[a].

Visitor categories	Sample distribution		Population distribution		Sample-population ratio[b]
	n	%	N	%	
Hiking (T)	143	16.2	15,475	26.3	0.6
Recreation (R)	602	68.3	38,602	65.6	1.0
Other activity (O)	136	15.4	4,752	8.1	1.9
Student (S)	463	52.6	42,270	71.9	0.7
Nonstudent (N)	418	47.5	16,559	28.2	1.7
Resident (I)	360	40.9	22,866	38.9	1.1
Nonresident (Ot)	521	59.1	35,963	61.1	1.0
Total	881		58,829		

[a] Sample data were based on the survey conducted from January 22 to April 17, 1994, while population data were derived from the visitor registration book administered by the GPNP management from April 1, 1993 to March 30, 1994.
[b] Divide column 3 by column 5 for each category (e.g., Hiking (T): 16.2/26.3 = 0.6).

Cibodas Botanical Garden with 372,613 visitors and Manadalawangi Park with 68,169 visitors (Appendix B, Table B-1b).

To observe the degree of representativeness of the sample by category, this analysis relied on the population distributions by category as the true representative. What the author means with the representativeness of the sample is the proportional allocation of the sample by category relative to the population, not the optimal allocation. Based upon the population distribution, the "hiking" and the "student" were under-represented, while the "other activity" and the "nonstudent" were over-represented. For the "residency" and the "recreation" categories, both the sample and the population revealed similar patterns. The sample representativeness is clearly indicated by the sample

population ratios in which the values under 1.0 indicate under-representation in the sample whereas values greater than 1.0 indicate over-representation.

Combinations of the three categories resulted in 12 segments. When the sample distributions were observed across the combinations, in general, their patterns indicated a similar fashion as the categories' representations (Table 7). The categories that were over-represented resulted in combinations that were also over-represented or at least equal relative to the population. These were depicted by most segments of the "other activity" and the "nonstudent" categories (i.e., R/N/I, R/N/Ot, O/N/I, and O/N/Ot segments). Similarly, the categories that were under-represented generated combinations that indicated under-representation or at most equal relative to the population. These were associated with most segments of the "hiking" and the "student" categories (i.e., R/S/I, R/S/Ot, T/S/I, and T/S/Ot segments). For the other four segments, their distribution patterns varied depending on what categories built those segments. Combinations of the "hiking" and the "nonstudent" categories resulted in the segments with equal distributions relative to the population (i.e., T/N/I and T/N/Ot segments). However, combinations of the "other activity" and the "student" categories created the segments that were over-represented relative to the population (i.e., O/S/I and O/S/Ot segments). The sample-population ratio values (column 6) give more detailed information.

Several conditions may have affected the distribution patterns of the sample, they include:

(1) Seasonality (over a year) was not covered by the survey (i.e., it was about three months) so that the sample distributions did not truly reflect or represent the annual population distributions.

(2) The survey was conducted during the school season so that fewer students participated in leisure activities. In the case that the O/S/I and O/S/Ot segments were over-represented, this was because of high intensity on camping activities, defined as a part

Table 7. Sample and population distributions by 12 visitor segments, GPNP.

Visitor segments[a]	Sample distribution		Population distribution		Sample-population ratio[b]
	n	%	N	%	
T/S/I	28	3.2	4,745	8.1	0.4
T/N/I	8	0.9	511	0.9	1.0
R/S/I	108	12.3	8,877	15.1	0.8
R/N/I	194	22.0	7,598	12.9	1.7
O/S/I	12	1.4	463	0.8	1.7
O/N/I	10	1.1	672	1.1	1.0
T/S/Ot	93	10.6	9,310	15.8	0.7
T/N/Ot	14	1.6	909	1.6	1.0
R/S/Ot	113	12.8	15,557	26.4	0.5
R/N/Ot	187	21.2	6,570	11.2	1.9
O/S/Ot	109	12.4	3,318	5.6	2.2
O/N/Ot	5	0.6	299	0.5	1.1
Total	881	100.0	58,829	100.0	

[a] T/R/O: Hiking/Recreation/Other activity.
S/N: Student/Nonstudent.
I/Ot: Resident/Nonresident.

[b] Divide column 3 and column 5 for each segment.

of the "other activity" category, to inaugurate new students for particular schools (the survey found groups of over one-hundred students).

(3) During the survey, there was one month of fasting (in March, 1994) for Islamic people. This is common in the area of the survey, and people gather (to celebrate) or visit holy places both before and after the Fasting month. This might have resulted in higher samples captured in the survey as represented by the "nonstudent" (resident and non-resident) with the "recreation" category (the R/N/I and R/N/Ot segments). Their distributions in the sample were 22.0% and 21.2%, while in the population they were 12.9% and 11.2%, respectively.

(4) Other possibilities were instrument design and human errors (during interviews and data entries) so that these affected the calculation and manipulation of data.

To show the adequacy of the sample, the statistical analysis is presented in the following discussion part of this chapter.

Visitor Segmentation

The purpose of visitor segmentation is to capture relatively homogeneous trip-related expenditures among groups of visitors, so that the variation in expenditures which can create biases in the total estimates with respect to their patterns can be reduced. In this study, the author assumes that type of visitor activities results in different spending patterns. Consistent with visitor activity categories defined by the GPNP management, this study differentiates visitor activities into hiking, recreation, and other activity categories. The "other activity" category includes camping, studying/researching, visiting holy places, and other activities. In order to conduct impact analyses, it is necessary to separate spending that is generated by resident visitors (inside the region) and by nonresident visitors (outside the region). Furthermore, the author also assumes that spending stemming from students is different from that of nonstudents. Realizing that a visitor may visit more than one recreation sites in the same trip, this study also groups the

visitors based on the purpose of visiting the park, primary or secondary purpose. Thus, briefly, the preliminary visitor categories utilized in this study consist of the following:

(1) Type of activities: hiking (T), recreation (R), and other activity (O).

(2) Occupations: student (S) and nonstudent (N).

(3) Purposes: primary (P) and secondary (Sc).

(4) Residence: resident (I) and nonresident (Ot).

Other categories that do not fall under the above categories were dropped from the sampling frame. This resulted in a reduction of the sampling frame from 881 samples to 872 samples due to the existence of 9 samples categorized as occasional visits. These samples existed in four visitor segments (Table 8). Using the proportion of reduction in the sample, the population was reduced from 58,829 units to 58,466 units, with 363 units dropped.

Table 8. Distribution of the sample and population dropped in four visitor segments, GPNP.

Visitor segments	Sample			Population		
	n	n1	n2	N	N1	N2
R/N/Ot	187	5	182	6,570	177	6,393
O/S/Ot	109	1	108	3,318	30	3,288
R/S/I	108	1	107	8,877	80	8,797
R/N/I	194	2	192	7,598	76	7,522
Total	598	9	589	26,363	363	26,000

Note: n: Sample sizes before dropping.
n1: Number of samples dropped.
n2: Sample sizes after dropping.
N: Population sizes before dropping.
N1: Number of population units dropped (e.g., R/N/Ot: 5/187*100%*6,570=177).
N2: Population sizes after dropping.

Combining all categories described above yielded the preliminary set of 24 visitor segments identified in Table 9. This table displays the sample distributions for all possible visitor segments. Because 17 segments contained small samples (less than 30 samples each), for reporting and analysis purposes, it was necessary to combine those small segments into bigger segments (containing more than 30 samples each). The first combination process resulted in a reduction from 24 segments (column 1) to 12 segments (column 4). In this process the purpose categories (primary and secondary) were dropped, but the spending data were used in estimating spending profiles. Still, there were 6 segments contained less than 30 samples each. To get larger samples for analysis, the 12 segments were narrowed into 8 segments (column 7). In the process, the occupation categories (student and nonstudent) in the segments with the "hiking" as well as with the "other activity" categories were combined into the visitor category (V). For example, nonresident nonstudents who hike (the T/N/Ot segment) and nonresident students who hike (the T/S/Ot segment) were combined as nonresident visitors who hike (the T/V/Ot segment). In brief, the eight visitor segments, followed by the number of samples and the proportion (to the total sample) for each segment in parentheses, are as follow:

R/N/Ot: recreation, nonstudent, nonresident (n=182; 20.9%).
R/S/Ot: recreation, student, nonresident (n=113; 13.0%).
R/N/I: recreation, nonstudent, resident (n=192; 22.0%).
R/S/I: recreation, student, resident (n=107; 12.3%).
T/V/Ot: hiking, visitor, nonresident (n=107; 12.3%).
T/V/I: hiking, visitor, resident (n=36; 4.1%).
O/V/Ot: other, visitor, nonresident (n=113; 13.0%).
O/V/I: other, visitor, resident (n=22; 2.5%).

In Table 9, within the "recreation" category segments (column 7), nonstudents dominated the segments (32.3% were residents and 30.6% were nonresidents) as compared to those of students (18.0% were residents and 19.0% were nonresidents). By the residency category, residents and nonresidents shared almost equal proportions with

Table 9. Sample distributions by the possible visitor segments, GPNP.

Preliminary			Combination1.			Combination2.		
Segment	n	% [a]	Segment	n1	% [b]	Segment	n2	% [c]
R/N/P/Ot	153	17.55	R/N/Ot	182	61.69	R/N/Ot	182	30.64
R/S/P/Ot	100	11.47						
R/N/Sc/Ot	29	3.33	R/S/Ot	113	38.31	R/S/Ot	113	19.02
R/S/Sc/Ot	13	1.49						
Subtotal	295	33.83		295	100.00			
R/N/P/I	169	19.38	R/N/I	192	64.21	R/N/I	192	32.32
R/S/P/I	97	11.12						
R/N/Sc/I	23	2.64	R/S/I	107	35.79	R/S/I	107	18.01
R/S/Sc/I	10	1.15						
Subtotal	299	34.29		299	100.00		594	100.00
T/N/P/Ot	14	1.61	T/N/Ot	14	13.08	T/V/Ot	107	74.83
T/S/P/Ot	92	10.55						
T/N/Sc/Ot	0	0.00	T/S/Ot	93	86.92			
T/S/Sc/Ot	1	0.11						
Subtotal	107	12.27		107	100.00			
T/N/P/I	7	0.80	T/N/I	8	22.22	T/V/I	36	25.17
T/S/P/I	28	3.21						
T/N/Sc/I	1	0.11	T/S/I	28	77.78			
T/S/Sc/I	0	0.00						
Subtotal	36	4.13		36	100.00		143	100.00
O/N/P/Ot	4	0.46	O/N/Ot	5	4.42	O/V/Ot	113	83.70
O/S/P/Ot	86	9.86						
O/N/Sc/Ot	1	0.11	O/S/Ot	108	95.58			
O/S/Sc/Ot	22	2.52						
Subtotal	113	12.96		113	100.00			
O/N/P/I	9	1.03	O/N/I	10	45.45	O/V/I	22	16.30
O/S/P/I	11	1.26						
O/N/Sc/I	1	0.11	O/S/I	12	54.55			
O/S/Sc/I	1	0.11						
Subtotal	22	2.52		22	100.00		135	100.00
Total	872	100.00		872			872	

Note: R/T/O: Recreation/Hiking/Other activity.
N/S: Nonstudent/Student.
P/Sc: Primary/Secondary purpose.
Ot/I: Nonresident/Resident.
V: Visitor (Nonstudent and Student).

Preliminary: All possible combinations of five visitor categories.
Combination1: Combination of "P" and "Sc" categories (e.g., R/N/Ot = R/N/P/Ot + R/N/Sc/
Combination2: Further combination of Combination1 where the "S" and the "N" in "T" and "O" categories are combined (e.g., T/V/Ot = T/N/Ot + T/S/Ot).

[a] Percentages to the total samples.
[b] Percentages within the subtotal samples (e.g., R/N/Ot = 182/295 * 100% = 61.69%).
[c] Percentages within the "Recreation (R)", "Hiking (T)", and "Other (O)" categories (e.g., R/N/Ot = 182/594 * 100% = 30.64%).

the "recreation" category (50.3% for residents and 49.7% for nonresidents). However, in all segments with the "hiking" and the "other activity" categories (column 7), nonresidents dominated the segments (74.8% for the "hiking" and 83.7% for the "other activity" categories) as compared to those of residents (25.2% and 16.3%, respectively). By the occupation category, students had higher proportion in each segment with the "hiking" and the "other activity" categories (column 6). They were 86.9% for the T/V/Ot, 77.8% for the T/V/I, 95.6% for the O/V/Ot, and 54.6% for the O/V/I segments. Conversely, nonstudents generated more contributions in the segments with the "recreation" category.

Following similar steps as applied to the sample, Table 10 represents the population distributions by possible visitor segments. Unlike in the sample, student dominated the "recreation" category segments (column 7) (23.0% for residents and 40.7% for nonresidents) as compared to those of nonstudents (19.7% were residents and 16.7% were nonresidents). In the residency category, 42.7% were residents and 57.4% were nonresidents. However, as in the sample, nonresidents dominated in the segments both with the "hiking" and the "other activity" categories (66.0% and 76.0%, respectively), while residents had 34.0% and 24.0%, respectively. Also, by the occupation category, except in the O/V/I segment, students had higher proportions in the segments both with the "hiking" and the "other activity" categories (column 6). They were 91.1% for the T/V/Ot, 90.3% for the T/V/I, and 91.7% for the O/V/Ot segments.

In terms of regional distributions for the eight visitor segments described above, there was a similarity between the sample and the population (Table 11). Nonresident visitors contributed nearly identical proportion in the sample and the population (59.1% and 61.2%, respectively). The same pattern was also showed by resident visitors (40.9% for the sample and 38.8% for the population). However, some variations occurred when the distributions were observed by the individual segment within the subgroups as identified in column 3 and 6 (Table 11).

Table 10. Population distributions by the possible visitor segments, GPNP.

Preliminary			Combination1.			Combination2.		
Segment	N[a]	%[a]	Segment	N1	%[b]	Segment	N2	%[c]
R/N/P/Ot	5,374	9.19	R/N/Ot	6,393	29.13	R/N/Ot	6,393	16.7
R/S/P/Ot	13,767	23.55						
R/N/Sc/Ot	1,019	1.74	R/S/Ot	15,557	70.87	R/S/Ot	15.56	40.65
R/S/Sc/Ot	1,790	3.06						
Subtotal	21,950	37.54		21,950	100.00			
R/N/P/I	6,621	11.32	R/N/I	7,522	46.09	R/N/I	7,522	19.66
R/S/P/I	7,975	13.64						
R/N/Sc/I	901	1.54	R/S/I	8,797	53.91	R/S/I	8,797	22.99
R/S/Sc/I	822	1.41						
Subtotal	16,319	27.91		16,319	100.00		38,269	100.00
T/N/P/Ot	909	1.55	T/N/Ot	909	8.90	T/V/Ot	10,219	66.04
T/S/P/Ot	9,210	15.75						
T/N/Sc/Ot	0	0.00	T/S/Ot	9,310	91.10			
T/S/Sc/Ot	100	0.17						
Subtotal	10,219	17.48		10,219	100.00			
T/N/P/I	447	0.76	T/N/I	511	9.72	T/V/I	5,256	33.96
T/S/P/I	4,745	8.12						
T/N/Sc/I	64	0.11	T/S/I	4,745	90.28			
T/S/Sc/I	0	0.00						
Subtotal	5,256	8.99		5,256	100.00		15,475	100.00
O/N/P/Ot	239	0.41	O/N/Ot	299	8.34	O/V/Ot	3,587	75.96
O/S/P/Ot	2,618	4.48						
O/N/Sc/Ot	60	0.10	O/S/Ot	3,288	91.66			
O/S/Sc/Ot	670	1.15						
Subtotal	3,587	6.14		3,587	100.00			
O/N/P/I	605	1.03	O/N/I	672	59.21	O/V/I	1,135	24.04
O/S/P/I	424	0.73						
O/N/Sc/I	67	0.11	O/S/I	463	40.79			
O/S/Sc/I	39	0.07						
Subtotal	1,135	1.94		1,135	100.00		4,722	100.00
Total	58,466	100.00		58,466			58,466	

Note: R/T/O: Recreation/Hiking/Other activity.
N/S: Non-Student/Student.
P/Sc: Primary/Secondary purpose.
Ot/I: Nonresident/Resident.
V: Visitor (Nonstudent and Student)

* The entries are calculated by multiplying the sample's proportion of each segment (derived form column 2, Table 9) by the entries of the corresponding segment (derived from column 4, Table 7 or column 8, Table 8). For example, the segment R/N/P/Ot (5,374) results from 153/182 multiply by 6,393.

Preliminary: All possible combinations of five visitor categories.
Combination1: Combination of "P" and "Sc" categories (e.g., R/N/Ot = R/N/P/Ot + R/N/Sc/Ot).
Combination2: Further combination of Combination1 where the "S" and "N" in "T" and "O" categories are combined (e.g., T/V/Ot = T/N/Ot + T/S/Ot).

[a] Percentages to the total population.
[b] Percentages within the subtotal population (e.g., R/N/Ot = 6,393/21,950*100% = 29.13%).
[c] Percentages within the "Recreation (R)", "Top (T)", and "Other (O)" categories (e.g., R/N/Ot = 6,393/38,269*100% = 16.70%).

The eight visitor segments identified in Table 11 are used as the base of estimates in subsequent trip-related spending by segment described in the next section. The trip-related spending within the region made by the first four segments in this table is the basic information for the economic impact analysis. In addition, spending generated by the second four segments in this table could be derived to estimate the "economic significance" of the GPNP to the B-C-S region (see definition of terms).

Table 11. Regional distribution of the sample and population by segment, GPNP.

Visitor segments	Sample			Population		
	n	%[a]	%[b]	N	%[a]	%[b]
R/N/Ot	182	35.34	20.87	6,393	17.88	10.93
R/S/Ot	113	21.94	12.96	15,557	43.51	26.61
T/V/Ot	107	20.78	12.27	10,219	28.58	17.48
O/V/Ot	113	21.94	12.96	3,587	10.03	6.14
Subtotal	515	100.00	59.06	35,756	100.00	61.16
R/N/I	192	53.78	22.02	7,522	33.12	12.87
R/S/I	107	29.97	12.27	8,797	38.74	15.05
T/V/I	36	10.08	4.13	5,256	23.14	8.99
O/V/I	22	6.16	2.52	1,135	5.00	1.94
Subtotal	357	100.00	40.94	22,710	100.00	38.84
Total	872		100.00	58,466		100.00

[a] Percentages to the subtotal.
[b] Percentages to the total.

Trip-related Spending

Trip-related spending in this study was the amount spent within the region of interest (the B-C-S region). Estimates of average trip expenditures were based on the full sample (n = 872 samples), including the zero spending. Because this study used direct interviews to collect trip-related spending data, problems of blank responses on spending (in the questionnaire) were eliminated. Across the sampling frame, the total average trip-

related spending for variable costs was Rp 9,505 per person per day (approximately equal to U.S. $4.4). By applying the population sizes (by segment), total spending can be estimated.

Average Trip-related Spending by Category

Table 12 presents the distributions of the Rp 9,505 average total spending across 28 detailed spending categories and the 5 spending aggregates (identified as subtotals). Among the aggregates, spending for miscellaneous items was the largest portion (40.0%) in which about 50% related to admission and insurance fees (27.4% and 14.0%, respectively). The second largest was spending for food and beverages (29.5%), followed by transportation (18.4%), outside market (9.0%), and lodging (3.1%). Within the transportation expenditures, spending for public transportation in terms of fare/ticket (41.4%) and rental (23.2%) fees was the largest contributor as compared to that for private transportation in the form of gas and oil expenses (23.1%). Within the food and beverage expenditures, spending at grocery stores (58.9%) was higher than that at restaurants (41.1%). Furthermore, visitors also spent more for fruits (51.7%) than for other outside market items.

Average Trip-related Spending by Segment

The detailed trip spending profiles by segment (8 visitor segments) for 28 detailed spending categories are identified in Table 13 (for the "nonresident" category) and Appendix B, Table B-3 (for the "resident" category). The 5 aggregate spending categories are shown as the subtotals in these tables. Trip-related spending variations ranged from an average of Rp 6,889 for nonresident visitors with the "other activity" category (the O/V/Ot segment) to Rp 21,812 per day for resident visitors with the

Table 12. Average trip spending (Rp. per person per day) within the B-C-S region for 28 detailed expenditure items, GPNP.

Items	Rp.	% [a]	% [b]
TRANSPORTATION			
Gas and oil	405.1	23.1	4.3
Repairs & washing	46.04	2.6	0.5
Spare parts	5.12	0.3	0.1
Parking & tolls	151.98	8.7	1.6
Fares/tickets	725.27	41.4	7.6
Rent	406.76	23.2	4.3
Recreation vehicle fares	12.09	0.7	0.1
Subtotal	1,752.36	100.0	18.4
LODGING			
Hotels	275.37	94.5	2.9
Campgrounds	16	5.5	0.2
Subtotal	291.37	100.0	3.1
FOOD AND BEVERAGE			
Grocery	1,648.54	58.9	17.3
Restaurant	1,151.23	41.1	12.1
Subtotal	2,799.77	100.0	29.5
OUTSIDE MARKET			
Fruits	443.15	51.7	4.7
Vegetables	172	20.1	1.8
Other food crops	12.57	1.5	0.1
Plants	222.74	26.0	2.3
Fishes	6.14	0.7	0.1
Subtotal	856.6	100.0	9.0
MISCELLANEOUS			
Equipment rental	122.73	3.2	1.3
Cigarettes	451.05	11.9	4.7
Insurances	530.68	13.9	5.6
Guide fees	34.96	0.9	0.4
Admission fees	1,041.99	27.4	11.0
Attraction fees	12.32	0.3	0.1
Other recreation fees	7.17	0.2	0.1
Film purchase	676.37	17.8	7.1
Film developing	441.07	11.6	4.6
Souvenirs	207.39	5.5	2.2
Clothing	136.9	3.6	1.4
Other expenses	142.48	3.7	1.5
Subtotal	3,805.11	100.0	40.0
Total	9,505.21		100.0

[a] Percentages within the subtotal average (aggregate) spending.

[b] Percentages to the total average spending.

Note: The average spending is derived from the entire sample (n = 872).

Table 13. Average trip spending (Rp. per person per day) within the B-C-S region for 28 detailed expenditure items brought by the nonresident visitors (4 visitor segments), GPNP.

Items	R/N/Ot (n = 182)			R/S/Ot (n = 113)			T/V/Ot (n = 107)			O/V/Ot (n = 113)		
	Rp.	% [a]	% [b]	Rp.	% [a]	% [b]	Rp.	% [a]	% [b]	Rp.	% [a]	% [b]
TRANSPORTATION												
Gas and oil	250.03	17.6	2.8	174.42	14.2	2.1	172.05	7.0	1.3	126.39	25.1	1.8
Repairs & washing	59.27	4.2	0.7	45.64	3.7	0.6	18.69	0.8	0.1	36.50	7.3	0.5
Spare parts	1.83	0.1	0.0	1.18	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0
Parking & tolls	338.97	23.9	3.9	192.78	15.7	2.3	119.00	4.8	0.9	101.33	20.1	1.5
Fares/tickets	484.76	34.2	5.5	760.94	62.0	9.3	2,080.71	84.6	15.8	154.29	30.7	2.2
Rent	271.50	19.1	3.1	5.90	0.5	0.1	70.09	2.8	0.5	80.11	15.9	1.2
Recreation vehicle fares	11.72	0.8	0.1	45.72	3.7	0.6	0.00	0.0	0.0	4.42	0.9	0.1
Subtotal	1,418.08	100.0	16.1	1,226.58	100.0	14.9	2,460.54	100.0	18.6	503.04	100.0	7.3
LODGING												
Hotels	407.19	97.7	4.6	13.61	47.7	0.2	161.33	89.0	1.2	0.00	0.0	0.0
Campgrounds	9.43	2.3	0.1	14.92	52.3	0.2	19.86	11.0	0.2	46.54	100.0	0.7
Subtotal	416.62	100.0	4.7	28.53	100.0	0.3	181.19	100.0	1.4	46.54	100.0	0.7
FOOD AND BEVERAGE												
Grocery	1,052.98	39.5	12.0	1,324.56	54.6	16.1	2,573.98	63.9	19.5	1,276.26	49.8	18.5
Restaurant	1,610.13	60.5	18.3	1,100.18	45.4	13.4	1,452.48	36.1	11.0	1,288.02	50.2	18.7
Subtotal	2,663.11	100.0	30.3	2,424.74	100.0	29.5	4,026.46	100.0	30.5	2,564.28	100.0	37.2
OUTSIDE MARKET												
Fruits	525.00	49.7	6.0	1,055.50	56.9	12.8	231.72	32.2	1.8	189.13	48.5	2.7
Vegetables	252.03	23.8	2.9	294.47	15.9	3.6	238.16	33.1	1.8	44.84	11.5	0.7
Other food crops	21.98	2.1	0.2	0.00	0.0	0.0	29.91	4.2	0.2	11.18	2.9	0.2
Plants	258.14	24.4	2.9	504.42	27.2	6.1	200.00	27.8	1.5	134.96	34.6	2.0
Fishes	0.00	0.0	0.0	0.00	0.0	0.0	19.63	2.7	0.1	9.51	2.4	0.1
Subtotal	1,057.15	100.0	12.0	1,854.39	100.0	22.6	719.42	100.0	5.4	389.62	100.0	5.7
MISCELLANEOUS												
Equipment rental	18.86	0.6	0.2	0.00	0.0	0.0	0.00	0.0	0.0	899.28	26.6	13.1
Cigarettes	387.06	11.9	4.4	335.71	12.5	4.1	543.79	9.4	4.1	358.17	10.6	5.2
Insurances	303.12	9.3	3.4	272.29	10.1	3.3	2,273.70	39.1	17.2	100.36	3.0	1.5
Guide fees	112.64	3.5	1.3	2.95	0.1	0.0	0.00	0.0	0.0	4.91	0.1	0.1
Admission fees	1,383.21	42.6	15.7	1,085.64	40.4	13.2	1,866.29	32.1	14.1	253.22	7.5	3.7
Attraction fees	52.75	1.6	0.6	0.00	0.0	0.0	0.00	0.0	0.0	3.24	0.1	0.0
Other recreation fees	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	55.31	1.6	0.8
Film purchase	515.07	15.9	5.9	509.40	19.0	6.2	770.56	13.3	5.8	276.20	8.2	4.0
Film developing	109.77	3.4	1.2	75.83	2.8	0.9	144.16	2.5	1.1	133.90	4.0	1.9
Souvenirs	230.86	7.1	2.6	213.86	8.0	2.6	57.01	1.0	0.4	443.95	13.1	6.4
Clothing	27.47	0.8	0.3	0.00	0.0	0.0	109.03	1.9	0.8	736.36	21.8	10.7
Other expenses	106.85	3.3	1.2	191.38	7.1	2.3	49.90	0.9	0.4	120.12	3.5	1.7
Subtotal	3,247.66	100.0	36.9	2,687.06	100.0	32.7	5,814.44	100.0	44.0	3,385.02	100.0	49.1
Total	8,802.62		100.0	8,221.30		100.0	13,202.05		100.0	6,888.50		100.0

[a] Percentages within the average subtotal (aggregate) spending.
[b] Percentages to the total average spending.

"hiking" category (the T/V/I segment) (see the column totals in Table 13 and Appendix B, Table B-3). For the aggregate spending categories, the average spending patterns varied across the segments. Most "nonresident" category segments reported that they spent mostly for miscellaneous items, followed by food and beverages, transportation, outside market items, and lodging expenses. Only nonresident students within the "recreation" category (the R/S/Ot segment) spent more for outside market items than for transportation expenses. More variation occurred when the spending patterns were observed across the "resident" category segments. Resident visitors with the "other activity" category (the O/V/I segment) spent the most on food and beverages, while the other three segments spent the most on miscellaneous items. Spending on lodging was identified as the lowest proportion in most segments, except for resident nonstudents within the "recreation" category (the R/N/I segment); they had the lowest spending on outside market items. Table 14 summarizes the average aggregate spending patterns by rank for the eight segments (derived from Table 13 and Appendix B, Table B-3).

The patterns depicted by the average spending by segment confirmed the important role of segmenting into homogeneous spending groups. Without segmentation, results may be misleading based on interpreting the average spending; average spending patterns based on the full sample (Table 12) were different from those of utilizing the sample by segment (Table 13). Other information derived from the survey, in which most segments reported small spending on lodging, was that visitors to the GPNP were mostly the day users. The frequency data (Appendix A, A-3) also support this phenomenon in which only

Table 14. Average spending patterns (ranks) by segment for 5 aggregate spending categories, GPNP.

Items	R/N/Ot	R/S/Ot	T/V/Ot	O/V/Ot	R/N/I	R/S/I	T/V/I	O/V/I
Transportation	3	4	3	3	3	2	3	3
Lodging	5	5	5	5	4	5	5	5
Food and bev.	2	2	2	2	2	3	2	1
Outside market	4	3	4	4	5	4	4	4
Miscellaneous	1	1	1	1	1	1	1	2

Note: The rank 1 is the highest spending, and conversely the rank 5 is the lowest.

about 10% and 15% of respondents reported spent overnight before and after arriving at the GPNP, respectively.

Within the transportation category, spending for fare/ticket and rental fees was higher than that for gas and oil expenses in six out of eight segments. This implied that public transportation was commonly used by visitors during their trips to the park as compared to private transportation. From the frequency data (Appendix A, A-3) it is reported that about 30% of respondents used private transportation to the park.

Within the food and beverage spending, all the "resident" category segments reported much higher spending at grocery stores than at restaurants (varied from about 5% to 28% in differences). However, for the segments with the "nonresident" category, one segment (R/N/Ot) had higher spending at restaurants, two segments (R/S/Ot and T/V/Ot) reported higher spending at grocery stores, and one segment (O/V/Ot) split spending equally between grocery stores and restaurants.

Another important finding from the spending profiles estimates was that almost all the "resident" category segments spent more total average spending as compared to the "nonresident" category segments (see the row total of Table 13 and Appendix B, Table B-3). This means that, in average, transfer of spending by most the "resident" category

segments is higher than new money injected by the "nonresident" category segments in the B-C-S region. This situation was, in part, because:

(1) Only a part of nonresident visitors' spending, which was spending inside the B-C-S region, was included in the estimation.-- For some spending categories, this procedure resulted in only a portion of the spending being captured (e.g., transportation, food and beverage, and some of miscellaneous expenses).

(2) The small samples contained in some the "resident" category segments.-- This applied to resident visitors within the "hiking" and the "other activity" categories (the T/V/I and O/V/I segments) which contained only 36 and 22 samples for each segment, respectively. The small samples, in turn, could produce high spending averages.

Total Trip-related Spending by Segments

For the population, the total spending was Rp 613,616,248 (the sum of grand totals displayed in Table 15 and Appendix B, Table B-4). By segment, resident visitors within the "other activity" category (the O/V/I segment) contributed the lowest spending with about 1.6% from the total spending (derived from column 8, Appendix B, Table B-5). The highest spending was made by nonresident visitors within the "hiking" category (the T/V/Ot segment). The contribution was about 22.0% from the total spending (derived from column 6, Table 16).

In interpreting the role of segments in generating spending in the region of interest, considerations should not only focus on the total spending made, but also on the average spending displayed. For instance, resident visitors within the "hiking" category (the T/V/I segment) created low total spending, but had the highest average spending among the segments (column 8, Appendix B, Table B-3). In the future, with proper management, this segment might generate the highest total spending for the region.

Table 15. Total trip spending (Rp, total population) within the B-C-S region for 28 detailed spending categories brought by the nonresident visitors (4 visitor segments), GPNP.

Item	R/N/Ot (N = 6,393)	R/S/Ot (N = 15,557)	T/V/Ot (N = 10,219)	O/V/Ot (N = 3,587)	Total (N = 35,756)
TRANSPORTATION					
Gas and oil	1,598,441.79	2,713,451.94	1,758,178.95	453,360.93	6,523,433.61
Repairs & washing	378,913.11	710,021.48	190,993.11	130,925.50	1,410,853.20
Spare parts	11,699.19	18,357.26	0.00	0.00	30,056.45
Parking & tolls	2,167,035.21	2,999,078.46	1,216,061.00	363,470.71	6,745,645.38
Fares/tickets	3,099,070.68	11,837,943.58	21,262,775.49	553,438.23	36,753,227.98
Rent	1,735,699.50	91,786.30	716,249.71	287,354.57	2,831,090.08
Recreation vehicle fares	74,925.96	711,266.04	0.00	15,854.54	802,046.54
LODGING					
Hotels	2,603,165.67	211,730.77	1,648,631.27	0.00	4,463,527.71
Campgrounds	60,285.99	232,110.44	202,949.34	166,938.98	662,284.75
FOOD AND BEVERAGE					
Grocery	6,731,701.14	20,606,179.92	26,303,501.62	4,577,944.62	58,219,327.30
Restaurant	10,293,561.09	17,115,500.26	14,842,893.12	4,620,127.74	46,872,082.21
OUTSIDE MARKET					
Fruits	3,356,325.00	16,420,413.50	2,367,946.68	678,409.31	22,823,094.49
Vegetables	1,611,227.79	4,581,069.79	2,433,757.04	160,841.08	8,786,895.70
Other food crops	140,518.14	0.00	305,650.29	40,102.66	486,271.09
Plants	1,650,289.02	7,847,261.94	2,043,800.00	484,101.52	12,025,452.48
Fishes	0.00	0.00	200,598.97	34,112.37	234,711.34
MISCELLANEOUS					
Equipment rental	120,571.98	0.00	0.00	3,225,717.36	3,346,289.34
Cigarettes	2,474,474.58	5,222,640.47	5,556,990.01	1,284,755.79	14,538,860.85
Insurances	1,937,846.16	4,236,015.53	23,234,940.30	359,991.32	29,768,793.31
Guide fees	720,107.52	45,893.15	0.00	17,612.17	783,612.84
Admission fees	8,842,861.53	16,889,301.48	19,071,617.51	908,300.14	45,712,080.66
Attraction fees	337,230.75	0.00	0.00	11,621.88	348,852.63
Other recreation fees	0.00	0.00	0.00	198,396.97	198,396.97
Film purchase	3,292,842.51	7,924,735.80	7,874,352.64	990,729.40	20,082,660.35
Film developing	701,759.61	1,179,687.31	1,473,171.04	480,299.30	3,834,917.26
Souvenirs	1,475,887.98	3,327,020.02	582,585.19	1,592,448.65	6,977,941.84
Clothing	175,615.71	0.00	1,114,177.57	2,641,323.32	3,931,116.60
Other expenses	683,092.05	2,977,298.66	509,928.10	430,870.44	4,601,189.25
Total	56,275,149.66	127,898,764.10	134,911,748.95	24,709,049.50	343,794,712.21

Note: The entries are calculated by multiplying the entries of column 2, 5, 8, and 11 in Table 13 by the population sizes of the corresponding segments (e.g., the gas & oil spending for R/N/Ot (Rp. 1,598,441.79) = Rp. 250.03*6,393).

Table 16. Total trip spending (Rp, total population) within the B-C-S region for 5 aggregate spending categories brought by the nonresident visitors (4 visitor segments), GPNP.

Item	R/N/Ot (N = 6,393)		R/S/Ot (N = 15,557)		T/V/Ot (N = 10,219)		O/V/Ot (N = 3,587)		Total (N = 35,756)	
	Rp.	%	Rp.	%	Rp.	%	Rp.	%	Rp.	%
Transportation	9,065,785.44	16.1	19,081,905.06	14.9	25,144,258.26	18.6	1,804,404.48	7.3	55,096,402.91	16.0
Lodging	2,663,451.66	4.7	443,841.21	0.3	1,851,580.61	1.4	166,938.98	0.7	5,125,818.91	1.5
Food and bev.	17,025,262.23	30.3	37,721,680.18	29.5	41,146,394.74	30.5	9,198,072.36	37.2	105,091,499.76	30.6
Outside market	6,758,359.95	12.0	28,848,745.23	22.6	7,351,752.98	5.4	1,397,566.94	5.7	44,356,465.11	12.9
Miscellaneous	20,762,290.38	36.9	41,802,592.42	32.7	59,417,762.36	44.0	12,142,066.74	49.1	134,124,825.52	39.0
Total	56,275,149.66	100.0	127,898,764.10	100.0	134,911,748.95	100.0	24,709,049.50	100.0	343,795,012.21	100.0

Total Trip-related Spending by Activity Categories

Table 17 presents the distribution of total spending for 5 aggregate spending categories in the population by the activity categories (recreation, hiking, and other activity categories). These were derived by adding the total spending by segments identified in Table 16 and Appendix B, Table B-5 by the activity category. For example, the total spending on transportation for the "hiking" category , Rp 38,396,526 (column 4, Table 17), came from the total spending on transportation made by nonresident visitors who hike (the T/V/Ot segment), Rp 25,144,258 (column 6, Table 16), plus the total spending on transportation made by resident visitors who hike (the T/V/I segment), Rp 13,252,268 (column 6, Appendix B, Table B-5).

Across the activity categories, in the population, the "recreation" generated the highest total spending (53.7%) as compared to the "hiking" (40.7%) and the "other activity" (5.6%) categories. The "recreation" also had the highest proportions of spending across the aggregate spending categories. However, a similar order of aggregate spending was depicted by the three activity categories in which the highest spending was on miscellaneous items, followed by food and beverages, transportation, outside market items, and lodging expenses.

Total Trip-related Spending by Occupation Categories

There are two steps were accomplished in estimating the spending by occupation categories. The first was calculating the proportion of the "nonstudent" and the "student" in total spending made by the segments that contained these categories. This case applied to resident and nonresident visitors with the "hiking" as well as with the "other activity" categories. They were the T/V/Ot and O/V/Ot segments in Table 16 and the T/V/I and O/V/I segments in Appendix B, Table B-5. It was because these segments combined the "student" and the "nonstudent" categories into the "visitor" category. The calculation was done by multiplying the percentage shares of the "nonstudent" and the "student"

Table 17. Total trip spending (Rp, total population) within the B-C-S region for 5 aggregate spending categories by the activity categories, GPNP.

Items	Recreation (R)		Hiking (T)		Others (O)		Total	
	Rp.	%*	Rp.	%*	Rp.	%*	Rp.	%*
Transportation	67,801,243.90	61.3	38,396,526.42	34.7	4,410,954.68	4.0	110,608,839.60	100.0
Lodging	9,186,232.01	80.1	2,034,068.93	17.7	250,338.78	2.2	11,470,655.96	100.0
Food and beverage	89,806,160.11	48.5	83,002,340.50	44.8	12,331,693.86	6.7	185,140,369.14	100.0
Outside market	46,489,420.45	77.5	10,881,735.14	18.1	2,629,564.04	4.4	60,000,777.12	100.0
Others	116,238,644.31	47.2	115,240,319.24	46.8	14,917,005.54	6.1	246,396,206.09	100.0
Total	329,521,700.78	53.7	249,554,990.23	40.7	34,539,556.90	5.6	613,616,847.91	100.0

* Percentages to the row totals.

Note: The spending amount entries are the summation of the total spending made by the visitor segments identified in Table 15 and Appendix B, Table B-4 by taking the activity categories only. For example, the spending on transportation for the hiking category, Rp. 38,396,526.42, is Rp. 25,144,258.26 (column 6, Table 15) plus Rp. 13,252,268.16 (column 6, Appendix B, Table B-4).

categories (column 6, Table 10) by the total spending of each corresponding segment. For example, total spending of the T/V/Ot segment, Rp 25,144,258 (column 6, Table 16), was contributed by nonstudents of 8.9% (Rp 2,227,839) and by students of 91.1% (Rp 22,906,419). The second step was summing all the segments' spending into two groups of spending, nonstudents' and students' spending. No adjustment was made in total spending by the "recreation" category segments because their total spending was already divided into nonstudents' and students' spending. The results of these summations are presented in Table 18.

The table indicates that students accounted for 75.7% of the total spending within the B-C-S region. This was about 50% higher than the total spending incurred by nonstudents (24.3%). Across the aggregate spending categories, students spent higher in almost all categories. The most striking feature was that nonstudents spent relatively higher on lodging expenses when compared to students (73.4% and 26.6%, respectively). However, both students and nonstudents reported that they spent more on miscellaneous items, followed by food and beverages, transportation, outside market items, and lodging expenses.

Total Trip-related Spending by Residency Categories

Table 19 provides the distributions of total spending made by nonresident and resident visitors. The entries of the table were derived from the total column of Table 16 for the "nonresident" category and total column of Appendix B, Table B-5 for the "resident" category. In the population, nonresident visitors accounted for 56.0% of the total spending, whereas the rest, 44.0%, was generated by resident visitors. They divided their expenses more evenly on transportation (49.8% for nonresidents and 50.2% for residents). However, resident visitors spent relatively more on lodging (55.3%) compared to nonresident visitors (44.7%). For the impact analysis, the estimation was derived from

Table 18. Total trip spending (Rp, total population) within the B-C-S region for 5 aggregate spending categories by the occupation, categories, GPNP.

Items	Non-Student (N)		Student (S)		Total	
	Rp.	%*	Rp.	%*	Rp.	%*
Transportation	28,328,241.96	25.6	82,280,483.04	74.4	110,608,725.00	100.0
Lodging	8,415,538.37	73.4	3,055,101.35	26.6	11,470,639.72	100.0
Food and beverage	41,468,210.55	22.4	143,671,983.92	77.6	185,140,194.47	100.0
Outside market	11,864,244.64	19.8	48,136,474.99	80.2	60,000,719.63	100.0
Miscellaneous	58,807,883.95	23.9	187,588,085.14	76.1	246,395,969.09	100.0
Total	148,884,119.47	24.3	464,732,128.44	75.7	613,616,247.91	100.0

* Percentages to the row totals.

Table 19. Total trip spending (Rp, total sample) within the B-C-S region for 5 aggregate spending categories by the residency categories, GPNP.

Items	Nonresident (Ot)		Resident (I)		Total	
	Rp.	%*	Rp.	%*	Rp.	%*
Transportation	55,096,402.91	49.8	55,512,436.70	50.2	110,608,839.61	100.0
Lodging	5,125,818.91	44.7	6,344,837.04	55.3	11,470,655.95	100.0
Food and beverage	105,091,499.76	56.8	80,048,869.38	43.2	185,140,369.14	100.0
Outside market	44,356,465.11	73.9	15,644,312.00	26.1	60,000,777.11	100.0
Miscellaneous	134,124,825.52	54.4	112,271,380.57	45.6	246,396,206.09	100.0
Total	343,795,012.21	56.0	269,821,835.69	44.0	613,616,847.90	100.0

* Percentages to the row totals.

the spending within the B-C-S region made by nonresident visitors which was 56.0% (Rp 343,795,012) of the total spending.

Regional Output Multipliers

In assessing total economic impacts of tourism activities, as described in the literature review chapter, there are three components involved in the calculation: (1) total number of visitors by segment, (2) average spending per visitor by segment, and (3) a multiplier (output, income, or employment, usually). In this case, the estimates are associated with the spending within the region brought by the nonresident visitors. So far, the first two components have been calculated and totaled in the previous sections (see Table 15). This section describes the calculation for estimating the regional output multipliers.

Since there is no input-output table available for the B-C-S region, the regional output multipliers were developed from the 1990 national 66-sector input-output model using the Simple Location Quotient (SLQ) method. This method is a normal approach used in some studies to regionalize an input-output model from the national level. In reducing from the national to the regional level, data on output by industry are usually required to estimate the location quotient (LQ) values. However, in the case that these data are not available (at regional level, for example), other economic indicators such as employment, value added, income, and so on, by sector can also be utilized (Miller and Blair, 1985). This study used gross domestic products (GDP) by sector, which were available for eighteen aggregated sectors to develop the LQ values.

In the process of estimating the regional output multipliers, the number of sectors were maintained as identified in the national model (66 sectors). As in the national model, the regional output multipliers are Type I multipliers (direct and indirect changes). Procedures utilized to reduce the national model to the regional model included:

(1) Calculation of the location quotients (LQs) for the eighteen aggregated sectors.-- This was done by applying Equation (6) with GDP as the weighted factors. The results are presented in Table 20.

(2) Calculation of the regional technical coefficients table (matrix A) from the national table.-- The LQs were available in eighteen aggregate sectors (step (1)); therefore, to get the LQs for detailed sectors (66 sectors), these LQs were disaggregated into sixty-six sectors. In this case, sectors that are in the same aggregate are assumed to have the same LQs. As explained in the SLQ method, for sectors with LQs ≥ 1, the national technical coefficients are directly applied for the regional level (see Equation (7)). For sectors with LQs < 1, the national technical coefficients should be adjusted. The adjustment was accomplished by multiplying each row of the national coefficient table by the appropriate LQ of the sectors (see Equations (8) and (9)). Appendix B, Table B-6 displays the results.

(3) Calculation of the regional output multipliers.-- This was based on the inverse of the Leontief matrix; it was derived by subtracting the matrix A (step (2)) from an identity matrix (a matrix with 1 in its diagonal and 0 in its other cells). The total output multiplier for a sector, then, can be computed by summing sectoral column entries of the inverted Leontief matrix (summarized in Table 21).

In interpreting the LQs, Miller and Blair (1985, p. 297) noted that:

> ".... the simple location quotient has been viewed as a measure of the ability of regional industry i to supply the demands placed upon it by other industries in the region and by regional final demand".

For the sectors with LQs ≥ 1, it is said that the sectors are more localized or concentrated in the region, and these sectors are export oriented. Conversely, if the LQs are < 1, the sectors are less localized in the region, and they are import oriented. Thereby, information derived from Table 20 can be interpreted that 9 out of 18 aggregate sectors were more localized in the B-C-S region, and their production surpluses were assumed to be exported

Table 20. The 1990's gross domestic products by industrial origin at current market prices (billion rupiahs) and the values of location quotients (LQs), GPNP.

Industrial Origin	Regional GDP (The B-C-S)[a]	National GDP (Indonesia)[b]	LQ[c]
Agriculture, Livestock, Forestry and Fishery:	1,329.8	43,062.1	1.424
1. Farm Food Crops	989.1	26,065.5	1.750
2. Farm Non Food Crops	46.5	5,056.4	0.424
3. Estate Crops	62.7	1,797.1	1.609
4. Livestock and Products	169.0	4,560.1	1.709
5. Forestry	5.9	1,931.3	0.141
6. Fisheries	56.6	3,651.7	0.715
Mining and Quarrying:	18.9	28,748.2	0.030
1. Crude Petroleum and Natural Gas		24,695.4	
2. Other Mining and Quarrying		4,052.8	
Manufacturing Industries:	791.5	38,601.5	0.946
1. Manufacturing Without Petroleum & Gas		30,222.6	
2. Petroleum Refinery		3,531.2	
3. Liquid Natural Gas		4,847.7	
Electricity, Gas and Water Supply	59.6	1,258.1	2.185
Construction	307.5	10,827.8	1.310
Trade, Hotels and Restaurants:	971.5	32,153.7	1.394
1. Wholesale and Retail Trade	765.5	26,865.7	1.314
2. Hotels and Restaurants	205.9	5,288.0	1.796
Transportation and Communication:	195.8	11,040.9	0.818
1. Transportation	191.1	9,734.8	0.905
2. Communications	4.7	1,306.1	0.166
Banking and Other Financial Intermediaries	16.4	7,902.3	0.096
Ownership of Dwellings	87.3	4,890.8	0.823
Public Administration and Defense	303.9	12,801.4	1.095
Services	204.8	6,434.1	1.486
Total	4,287.0	197,721.0	

[a]Bogor in Figures, 1991; Cianjur in Figures, 1992; and Sukabumi in Figures, 1992.
[b]Central Bureau of Statistics, Statistical Yearbook of Indonesia, 1991.
[c]Regional location quotients.

Table 21. National and regional output multipliers in 1990 (66 sectors), GPNP[a].

Sector	National (Indonesia)	Regional (B-C-S Region)	Difference	
			Magnitude	%
1	1.25977	1.19511	0.06466	5.13
2	1.27509	1.22593	0.04916	3.86
3	1.29939	1.23088	0.06851	5.27
4	1.10273	1.08156	0.02117	1.92
5	1.15346	1.12643	0.02703	2.34
6	1.18402	1.14262	0.04140	3.50
7	1.62181	1.47386	0.14795	9.12
8	1.53508	1.41163	0.12345	8.04
9	1.19084	1.14699	0.04385	3.68
10	1.62835	1.48685	0.14150	8.69
11	2.02131	1.81104	0.21027	10.40
12	1.56920	1.50631	0.06289	4.01
13	1.25142	1.19272	0.05870	4.69
14	1.26493	1.19863	0.06630	5.24
15	1.23695	1.17487	0.06208	5.02
16	1.24472	1.18648	0.05824	4.68
17	1.22570	1.16524	0.06046	4.93
18	1.47582	1.40010	0.07573	5.13
19	2.19720	2.12388	0.07332	3.34
20	1.77672	1.68039	0.09634	5.42
21	1.31894	1.23805	0.08089	6.13
22	1.29411	1.23883	0.05528	4.27
23	1.42981	1.28813	0.14169	9.91
24	1.37186	1.25447	0.11740	8.56
25	1.16371	1.11847	0.04523	3.89
26	1.39317	1.30915	0.08403	6.03
27	2.27906	1.96057	0.31848	13.97
28	1.92991	1.82290	0.10701	5.54
29	2.15702	2.08343	0.07359	3.41
30	2.07350	1.95260	0.12090	5.83
31	1.90151	1.76937	0.13214	6.95
32	1.92658	1.81750	0.10908	5.66
33	2.03964	1.84994	0.18970	9.30
34	1.84012	1.72208	0.11804	6.41
35	2.35172	2.08622	0.26550	11.29
36	2.71989	2.41341	0.30648	11.27
37	1.88715	1.40543	0.48172	25.53
38	2.48080	2.18219	0.29860	12.04
39	2.62861	2.20937	0.41924	15.95
40	2.58468	2.25470	0.32998	12.77
41	1.78333	1.12547	0.65786	36.89
42	2.70592	2.42837	0.27755	10.26
43	1.98337	1.48731	0.49606	25.01
44	2.17518	1.50136	0.67381	30.98

Table 21 (contd.)

Sector	National (Indonesia)	Regional (B-C-S Region)	Difference	
			Magnitude	%
45	2.34805	2.05577	0.29227	12.45
46	2.33396	1.69378	0.64018	27.43
47	2.53400	2.19300	0.34100	13.46
48	2.84282	2.53068	0.31215	10.98
49	2.53611	2.26112	0.27499	10.84
50	2.31509	2.03229	0.28281	12.22
51	2.30728	1.82493	0.48234	20.91
52	2.44730	1.98157	0.46573	19.03
53	1.30721	1.21157	0.09564	7.32
54	2.00877	1.85749	0.15128	7.53
55	2.15248	1.85437	0.29811	13.85
56	1.74070	1.56122	0.17948	10.31
57	1.81225	1.58104	0.23122	12.76
58	2.24552	1.92127	0.32424	14.44
59	1.58249	1.42999	0.15250	9.64
60	1.51819	1.31949	0.19870	13.09
61	1.48117	1.28642	0.19475	13.15
62	1.42611	1.31856	0.10755	7.54
63	1.00000	1.00000	0.00000	-
64	1.66400	1.54192	0.12208	7.34
65	2.18585	1.96939	0.21646	9.90
66	2.33096	2.12295	0.20801	8.92
Total	120.05439	107.02963	13.02476	10.85

[a]Type I output multipliers (total direct and indirect effects).
Note: These multipliers are derived from the 1990's Indonesia 66-sector input-output table.
Sector names are presented in Appendix B, Table B-2.

to the rest of the nation. Part of these sectors were wholesale and retail trades, hotels and restaurants, farm food crops, and services sectors. Other sectors such as transportation, manufactures, banking and financial intermediaries, and mining sectors were less concentrated in the B-C-S region, and they were assumed to import some inputs for producing their products to satisfy the regional demand.

Regional output multipliers in Table 21 varied from 1.0 (for general government and defense sector) to 2.43 (for manufacture of rubber and plastic wares sector). Compared to the national level, there were differences ranging from 0.0% (for general government and defense sector) to 36.9% (for petroleum refinery sector). In total, the regional output multiplier was lower about 11% than that of the national level.

The procedures described above are not without limitations. This study ignores sectors that might not exist in the region of interest so that it affects the magnitudes of the regional technical coefficients due to biases on the total output by sectors. By applying the same LQs for sectors in the same aggregate, biases in their technical coefficients might result, and in turn, their multipliers may be biased. Furthermore, the level of technology between the national and the regional level might be different so that the productivity level of industries in both levels might be different as well. Therefore, underlying the process of estimating the regional output multipliers from the national model, the following assumptions were made:

(1) The sectors identified in the national model existed in the region being studied.

(2) Technical coefficients developed at the national level were representative for the region of interest.

(3) Industries at the national level represented in particular sectors utilized a similar level of technology as those in the region of concern.

(4) Direct requirements of industries in the national level remain stable over time.

Margining and Bridging Processes

In tourism-based economic impact analyses, margining and bridging are used to match and convert total spending within broad categories injected by nonresident visitors into the region to a final demand vector within specific economic sectors. In a margining process, the total spending made by visitors is delineated to choose what portion of spending is truly associated with industries or sectors that exist within the region of interest since many goods that are purchased by visitors may not be produced within the region. Spending for retail goods usually requires margining because it reflects charges for the output of wholesalers, retailers, transporters, and manufacturers.

In this study, "margining" was applied to total spending for oil and gas, spare parts (for vehicles), cigarettes, photo films, souvenirs, and clothing. To the author's knowledge, the manufacturers that produced these retail goods (e.g. petroleum refinery, manufacturer of transportation equipment and its repair, manufacturer of cigarette, manufacturer of photographic and optical equipment, manufacturer of artist material, and manufacturer of textile, wearing apparel and leather -- all these names referred to the national industrial classification) are located outside the B-C-S region. After identifying the sectors, the next process is to estimate charges for wholesale trade, retail trade, and transportation industries correlated to those retail goods. There is no supporting data available to assess these charges; therefore, margins from comparable sectors in the U.S. are used to approach the estimates (see column 4, Appendix B, Table B-7). The charges were estimated by using the percentage shares of national personal consumption expenditures in the category "other recreation". The charges for wholesale and retail trade industries included operating expenses, profits, and sales taxes. Here, wholesale and retail trades were combined since these industries were classified as one sector in the input-output table used (as a trade sector). Thereby the charges were calculated by multiplying the estimated percentage charges by total spending on such retail goods (derived from the

total column, Table 15). These charges were changes in final demand in the region (see Appendix B, Table B-7).

To develop the final demand vector, a bridge table was constructed. It was done by matching the detailed spending categories (28 categories) to the sectors contained in the Indonesia's 1990 66-sector input-output model. The results are presented in Table 22. In this table, the sector codes are presented in two versions: input-output codes and KLUI codes (the Indonesian Version of Industrial Classification) which are expressed as a five-digit code. The next process was aggregating or disaggregating the spending categories into the appropriate sector or sectors. This process was followed by summing or dividing their spending amounts (identified in Table 23). There were 13 sectors, within the B-C-S region, impacted by economic activities stemming from nonresident visitors associated with the GPNP. One problem that arose in this bridging process concerned the estimation of final demand changes for sectors resulting from a disaggregated spending category. In this case, the other food crops' spending category was disaggregated into 3 sectors (maize, root crops, and other food crops sectors). To estimate the distributions, this study utilized percentage proportions of national (Indonesia) per capita food consumption (excluding rice, fruit, vegetable, fish, and meat) in 1988 (The World Bank, 1994). Assuming that these percentages remain the same as in 1994, they were accounted using 25.78% for maize, 56.75% for root crops, and 17.47% for other food crops. In addition of applying Equation (16), the final demand vector by sector was completely estimated (column 3, Table 23). This vector was calculated by summing the "nonresident" category segments' spending rather than by calculating impacts for each segment.

The change in total final demand in the region of interest accounted for Rp 310,493,506 (total of column 3, Table 23). This was Rp 33,301,506 (about 10%) less than the total spending actually reported by the nonresident visitors, which was Rp 343,795,012 (the total of column 10, Table 16). This reduction was caused by the margining process. Here, from the total spending of Rp 52,084,070 contributed by retail

Table 22. Bridge table derived from the 1990's Indonesia 66-sector input-output table, GPNP.

Spending Categories	Related Sectors		
	I-O Code	KLUI Code[a]	Name of Sectors
Transportation Expenses:			
1. Gas and oil	53	62451; 62452	Trade
2. Repairs and washing	65	97110; 97990	Other services
3. Spare parts	53	62477	Trade
4. Parking fees and toll (road, bridge, etc.)	59	71410; 71490	Services allied to transport
5. Fares/tickets	56	71211	Road transport
6. Rent	59	82211	Services allied to transport
7. Fares for recreation vehicles	65	96215	Other services
Lodging Expenses:			
8. Hotels, motels, rental homes, cottages, etc.	54	64110; 64120; 64200; 64300	Restaurant and hotel
9. Campgrounds (outside the park)	54	64400	Restaurant and hotel
Food and Beverage Expenses:			
10. Grocery stores, convenience, liquor, vendor, soft-drink, and other food and beverage stores (for eating and drinking off-premises)	53	62110; 64120; 62322; 62326; 62329; 62610; 62690	Trade
11. Restaurants, diners, catering, bars, and other eating and drinking places	54	63110-63150; 63200	Restaurant and hotel
Outside Market Expenses:			
12. Fruits	5	11321; 11322	Vegetables and fruits
13. Vegetables	5	11311; 11312	Vegetables and fruits
14. Other food crops	3	11230	Maize
	4	11212; 11211; 11311	Root crops
	6	11230; 11900	Other food crops
15. Plants (including ornamental plants)	17	11339; 12200	Other agriculture
16. Fishes (including ornamental fishes)	23	18211	Fishery
Miscellaneous Expenses:			
17. Rental fees for recreation equipment, rental horse, etc.	65	96139; 97990	Other services
18. Cigarettes	53	62327; 62610; 62690	Trade
19. Insurance fees	61	81411	Financial intermediaries
20. Fees for guide services	65	97990	Other services
21. Admission to recreation sites	65	96133; 96243	Other services
22. Admission to tourist attraction	65	96133; 96243	Other services
23. Other recreation expenses (billiard, golf, movie, fishing, etc.)	65	96215; 96119; 96219; 96250; 96212	Other services
24. Camera film or video tape purchase	53	62466	Trade
25. Film developing or video tape processing	65	97910	Other services
26. Souvenirs or gifts	53	62481-89; 62560	Trade
27. Clothing (including footwear)	53	62419	Trade
28. Other expenses	66	00000	Unspecified sector

[a]KLUI: The Indonesian Version of Industrial Classification.

Table 23. Final demand changes within the B-C-S region by sectors, GPNP.

Spending categories	Impacted sectors (I-O code)[a]	Final demand (Rp)[b]	%	Rank
Other food crops	Maize (3)	125,361	0.04	12
	Root Crops (4)	275,959	0.09	10
	Other Food Crops (6)	84,952	0.03	13
Fruits Vegetables	Vegetables and Fruits (5)	31,609,990	10.18	5
Plants	Other Agriculture (17)	12,025,452	3.87	7
Fishes	Fishery (23)	234,711	0.08	11
Cigarettes Clothing Film purchase Gas and oil Grocery Spare parts Souvenirs	Trade (53)	76,615,302	24.68	1
Campgrounds Hotels Restaurant	Restaurant and Hotel (54)	51,997,895	16.75	3
Fares/tickets	Road Transport (56)	37,140,116	11.96	4
Parking & tolls Rent	Services Allied to Transport (59)	9,576,735	3.08	8
Insurances	Financial Intermediaries (61)	29,768,793	9.59	6
Admission fees Attraction fees Equipment rental Film developing Guide fees Other recreation fees Recreation vehicle fares Repairs & washing	Other Services (65)	56,437,049	18.18	2
Other expenses	Unspecified Sector (66)	4,601,189	1.48	9
Total		310,493,506	100.00	

[a] Derived from the 1990's Indonesia 66-sector input-output table.

[b] Derived from column total (Table 16) with adjustment (margining process).

goods, only Rp 18,782,863 (about 36%) remained within the region; it was separated into two industries: the wholesale, retail trade industry and the transportation industry. From the total change in final demand, the highest proportion of about 25% was contributed to "trade" (sector 53), followed by "other services" (sector 65) of 18%, "restaurant and hotel" (sector 54) of 17%, "road transport" (sector 56) and "services allied to transport" (sector 59) of 15%, "vegetables and fruits" (sector 5) of 10%, and "financial intermediaries" (sector 61) of 10%. Less than 5% was the final demand contributed by the six other sectors (see Table 23).

In economic impact analyses, changes in final demand will affect the transaction activities among affected sectors in the regional economy. To provide those changes in final demand, the producing sectors make transactions with others. Initial transactions made by those sectors reflect direct impacts of the final demand. In addition to direct impacts, however, these initial transactions initiate the stream of transactions as the successive rounds of re-spending occur among the producing sectors. These are what economists call indirect (or) induced impacts. The following section describes the impacts of the final demands identified above.

Regional Economic Impact Estimates

In this study, the impacts of trip-related spending in the B-C-S region were estimated for output (sale), income, and employment. The impacts were measured in total, which includes the direct and indirect changes; the regional multipliers developed in this study were Type I (direct and indirect) multipliers. The "households" sector was excluded from the process of developing output multipliers. Furthermore, the term "income" reflects a number of wages and salaries paid to households by producing sectors to produce their outputs.

To arrive at impact estimates, so far, two important elements have been estimated: a set of output multipliers and a final demand vector derived from the trip-related

spending. Since income and employment multipliers are needed, the next step is calculating income-output and employment-output ratios by related sectors. Assuming that the national 1990 ratios were representative for the B-C-S region in 1993/1994, the calculation was obtained by dividing income and employment by output for each related sector. The results are presented in Appendix B, Table B-8. The employment-output ratio was measured by a number of persons employed per million rupiahs of output. By multiplying the final demand vector by the appropriate output multipliers and applying the Equations (18) and (19), the impact estimates for output, income, and employment, respectively, were developed.

From Appendix B, Table B-8, the first four sectors (i.e., agricultural activities) showed relatively high employment-output ratios. This provides information that these sectors create relatively high employment (labor intensive) to produce a unit of output (million of rupiahs) in the B-C-S region. But, the impact generated by these sectors depends upon the magnitudes of trip-related spending injected into these sectors.

The total impact (direct and indirect) of outputs, income, and employment generated by the trip-related spending for the B-C-S region is presented in Table 24. Trip-related spending by nonresident visitors generated total annual outputs (sales) of Rp 470,769,881 in 1993/1994 for the B-C-S region. In the same year, this output supported Rp 80,115,334 of annual income and employed 155 persons. The distributions of output and income displayed a similar pattern across the impacted sectors. With the employment impacts, however, the variation in ranks occurred (see Table 24). A consistent pattern was shown by "other services" (sector 65) and "trade" (sector 53); they had a relatively high output, supported high income, and high employment. Conversely, " vegetables and fruits" (sector 5) and "unspecified sectors" (sector 66) had a relatively low output, generated low income, but supported relatively high employment. The "restaurant and hotel" sector (sector 54) displayed a relatively high output, provided medium income, and supported very low employment. "Financial intermediaries" (sector 61) presented a

Table 24. Total regional output multipliers and the impacts on regional output, income, and employment by related sectors, GPNP.

Related sector (I-O code)	Change in final demand (rupiahs)	Output Multiplier (rupiahs)	Total impacts (direct and indirect changes)					
			Output[a]		Income[b]		Employment[c]	
			rupiahs	rank	rupiahs	rank	persons	rank
Maize (3)	125,361	1.23088	154,304	12	20,620	12	0	Un[d]
Root Crops (4)	275,959	1.08156	298,466	11	27,399	11	0	Un
Vegetable and Fruit (5)	31,609,990	1.12643	35,606,441	6	4,771,263	6	49	1
Other Food Crops (6)	84,952	1.14262	97,067	13	9,850	13	0	Un
Other Agriculture (17)	12,025,452	1.16524	14,012,538	7	3,945,931	7	3	6
Fishery (23)	234,711	1.28813	302,339	10	39,894	10	0	Un
Trade (53)	76,615,302	1.21157	92,824,801	3	13,730,645	2	30	3
Restaurant and Hotel (54)	51,997,895	1.85749	96,585,569	2	10,947,974	4	3	6
Road Tranport (56)	37,140,116	1.56122	57,983,892	4	9,264,666	5	10	5
Services Allied to Transport (59)	9,576,735	1.42999	13,694,636	8	2,500,641	8	1	7
Financial Intermediaries (61)	29,768,793	1.28642	38,295,171	5	11,128,960	3	1	7
Other Services (65)	56,437,049	1.96939	111,146,561	1	22,380,471	1	37	2
Unspecified Sectors (66)	4,601,189	2.12295	9,768,095	9	1,347,020	9	21	4
Total	310,493,505		470,769,881		80,115,334		155	

[a]Multiplication of the change in final demand (column 2) by the total output multiplier (column 3) of each sector.

[b]Multiplication of the total impact on output (column 6) by the income-output ratio (column 5 Appendix B, Table B-8) of each sector.

[c]Multiplication of the total impact on output (column 6) by the employment-output ratio (column 6 Appendix B, Table B-8) of each sector.

relatively medium output as well as income, but it created very low employment. Finally, "road transport" (sector 56) identified a relatively medium of all economic indicators (output, income, and employment).

Discussion

In addition to the findings discussed above, several important issues need to be discussed in more detail. Through detailed discussions, questions or ideas may arise, and in turn, these may be important for improvements of this study as well as for the needs of future studies. The discussion focuses on unit of measure, sample sizes, visitor segmentation, trip-related spending profiles, developing regional output multipliers, and economic impact estimates.

Unit of Measure

To measure trip-related spending, this study used "rupiahs per person per day" as a unit of measure. It was consistent with the measure of sampling units which was an individual visitor to the park. This decision relied on the assumption that trip-related spending had more to do with individual expenses than with group expenditures. Also, this is appropriate when visitors to the park were mostly day users. These phenomena were identified in the results discussed above.

From the sample, about 78% of respondents reported making trip with friends or business associates. In this type of party, the trip spending was more individual-based rather than an individual paying the group expenditures. Only 22% of respondents made the trip with families, relatives, or spouses. Spending for lodging were the lowest in all segments (Table 13 and Appendix B, Table B-3), as most visitors to the park were day users.

Estimating expenses on a per person basis reduces variance associated with different party sizes; for instance, expenditures on food and souvenirs will more likely vary

with the party size. Variations for expenses like gasoline and spare parts that do not depend much on the party size might have small effects in this study. The results (Table 12, 13, and Appendix B, Table B-3) indicated that most respondents used public transportation rather than private transportation. About 11% from the total average spending was for public transportation expenses as compared to about 5% for private transportation expenses. Furthermore, accounting for children (less than 6-year old) is another complication; it was also negligible in this study as only about 3% respondents reported having children in their groups. They accounted for about 0.5% from the total group members.

Sample Sizes

Because of time constraints, the problem of seasonality (over the year) could not be detected in this study. As a result, the samples from the survey were not a true representative for the population as the timeframe was different. However, information that could be derived to analyze the sample was the annual distribution patterns of the population units by visitor category. As identified in Table 6, the distribution patterns of the sample by visitor category showed a similar pattern as those of the population, which meant that both in the sample and the population "recreation" dominated the visitor activities, "student" participated more than "nonstudent", and "nonresident" contributed more than "resident". The differences were concerned with the degree of representativeness of each category between the two frames. In the sample, applying the proportional allocation of the samples relative to the population, "student" category was likely under-represented, while "nonstudent" and "other" categories were likely over-represented. However, these patterns were more likely a reflection of the true nature in the survey area during the time the survey was conducted (school season and fasting month) rather than some integral design flow (sampling and questionnaire designs).

The minimum sample size required to estimate the average trip-related spending for the population depends on the amount of sampling error one can tolerate. Unfortunately, this sampling error was not available (from previous studies or pilot surveys) for the GPNP area. As a guide, a similar study conducted in the U.S. reported that, by taking into account the likelihood of potential non-sampling errors and the expected accuracy of use estimates, errors below 0.20 (20%) are reasonable in estimating trip-related spending (Propst and Stynes, 1992). Table 25 indicates that, for this study, the sampling error for the average total spending was 3% with a 95% confidence interval of Rp 8,944 (lower bound) and Rp 10,066 (upper bound). Thus, by applying the 20% error guideline, the total sample of 872 respondents used in this study was adequate to estimate the average total spending for the population.

By segment (see Table 26), seven of the eight segments had the error below 20% or even below 10%. Among these segments, the lowest sample size was 36 respondents (the T/V/I segment). Only one segment (the O/V/I segment) had the error exceeded the 20% error guideline; it contained the sample size less than 36 respondents. Thus, for trip-related spending, a reasonable sampling size in future studies is at least 36 respondents per segment or 288 respondents for the total sample if the segments are maintained as in this study. By applying the 36 sample size per segment and utilizing the standard deviations as presented in Table 26, the errors are still below 20% for each segment (ranging from 8.9% to 18.7%); the error for the average total spending is about 5%.

If one is interested in total samples without segmentation, the minimum sample size for assessing the population mean can be approached by the following Equation suggested by Bhattacharyya and Johnson (1977), by assuming that the population distribution is normal, as follows:

$$n = \frac{Z_{\alpha/2}^{\ 2}\sigma^2}{d^2} \qquad (20)$$

Table 25. Selected statistics for trip-related spending by 28 detailed spending categories, GPNP.

Items	Mean	Std. Dev	Std. Error	Pct. Error	95% CI	
					Mean(-)	Mean(+)
Gas and oil	405.10	1,477.66	50.04	12.4	305.02	505.18
Repairs & washing	46.04	414.07	14.02	30.5	18.00	74.08
Spare parts	5.12	97.54	3.30	64.5	0.00	11.73
Parking & tolls	151.98	584.76	19.80	13.0	112.38	191.58
Fares/tickets	725.27	1,459.75	49.43	6.8	626.40	824.14
Rent	406.76	1,533.82	51.94	12.8	302.88	510.64
Recreation vehicle fares	12.09	180.94	6.13	50.7	0.00	24.34
Hotels	275.37	2,193.33	74.27	27.0	126.82	423.92
Campgrounds	16.00	89.52	3.03	18.9	9.94	22.06
Grocery stores	1,648.54	2,703.70	91.56	5.6	1,465.42	1,831.66
Restaurants	1,151.23	2,309.32	78.20	6.8	994.82	1,307.64
Fruits	443.15	1,455.56	49.29	11.1	344.57	541.73
Vegetables	172.00	673.46	22.81	13.3	126.39	217.61
Other food crops	12.57	141.29	4.78	38.1	3.00	22.14
Plants	222.74	1,740.77	58.95	26.5	104.84	340.64
Fishes	6.14	91.25	3.09	50.3	0.00	12.32
Equipment rental	122.73	510.22	17.28	14.1	88.17	157.29
Cigarettes	451.05	829.14	28.08	6.2	394.89	507.21
Insurances	530.68	934.75	31.65	6.0	467.37	593.99
Guide fees	34.96	724.29	24.53	70.2	0.00	84.01
Admission fees	1,041.99	1,496.92	50.69	4.9	940.61	1,143.37
Attraction fees	12.32	212.10	7.18	58.3	0.00	26.69
Other recreation fees	7.17	46.81	1.59	22.1	4.00	10.34
Film purchases	676.37	1,823.04	61.74	9.1	552.90	799.84
Film developing	441.07	1,754.52	59.41	13.5	322.24	559.90
Souvenirs	207.39	854.51	28.94	14.0	149.52	265.26
Clothing	136.90	729.83	24.71	18.1	87.47	186.33
Other expenses	142.48	666.23	22.56	15.8	97.36	187.60
Total	9,505.21	8,282.27	280.47	3.0	8,944.27	10,066.15

Note: Pct. Error = standard error of the mean as a percentage of the mean.
Two standard errors yield a 95% confidence interval (CI).

Table 26. Selected statistics for trip-related spending by segment, GPNP.

Segment	n	Mean	Std. Dev	Std. Error	Pct. Error	95% CI	
						Mean(-)	Mean(+)
R/N/Ot	182	8,802.56	7,955.72	589.72	6.7	7,623.13	9,981.99
R/S/Ot	113	8,221.33	6,720.37	632.20	7.7	6,956.93	9,485.73
R/N/I	192	8,186.29	8,295.92	598.71	7.3	6,988.88	9,383.70
R/S/I	107	9,522.68	7,993.32	772.74	8.1	7,977.19	11,068.17
T/V/Ot	107	13,202.05	7,362.05	711.72	5.4	11,778.62	14,625.48
T/V/I	36	21,811.88	11,641.61	1,940.27	8.9	17,931.34	25,692.42
O/V/Ot	113	6,888.48	4,755.48	447.36	6.5	5,993.76	7,783.20
O/V/I	22	8,661.44	9,708.20	2,069.80	23.9	4,521.85	12,801.03
Total	872	9,505.21	8,282.27	280.47	3.0	8,944.26	10,066.16

Note: Pct. Error = Standard error of the mean as a percentage of the mean.
Two standard errors yield a 95% confidence interval (CI).

where n : estimated sample size,

$z_{\alpha/2}$: marginal value associated with the level of confidence ($1-\alpha$) (derived from the Standard Normal Probabilities Table),

σ: population standard deviation, and

d : margin of error.

With a 20% error, here sample size would be 78. However, maintaining the analysis by segments to come up with the total sample estimate is suggested. It is because each segment has a different standard deviation and hence a different standard error.

Visitor Segmentation

The idea of visitor segmentation is to know who is affected by a particular action and reduce variation in spending patterns with segments that are relatively homogeneous in their spending patterns. Suitable segments may vary from one situation to another. For economic impact analyses, at least resident visitors should be distinguished from nonresident visitors. Other categories should be relied on the distinct characteristics of visitors and what kind of management and planning would be evaluated.

In the application for appropriate analysis and reporting, sufficient segments will be affected by the sample sizes resulting from the survey. The sample sizes will determine a number of samples contained by each segment. Insufficient samples by segment could result in an aggregation of the segments because of statistical analysis requirements. In this case, based on the Central Limit Theorem, the minimum number of samples (observations) in each segment should be greater than 30. This sample size is expected to provide a satisfactory approximation for situations in which the population distribution has a normal form (Bhattacharyya and Johnson, 1977).

This study tried to divide visitor groups into 24 segments. However, only a small portion of several visitor categories had large samples, and through aggregation processes (2 rounds) these resulted in 8 final segments. As can be seen in Table 6, the "hiking" and

the "other" categories had small samples. As a consequence, segments resulting from using these categories in their combinations would also be small in their sizes. In statistical analysis, the small size of segments could have higher variances (and hence higher standard errors) than others.

Trip-Related Spending Profiles

The important role of visitor segmentation, by which homogeneous spending is gained, was supported in this study. Without segmentation (adjustment), the average total spending accounted for Rp 9,505 per person per day (Table 14). However, with segmentation, the average total spending varied from Rp 6,889 to Rp 21,812 per person per day (Table 13 and Appendix B, Table B-3). One may use the average total spending without adjustment for their further analyses. The author urges that, for getting more precise estimates, the average total spending should be handled separately by segment as the patterns of variances or errors may vary between the two ways and among the segments as well.

However, one should know that the total spending and hence the total impact estimates are affected by segmentation if the sample does not represent the population. For the population, without adjustment (for segments), the total spending was Rp 555,731,607 (Rp 9,505.21 x 58,466). Using adjustments in this study, the total spending for the population was reported Rp 613,616,248. This was because the population distribution was not estimated by using the sample proportion; it was derived from the secondary data.

Regional planners should be careful in interpreting spending profiles when making recommendations. From Table 13, Table 15, Table B-3, and Table B-4, it was clear that the patterns of average total spending and total spending were different across the segments. A segment with a relatively high average total spending did not mean that its total spending was also high. Conversely, a low average total spending in a segment did

not always reflect that its total spending was also low (see the ranks in Table 27). For instance, resident visitors within the "hiking" category (the T/V/I segment) had the highest average total spending; however, its total spending was not the highest. The highest total spending was spent by nonresident visitors within the "hiking" category (the T/V/Ot segment). These phenomena are due to the differences in population sizes among the segments.

Table 27. Ranks or patterns of spending for eight segments, GPNP.

Spending	R/N/Ot	R/S/Ot	T/V/Ot	O/V/Ot	R/N/I	R/S/I	T/V/I	O/V/I
Average	4	6	2	8	7	3	1	5
Total	6	2	1	7	5	4	3	8

By activity category, the "recreation" segments dominated total spending for the population. The high proportion was probably more a reflection of the true nature of the study area in which facilities for recreation activities were more appropriate. Very few campgrounds were available in the study area; they were in poor conditions. The "other activity" (hiking) needed a particular requirement; only younger people were able to participate in this activity (the elevation is about 2,000 m above sea level and more).

By occupation category, the "student" spent more higher total spending than that of the "nonstudent". The excess was about 50%. This was because of the higher participation of students as compared to nonstudents in the GPNP. As indicated in Table 6, for the population, students accounted for about 72% whereas nonstudents comprised about 28% (about 50% in difference).

Furthermore, the total spending by the "nonresidents" was higher than that of the "residents" (about 12% in deference). The "nonresident" participation was about 61%, while the "resident" was about 39% (about 22% in difference). Unlike in the occupation

category, the percentage excess spending was lower than the percentage excess participation. This was because the average total spending by the "nonresident" was slightly lower than that by the "resident"; they were Rp 9,169 and Rp 9,990 per person per day, respectively (derived from Table 13 and Appendix B, Table B-3).

Developing Regional Output Multipliers

The Simple Location Quotient method used in this study is one non-survey method for regionalizing coefficients from the national level. Given available data, this study used the GDP by aggregate sectors as weighted factors. The rationale of using it is that GDP is a part of domestic gross input or output accounting. GDP is defined as the current market value of all final goods and services produced by the domestic economy during a year or time period (Peterson and Esterson, 1992). On the expenditure side, GDP represents the total purchases of goods and services by consumers and governments, gross private domestic investment, and net exports of goods and services. On the income side, GDP shows both the total income created as a result of current productive activity and the allocation of this income. Thus, in input-output terms, GDP is identified as the total final demand minus imports or as the total value added plus import sales tax and import duty. GDP reflects the ability of a region to produce goods and services, so that, in using the Simple Location Quotient method, GDP is a valid factor (as a weighted factor) for adjusting the national coefficients to the regional level.

In addition to some limitations described in the results part above, other drawbacks of procedures used in this study are concerned with time differences. The data for GDP as well as the national input-output model were available for the year of 1990. By the time of this study, 1994, these data possibly change. Therefore, the value of LQs are probably no longer correct. The national technical coefficients used to estimate the regional coefficients might also change as the structural economy and the level of technology change; the static nature of input-output models is also the limitation. These changes, in

turn, could result in biases in the regional output multiplier estimates. Besides the assumptions addressed in the results part above, therefore, this study also assumes that proportions of the GDP (regional to national), the structural economy, and the level of technology remain stable over time. However, if the economy does not change drastically in the time period in question, the static nature of an input-output table is not a huge problem (Miernyk, 1965).

Economic Impact Estimates

In the margining process, it was roughly estimated that all manufacturing industries were located outside the B-C-S region. It is probably not true for particular industries such as an industry that produces souvenir goods. These products, in the B-C-S region, were manufactured more locally. Therefore, for future study, accurate information concerning the existence of manufacturing industries within the B-C-S region should be collected.

From the foregoing impact estimates described in the results part, one may say that the GPNP has a minor role for the B-C-S region in terms of its recreational economic contribution. This might be true if the impacts are compared to the overall economy of the B-C-S region. In 1990, total GDP for the region (in current market prices) was about Rp 4,287 billion, and number of people who were seeking jobs in 1992 (based on the education level) was reported about 71,300 (the B-C-S, 1992). However, one should realize that the economical role of the GPNP to the B-C-S region is greater than the impact estimates have been calculated above. The rationale for this conclusion is that:

(1) The impact estimates were based only on the Type I regional output multipliers which meant only the direct and indirect effects were calculated. The flow of money due to re-spending from households (induced effects) was not included in the estimates. If so, the estimates must be higher than those identified in this study. Archer (1977) indicated that the Type II multiplier (including direct, indirect, and induced effects) is

more appropriate for assessing the economic impact of recreation and tourism as most of secondary (indirect and induced) effects of tourists' spending are induced effects. The study by Stynes and Propst (1992) indicated that the induced effect for output (sales), income, value added, and employment is about twice (100%) as much the indirect effect.

(2) In estimating the impact on income, this study rested heavily on income-output ratios. The results indicated that the average ratio was about 16% (derived from Appendix B, Table B-8). This was likely an underestimate as the income included in the estimation only covered wages and salaries. Thereby, proprietors income/profit of many family businesses, for example, may be missing from the estimation. Hence, the impact derived from the income-output ratios as applied in this study may be underestimated.

(3) The impact estimates accounted only for the spending stemming from the nonresident visitors. The government expenditures for managing the park were excluded from the estimation. For the year of 1993/1994, these expenditures (from the central government) were reported to be about Rp 1.2 billion (GPNP, 1994). It was about four times of the final demand generated by the nonresident visitors calculated previously. Significant amounts of these expenditures would likely be made in the B-C-S region.

(4) The role of the GPNP in the regional economy is not only reflected by the economic impact terms per se. Though not included in the impact analysis, the resident visitors' spending within the region (accounting for Rp 269,821,536) also affected the B-C-S economy. The economic significance of the park in the B-C-S region is much greater. In this case, the spending of both resident and nonresident visitors are included in estimating economic effects.

(5) Finally, this study did not calculate the economic effects of visitors' spending outside the B-C-S region. Some visitors spent their money outside the region during the trip to the park, and these expenditures are part of the total impacts -- they are simply

outside the B-C-S region. Spending for durable goods that might be linked with some particular activities was also not estimated.

Even if one may say that the GPNP has a minor role in economic activity for the B-C-S region, it may have great value in other roles. As a protected area, the GPNP has at least 4 major roles: (1) a biodiversity reserve, (2) a hydrological reserve, (3) a natural features scenery reserve, and (4) an area for scientific, educational and recreational use. In this study, the economic impacts of the last role were calculated. The values of the first three roles above have not been determined. If needed, several of these values might be included in a benefit-cost framework. Since there is not a market that reflects these values, several methods (i.e., the contingent valuation and the hedonic methods) solicit the benefits by asking the users what they are willing to pay for those roles; this benefits were beyond the scope of this study, however.

SUMMARY AND CONCLUSIONS

Introduction

The topics associated with this study's objectives have been addressed throughout the previous chapters. The results are summarized in the first part of this chapter. Then, conclusions pertinent to the major findings of this study (the strengths and drawbacks) are presented. Several recommendations addressed next are concerned with the improvement of this study as well as the needs of future studies. Finally, possible applications of the results are presented at the end of this chapter.

Summary

The overall purpose of this study is to provide an analytical framework for estimating economic impacts of GPNP visitors' trip-related expenditures in the B-C-S region. The Indonesian government has encouraged the roles of the GPNP as a protected area for regional economic development, on one hand, but has lacked methods for assessing those roles, on the other hand. In this study, no attempt was made to estimate the value (benefit) of the park to the participants themselves or as a protected area. Also there was no attempt to include the costs and the environmental and social impacts generated by those recreation activities.

Consistent with the purpose of this study, topics related to economic impacts have been addressed. Systematically, these involved developing instrument designs, procedures of data collection and data analysis, developing market segments and their spending profile estimates, and assessing the impacts. Since the impact estimates were analyzed by using an input-output model, these procedures were germane to the requirements of input-output analysis.

A primary instrument used in this study was a five-page on-site questionnaire for primary data collection. Designing a questionnaire is a crucial task as it will determine the quality of input data which, in turn, will influence confidence in the impact estimates. Therefore, the seventeen questions addressed in the questionnaire were carefully structured in a manner to meet the requirements of developing visitor segments, spending profiles, and impact analyses. Besides the spending information, open-ended answers were not allowed in the questionnaire. For the needs of visitor segmentation, the questions also provided linkages with the secondary data obtained from the park headquarters.

To obtain the primary data, on-site (direct) interviews were conducted on every weekend day and on a selected weekday between January 22 and April 17, 1994. Systematic random sampling was used. Thirteen experienced GPNP staff members were recruited as enumerators to conduct the interviews which resulted in 934 interviews. About 1% of interviewees refused to participate and about 5% of them were nonusable, leaving about 94% (881 respondents) as a sampling frame.

Using the Paradox Relational Database Version 3.5 (Borland), the on-site interview data were organized, validated, and edited. The primary database was developed in a matrix form with variable names (codes) as the columns (134 columns) and the respondents' identification numbers corresponding to the date of interviews as the rows (881 rows). This also applied to the secondary data in which 51 variable names as the columns and 1,443 dates as the rows were developed. Outliers (45 nonusable questionnaires) were crossed out from the primary database. For the computations, this study used the SPSS-PC software to develop spending profiles; all user-defined missing data (there were 9) were excluded from the computations.

To observe the degree of representativeness of the sample relative to the population, the analysis relied on the population distribution as the true representative.

By using the proportional allocation approach, the sample distributions were analyzed. The population distribution was derived from the secondary data administered by the GPNP management for the period of April 1, 1993 to March 30, 1994 (annual basis). The results of this study indicated that, across the visitor categories (residency, activity, and occupation), the distribution patterns of the sample were similar to those of the population. However, if the comparison was considered to each visitor category, it was likely that the sample represented lower proportions for the "hiking" and the "student" categories and higher proportions for the "other activity" and the "nonstudent" categories as compared to those in the population. For the "residency" category, both the sample and the population revealed similar patterns (see Table 6). The sample distribution by category reflected the distribution patterns across the combination of the categories (see Table 11). These phenomena were due in part to the different timeframe between the sample and the population, and the true nature of the survey area during that survey period.

From the database, some variables (e.g., residency, activity, occupation, group size, and spending data by category) were derived to estimate trip-related spending profiles. Based on the characteristics of visitors and their economic activities, this study applied rupiahs (the Indonesian currency) per person per day as a unit of measure. To estimate spending profiles by segments, grouping the visitors into segments was required. Combinations of four visitor categories used in this study (residency, activity, occupation, and purpose of visit) resulted in a 24 preliminary visitor segments. Due to small samples contained in some segments, for the purpose of analysis and reporting as well as statistical requirements, these segments were reduced (combined) to 8 segments.

To show the adequacy of the sample size for estimating the population average spending, statistical analyses were performed. The results indicated that, for the total sample (n = 872), the sampling error was about 3%. By segment, seven of the eight segments had the error of less than 10% (the lowest sample size was 36); only one

segment (the O/V/I segment) had the error of 24% (the sample size was 22). Applying the 20% error guideline, the total sample and the sample size of the segments were much more adequate, except for the O/V/I segment. Therefore, for future studies, the author suggests that the minimum sample size per segment is at least 36 or 288 samples in total if the segments are maintained as in this study.

Once visitor segmentation was completed, then the spending profiles were estimated. There were 28 trip-related spending categories which were grouped into 5 aggregate categories observed in this study. The importance of visitor segmentation was clearly identified by the results of this study. Without adjustment (for segments), the average total trip-related spending within the B-C-S region was Rp 9,505 per person per day with distributions: 40.0% for miscellaneous items, 29.5% for food and beverage, 18.4% for transportation, 9.0% for outside market items, and 3.1% for lodging. With adjustment, the average total spending as well as the distributions varied across the segments. The results indicated that the average total spending was ranging from Rp 6,889 for nonresident visitors with the "other activity" category (the O/V/Ot segment) to Rp 21,812 per person per day for resident visitors with the "hiking" category (the T/V/I segment). The average total spending distributions were also slightly different across the segments. For example, the average spending for miscellaneous items which was reported as the highest proportion by the 7 segments was the second highest spent by resident visitors with the "other activity" category (the O/V/I segment). However, this study indicated that adjustment did affect total spending. The difference depicted by the total spending for the population was because the segment proportions in the population were different from those in the sample; the population data were not derived from the sample.

Some important information derived from the spending profiles was that seven out of eight segments reported that they had the lowest spending on lodging expenses, and six out of eight segments spent higher on fare/ticket and transportation rental fees than on gas and oil expenses. This information confirmed the rationale mentioned previously that the

visitors to the GPNP were mostly day users and public transportation was more commonly used to make the trips than private transportation. The information was also supported by frequency data presented in Appendix A, A-3.

To arrive at the impact analysis, the total trip-related spending (for the entire population) within the B-C-S region should be determined. This study estimated that this spending was Rp 613,616,248 from which about 22.0% (the highest) was contributed by nonresident visitors within the "hiking" category (the T/V/Ot segment) and about 1.6% (the lowest) stemmed from resident visitors within the "other activity" category (the O/V/I segment).

By activity categories, the "recreation" category contributed the highest total spending (more than 50%) to the B-C-S region, followed by the "hiking" and the "other activity" categories. Across the aggregate spending, the highest spending was for miscellaneous items, followed by food and beverage, transportation, outside market items, and lodging expenses. By occupation categories, the "student" category had higher total spending than that of the "nonstudent" (75.7% and 24.3%, respectively). The striking feature was that the "nonstudent" category spent much more on lodging compared to the "student" category (more than 50% in difference). Furthermore, by residency categories, the "nonresident" total spending was higher than the "resident" total spending. They were 56.0% and 44.0% for the "nonresident" and the "resident" categories, respectively. This 56.0% of total spending was used to estimate the impacts to the B-C-S region; this spending was basically the final demand.

Once the final demand in broad spending categories was estimated for the impact analysis, additional steps were taken for determining regional economic multipliers, computing margin and bridge tables to construct a final demand vector by the appropriate sectors, and calculating the impacts themselves.

The final demand estimated above was basically the direct expenditures in the B-C-S region by nonresidents. However, these expenditures were not the only impacts on the

region. The effect of this spending when re-spent by recipients could produce indirect impacts. By using economic multipliers, the magnitudes of these impacts (direct and indirect effects) were estimated. Ideally, economic multipliers for an economy should be obtained from an input-output study conducted within that economy. If these multipliers are not available, they can be derived from the national input-output model. To estimate multipliers appropriate for the B-C-S region, this study relied on the 1990 Indonesian 66-sector input-output model. Here, the assumptions are that the national level of technology, level of industrial productivity, and economic structures are appropriate for the regional level. Another assumption is that the national technical coefficients remain stable over time. This study applied the Simple Location Quotient (SLQ) technique for adjusting the national technical coefficients by using gross domestic products (GDP) by sector as the weighted factor. The regional multiplier was then calculated by inverting the Leontief matrix derived by subtracting the regional technical coefficients matrix from an identity matrix. As for the national model, the estimated multipliers were Type I output multipliers (direct and indirect effects). The results indicated that the total regional output multiplier was about 11% lower than that of the national level.

The idea of the margining process is to identify the proportion of the spending associated only to the goods that are produced within the region of concern. Many goods that are purchased by visitors may not be produced within the region. In this study there were 6 spending categories that were margined: oil and gas, vehicle's spare parts, cigarettes, photo films, souvenirs, and clothing. By applying percentage margins used in the U.S. (under category of "other recreation"), it was estimated that 36% of the spending as actually injected to the B-C-S region through two impacted sectors: wholesale-retail trade and transportation sectors. The next step was developing a bridge table to convert the final demand vector by broad spending categories to the final demand vector by appropriate sectors. It was done by matching the detailed spending categories (28 categories) to the sectors contained in the 1990 Indonesian 66-sector input-output table.

The results indicated that there were 13 sectors, within the B-C-S region, impacted by the final demand stemming from economic activities of nonresident visitors associated with the GPNP. The change in total final demand in the B-C-S region accounted for Rp 310,493,506. This was about 10% less than the total spending actually reported by the nonresident visitors (Rp 343,793,012). This reduction was due to the margining process.

From the total change in final demand, the highest proportion of about 25% was attributed to "trade" (sector 53), followed by "other services" (sector 65) of 18%, "restaurant and hotel" (sector 54) of 17%, "road transport" (sector 56) and "services allied to transport" (sector 59) of 15%, "vegetables and fruits" (sector 5) of 10%, and "financial intermediaries" (sector 61) of 10%. Less than 5% of the final demand was attributed to the other six sectors (see Table 23).

Impacts were estimated for three economic indicators: output or sales, income, and employment. To estimate the total impacts (direct and indirect effects) on output, the estimated regional output multipliers were multiplied by the final demand vector which was converted to sectors. As the regional income and employment multipliers were not developed, to estimate the impacts, this study follows an assumption of linearity relationship of income, employment and output, which means that changes in output will be followed proportionally by changes of income and employment. Thereby, the income-output and the employment-output ratios were determined. This study used the 1990 national ratios as the B-C-S ratios with an assumption that the national ratios remained stable over time and were representative for the region. The total impacts were then estimated by multiplying those ratios by the total impacts on output for each corresponding sector.

This study estimated that the trip-related spending injected by nonresident visitors generated total annual outputs or sales of Rp 470,769,881 to the B-C-S region in 1993/1994. In the same time, this output supported Rp 80,115,334 of annual income and employed 155 persons. In terms of output and income, the highest impacts were

attributed to the "other services" sector (sector 65) which accounted for about 24% and 28%, respectively. However, in terms of employment, the "vegetables and fruits" sector (sector 5) received the highest impact which was estimated at about 32%. Those magnitudes of impacts should not be considered as a comprehensive description of the GPNP's contribution to the B-C-S region. It only described economic effects associated with particular spending (trip-related spending) and visitor (nonresident visitors). One should realize that spending incurred by resident visitors, spending on durable goods, governments expenditures for operating the park, and other local costs associated to the park were excluded from the impact analysis.

Conclusions

Relevant to the objectives of this study, given the data currently available, the methods or techniques applied herein are sufficient to develop a database consisting of visitors' expenditures stemming from participation in recreation activities in the GPNP and to estimate corresponding impacts of these expenditures to the B-C-S region. Three of the major findings are that the sampling unit (an individual visitor), the method of primary data collection (on-site interview), and the unit of measure (rupiahs per person per day) used in this study are relevant to the study area as these reflect the true nature of visitors' characteristics and their economic activities associate to the park.

By applying the 20% error guideline, the total sample used in this study was much more sufficient to estimate the average trip-related spending for the population. Even, if the segments are maintained as in this study, reducing the total sample up to 288 samples is still adequate, as the errors would remain below 20% (by segment and total). However, one should consider that each segment should contain at least 36 samples; for a particular segment (e.g., the O/V/I segment), a sample size of less than 36 would result in a sampling error of more than 20%.

The procedure of estimating the total spending used in this study has reduced problems with annual seasonality because of utilizing the annual visitation data (secondary data) derived from the GPNP headquarters. Therefore, spending profiles estimated from appropriate sample sizes permit calculation for the total spending on an annual basis. However, it would be a problem if spending profiles in the study area change over the year. In this case, a short effort survey at different times in a particular year may be needed.

Maintaining the spending profiles by segments is important for further analyses or applications. In this study, adjustments (for segments) affect the total spending, and hence the total impact. By segmentation, managers could grasp broader information on spending profiles and apply them, for example, for designing many programs, planning, or activities associated with recreation economy.

Given limited secondary data in this study, utilizing the Simple Location Quotient technique is very useful for regionalizing the national input-output model to estimate the regional output multipliers. However, errors stemming from secondary data employed by such a technique (non-survey technique) are unknown. Another problem is that the effect of not aggregating or excluding unrelated sectors on the estimated output multipliers (and hence on the impact results) is also unknown. These were beyond the scope of this study, however.

In assessing the impacts, the author assumes there is a linear relationship of output, income, and employment. This assumption implies that more visitors added to the resource base means equal amount of increase of impacts. However, one should realize that this is independent of effects on environmental quality and social stability of nearby communities.

The purpose of impact analysis under the objective of this study is to quantify the economic effects in the B-C-S region associated with the GPNP's visitors, but is limited to nonresidents' trip-related spending. By these limitations the impact results are not enough

to express a comprehensive description of the GPNP economic contribution to the B-C-S economy. There are a lot of impacts and values that are relevant and important but not covered in this typical input-output study. The author believes that the impact estimates from this study are only a beginning for better understanding a part of the economic roles of the GPNP.

Recommendations

Regarding the objectives of this study, several positive findings have been described throughout this thesis. However, the author realizes that many weaknesses still exist in this study. Therefore, for the improvement of this study as well as for the needs of future studies, the following are some recommendations that may be useful:

(1) The results of this study indicated that the number of respondents participating in the survey (response rates) were very high, and the method used for primary data collection (i.e., on-site interview) reduced the problem of respondents' illiteracy and eliminated blank responses. Also, visitors to the park were mostly day users. Regarding these findings, the author recommends using the on-site interview for primary data collection with an individual visitor as a sampling unit and the rupiahs per person per day as a unit of measure for future studies.

(2) As indicated previously that the total sample utilized in this study was adequate for estimating the average trip-related spending for the population. However, there was one segment that contained insufficient samples (the O/V/I segment). Therefore, for future studies, improving the sample size may be more to do with increasing the intensity of sampling to gain sufficient samples for each segment rather than extending the survey period to increase the total sample.

(3) To get a proper comparison between the spending profiles by the aggregate spending categories, the aggregation scheme should be considered. The results of this study indicated that seven out of eight segments reported that their spending for

"miscellaneous" were the highest. It might be because the miscellaneous spending category lumped too many spending items (there were 12 items). Therefore, dividing this aggregate into two aggregates is recommended. They are: (1) "activity" expenses which includes insurance, guide services, admission, and other recreation expenses, and (2) "other" expenses which includes the other items.

(4) The drawback of adjusting the national technical coefficients for the regional level by applying the SLQ technique in this study was the use of GDP derived from previous data (1990). By the time of this study (1994), these data possibly change, and hence the estimated LQs are probably no longer correct. Therefore, a further review of these values is suggested when more recent GDP data are available even though the national input-output model may remain the same as being used in this study. In Indonesia, the national input-output model is usually revised every five years.

(5) In terms of impact estimates, attempting to calculate the impacts by using Type II regional output multipliers is a good consideration as this will include the induced effects as well as the direct and indirect effects. To do this, the "household" sector should be treated as endogenous sector, as other producing sectors, in developing regional output multipliers. In addition to the impact estimation, the author also suggests assessing the economic significance of visitors' spending to the B-C-S region as this can provide broader understanding of economic roles of the GPNP in the B-C-S region. This involves calculation of spending for both resident and nonresident visitors.

(6) If available, it is also suggested estimating the impacts by utilizing a narrower area of an input-output model besides the national model (e.g., the West Java input-output model). This comparison may be important for providing information on the magnitude of the impact estimates as the differences in the area coverage and/or the economical structure of the models.

(7) For future studies in the GPNP, accounting the foreign visitors' spending may be important. Even though these international tourists were only 5% from the total visitors (in 1992/1993), they may have average spending higher than domestic tourists. Potential exists for local people to sell art products to foreigners and provide lodging, restaurants, and other goods and services.

Applications

Many analyses can be performed to support a variety of management and planning issues in which the results of this study may be applied. From the survey data set, analyses not related to economic impacts could be carried out. For example, the survey included data about origins, age classes, and group types of visitors. These data can be used in analyzing demand patterns of visitors to the GPNP. To gain a complete analysis, of course, this may require additional data such as demographic (i.e., population data), travel distance (origin-destination), income per capita by region, and other possible data. Frequency analyses for addressing general patterns of visitation by gate of entrance and date (weekdays and weekend-days) could be carried out by exploring the survey data. From these analyses, many planning and marketing issues or questions may be generated. The results of these analyses then could be compared to similar analyses in previous studies (if any) to get general figures about the consistency of sampling units, measurement procedures, and instrument design used in this study.

Market segments and spending profiles information provide a general guidance for the park manager and the regional planner for designing programs, planning, or activities related to the tourism industry and its impacts. From this information, the park manager will know, for instance, to whom an extension program should be directed, what tourism facilities or attractions should be developed or improved, and what management issues need to be coordinated with the regional planners to support regional economic development. Combined with the impact estimate data, this information may very

important in supporting guidelines to the regional planners in performing regional economic development. Some considerations gained from the information are, for example, what economic facilities should be improved and what sectors should be considered most as they contribute more output or sales to the region and income to the local people. Concerning the unemployment issues in the region (if any), the sectors that generate more impacts on employment can be considered as a priority emphasis.

By assuming that the spending profile patterns remain the same as those in the last year, the impact estimate procedures can be used as a tool to evaluate the level of the park management in terms of economic activities in future years. In this case, the average spending by segment from this study should be discounted by using appropriate deflators. The number of visitors by segment are estimated by multiplying the percentage population distribution by segment from this study by the total population over time. Then, by comparing the impact estimates over time, the park manager can evaluate if some improvements are needed.

Another application deals with projections or forecasting. There may be two ways to forecast the changes of impacts: (1) by estimating the level of final demand for output of affected sectors change, or (2) by applying the full carrying capacity of the park, which means the maximum number of visitors that can be handled by the park. A limitation of these applications is that if the period of projection gets longer, the accuracy of the impact estimates tends to decrease, because the technical coefficients of an input-output table used (and hence the multipliers) may tend to get out of date. However, it is not a big problem if the regional economy does not change drastically in the period of concern.

Realizing that Indonesian government has designated 31 national parks across the country, assessing their roles in economic development, in terms of the tourism industry, may be needed. The World Bank (1994) pointed out that these protected areas, properly managed, could encourage economic development by generating income and employment for regions and local people. Applying estimation procedures developed in this study may

help to answer those challenges. If not, at least the economic roles of those national parks could be determined regionally. In turn, some management and planning issues could be addressed. In implementing procedures, the author recommends using the sampling unit, unit of measure, instrument design, and procedure of primary data collection as developed in this study. The visitor and spending categories used to develop spending profiles in this study should be adjusted to specific characteristics of a particular region. Also, of course, the regional GDP used to regionalize the national input-output model should be the GDP of those particular regions. If any, the author suggests attempting to use the regional gross output by sector as weighted factors.

APPENDICES

APPENDIX A

APPENDIX A

A-1. English version of the questionnaire, GPNP.

January 22, 1994

Dear Visitor:

Thank you for agreeing to participate in this survey conducted by Indonesia's Natural Resources Management Project in coordination with Gede Pangrango National Park. You indicate your voluntary agreement to participate by completing this personal interview. We are interviewing visitors to find out about their recreational expenditures related to their visits to Gede Pangrango National Park. This data will be used to assess how their expenditures affect the region's economy. To complete this study, we need information from you based on the questions provided in the following questionnaire. We believe that your information will not only help us to plan for the needs of visitors like yourself, but also for the community affected by recreational activities to the park.

Using a systematic random sample, we have selected you as a survey respondent. Each 10th visitor to the park is selected. We would greatly appreciate your cooperation in making this survey a success, by taking 10 minutes to answer our questions. All of your answers will be kept anonymous and you will not be identified in any way. You may ask any questions at any time during the interview.

Thank you for your assistance. Please call me at (0255)-512776 if you have any further questions.

Sincerely,

Adi Susmianto
Researcher
Jl. Raya Cibodas PO. Box 3 Sdl Cipanas Cianjur
Telp. (0255)-512776

Larry Leefers, Ph.D.
Supervisor
Department of Forestry, Michigan State University
113 Natural Resource Building
East Lansing, MI 48824

APPENDIX A, A-1 (cont'd.)

ID # I__I__I__I
DATE I__I__I__I

RECREATIONAL USE AND EXPENDITURE SURVEY IN GEDE PANGRANGO NATIONAL PARK, INDONESIA

Good morning/afternoon/evening. My name is.....and I am working for Indonesia's Natural Resources Management project in coordination with Gede Pangrango National Park which is surveying visitors to find out about their recreational use of the park and how their expenditures affect the region's economy. May I talk with you about your trip? Circle "Y" (Yes) or "N" (No).

If "N", tally as a refusal and thank person for their time. I__I
(Then take the first visitor from the next group as a respondent)
If "Y", record the time and continue. ___a.m./p.m.

Hand the respondent the cover letter, the map and the list of spending categories, and say: This letter will give you a general idea about the purpose of the survey, while the map and the list of spending categories will help you answer a number of the questions that I will ask. The area marked on the map is the area we are interested in.

1. Are you hiking to the top of Gede or Pangrango mountain? (circle) Y/N

2. For this trip to the park, are you coming from: (circle)
   a. a permanent home, or
   b. a vacation/second home

3. Please tell me:
   a. Where is your permanent home? (circle)
      1). Bogor 2). Sukabumi 3). Cianjur 4). Other:.....
   b. Where is your vacation/second home? (circle)
      1). Bogor 2). Sukabumi 3). Cianjur 4). Other:.....

4. What is the primary purpose for trip to the park? You may choose more that one activities.
   a. Hiking/walking
   b. Camping
   c. Studying/researching
   d. Water fall/lake
   e. Pleasure/relaxation
   f. Flora & fauna watching
   g. Picnicking
   h. Other:.....

APPENDIX A, A-1 (cont'd.)

ID # I__I__I__I
DATE I__I__I__I

Refer to question 1, if the trip started from a:
a. **PERMANENT HOME**, say: For the rest of this interview, when I say TRIP I am referring to the time from when you left your permanent home until the time you return there.
b. **VACATION HOME**, say: For the rest of this interview, when I say TRIP I am referring to the time from when you left the vacation home until the time you return there or to your permanent home if you are not returning to your vacation home.

5. What other parks or recreation sites in the region have you visited or will you visit on this trip? (circle)
   a. Cibodas Botanical Garden
   b. Mandalawangi Park
   c. Safari Garden
   d. Selabintana Park
   e. Situgunung C.G.
   f. Gunung Mas Estate
   g. Telaga Warna
   h. Other:.....

6. Is your visit to the park as: (circle)
   a. Primary purpose
   b. Secondary purpose
   c. Unimportant
   d. By accidence
   e. Other:.....

7. How many nights have you spent away from your permanent or vacation home on this trip so far?
   How many additional nights will you spend away? I__I__I
   If none, move to question 10.
   If any, continue to question 8.

OVERNIGHT VISITORS ONLY

8. How many of these nights are/will be within the area marked on the map?I__I__I

9. Which types of lodging have you used or will you use within the area marked on the map on this trip? (Circle "Y" next to lodging types mentioned and ask how many nights for each type of lodging.)
   Y I__I__I Hotel/Motel
   Y I__I__I On-site Campground
   Y I__I__I Out-site Campground
   Y I__I__I Family's House
   Y I__I__I Friend's House
   Y I__I__I Rental House
   Y I__I__I Second Home
   Y I__I__I Other:.....

APPENDIX A, A-1 (cont'd.)

ID # I__I__I__I
DATE I__I__I__I

ALL RESPONDENTS

10. Are you currently a student? (circle) Y/N
(a student means any one who is in a formal education all of the time until now and doesn't have employment yet)

11. In what kind of transportation do you use during your trip to and from the park? (circle)
Private transportation: a. Private car b. Motor cycle c. Company car
Public transportation : a. Bus b. Rent-a-car c. Mini-cap d. Other:.....

12. Are you making this trip: (circle)
a. With your immediate family
b. With your spouse
c. With relatives
d. With your friend or business associates
e. Alone
f. Other:.....

THE FOLLOWING QUESTIONS CONCERN ABOUT THE TRIP-RELATED SPENDING MADE BY THE RESPONDENT FROM THE TIME HE OR SHE LEFT HIS OR HER PERMANENT/VACATION HOME UP TO THE TIME HE OR SHE RETURN THERE. If the respondent is making the trip in a group (spending unit), spending amount for the group is taken into account, and circle "G". If part of this spending is individually spent, circle "I". The following questions are formed into three columns. Column I is for types of spending, column II is for spending within the area marked on the map, and column III is for spending outside the area marked on the map. If there is no trip-related spending, fill 0 (zero) in the appropriate column (don't leave the column blank).

13. Including yourself, how many are in your group (spending unit)?
a. Adults (≥19 years): I__I__I
b. Teenagers (7-18 years): I__I__I
c. Children or infants (≤ 6 years): I__I__I

14. For this trip, please tell me how much you have spent and will spend for the following spending category I will ask: (if staying in a second home, expenditures should relate only to the park visit, not to maintaining the home, traveling to the second home from the permanent home, etc.)

APPENDIX A, A-1 (cont'd.)

ID # I__I__I__I
DATE I__I__I__I

There are five categories of expenditures: **TRANSPORTATION, LODGING, FOOD AND BEVERAGE, OUTSIDE MARKET, AND MISCELLANEOUS EXPENSES.**

		TYPE	WITHIN THE AREA MARKED	OUTSIDE THE AREA MARKED
A.	**TRANSPORTATION EXPENSES**			
	PRIVATE TRANSPORTATION:			
a.	Gas and oil	G / I	$_____	$_____
b.	Repairs and washing	G / I	$_____	$_____
c.	Spare parts	G / I	$_____	$_____
d.	Parking fees and tolls (road, bridge, etc.)	G / I	$_____	$_____
	PUBLIC TRANSPORTATION:			
a.	Fares/tickets	G / I	$_____	$_____
b.	Rent	G / I	$_____	$_____
c.	Fares for recreation vehicles	G / I	$_____	$_____
B.	**LODGING EXPENSES**			
a.	Hotels, motels, rental homes, cottages, etc	G / I	$_____	$_____
b.	Campgrounds (outside the park)	G / I	$_____	$_____
C.	**FOOD AND BEVERAGE EXPENSES**			
a.	Grocery, convenience, liquor, vendor, soft-drink, and other food and beverage stores (for eating and drinking off-premises)	G / I	$_____	$_____
b.	Restaurants, diners, catering, bars, and other eating and drinking places	G / I	$_____	$_____

APPENDIX A, A-1 (cont'd.)

ID # I__I__I__I
DATE I__I__I__I

D.	**OUTSIDE MARKET EXPENSES**			
a.	Fruits	G / I	$_____	$_____
b.	Vegetables	G / I	$_____	$_____
c.	Other food crops	G / I	$_____	$_____
d.	Plants (including ornamental plants)	G / I	$_____	$_____
e.	Fishes (including ornamental fishes)	G / I	$_____	$_____
E.	**MISCELLANEOUS EXPENSES**			
a.	Rental fees for recreation equipment, rental horse, etc.	G / I	$_____	$_____
b.	Cigarettes	G / I	$_____	$_____
c.	Insurance fees	G / I	$_____	$_____
d.	Fees for guide services	G / I	$_____	$_____
e.	Admission to recreation sites	G / I	$_____	$_____
f.	Admission to tourist attractions	G / I	$_____	$_____
g.	Other recreation expenses (billiard, golf, movie, fishing, etc.)	G / I	$_____	$_____
h.	Camera film or video tape purchase	G / I	$_____	$_____
i.	Film developing or video tape processing	G / I	$_____	$_____
j.	Souvenirs or gifts	G / I	$_____	$_____
k.	Clothing (including footwear)	G / I	$_____	$_____
l.	Other expenses (specify)	G / I	$_____	$_____

15. How many trips did you make between January through April last year to the park? I__I__I

16. How many trips did you make during the past 12 months to the park? I__I__I

17. How many trips do you plan to make during the next 12 months to the park? I__I__I

Thank you for participating in this survey. **THANK YOU FOR YOUR TIME.**
End the interview and record:
1. Ending time: _____ a.m./p.m.
2. Interviewer initial: _____

APPENDIX A

A-2. Indonesian version of the questionnaire, GPNP.

22 Januari, 1994

Yth. Pengunjung TN. Gede Pangrango

Terima kasih atas partisipasi anda dalam penelitian yang dilakukan oleh Indonesia's Natural Resources Management Project bekerja sama dengan Taman Nasional Gede Pangrango. Anda telah sepakat secara suka rela untuk berpartisipasi dalam penelitian ini melalui wawancara secara langsung. Kami sedang mewawancarai para pengunjung untuk mengetahui belanja rekreasi yang berkaitan dengan kunjungan mereke ke TN. Gede Pangrango. Data tersebut akan digunakan untuk menduga seberapa besar pengaruh belanja rekreasi dimaksud terhadap ekonomi regional. Untuk melengkapi penelitian ini, kami memerlukan informasi dari anda yang didasarkan atas beberapa pertanyaan yang telah disiapkan dalam kuesioner berikut ini. Kami yakin bahwa informasi anda tidak hanya akan membantu kami untuk menyusun suatu rencana kebutuhan pengunjung seperti anda, namun juga kebutuhan masyarakat yang terpengaruh akibat kegiatan-kegiatan rekreasi ke taman nasional.

Kami memilih anda sebagai responden secara systematic random sample, yaitu dengan memilih setiap pengunjung yang ke-10 sebagai responden. Kami sangat menghargai partisipasi anda dengan mengorbankan waktu kurang lebih 10 menit guna melengkapi wawancara ini. Semua jawaban anda akan kami catat tanpa menyertakan identitas anda, baik dalam proses pengumpulan data maupun dalam penyajian hasil penelitian ini. Kami persilahkan anda mengajukan pertanyaan selama wawancara berlangsung.

Terima kasih atas bantuan anda. Apabila ada pertanyaan lebih lanjut sehubungan dengan penelitian ini, silahkan menghubungi kami pada alamat tersebut di bawah ini.

Hormat kami,

Adi Susmianto
Peneliti
Jl. Raya Cibodas P.O. Box 3 Sdl Cipanas Cianjur
Telp. (0255)-512776

Larry Leefers, Ph.D.
Supervisor
Departement of Forestry, Michigan State University
113 Natural Resource Building
East Lansing, MI 48824

APPENDIX A, A-2 (cont'd.)

Nomor I___I___I___I
Tanggal I___I___I___I

SURVEY POLA PEMANFAATAN DAN BELANJA REKREASI DI TAMAN NASIONAL GEDE PANGRANGO, INDONESIA

Selamat pagi/siang/sore. Nama saya _____. Atas nama Indonesia's Natural Resource Management Project bekerja sama dengan Taman Nasional Gede Pangrango, saya sedang melakukan survey pengunjung untuk mengetahui penggunaan taman nasional sebagai tujuan rekreasi dan seberapa besar pengaruh belanja pengunjung terhadap ekonomi regional. Apakah anda bersedia untuk berpartisipasi dalam survey ini? Lingkari: "Y" (Ya) atau "T" (Tidak).

Apabila "Tidak", catat sebagai tidak bersedia dan sampaikan terima kasih. I___I
(Kemudian pilih pengunjung pertama dari group berikutnya sebagai responden)
Apabila "Ya", catat waktunya dan lanjutkan dengan wawancara. I___I___I

Serahkan kepada responden surat pengantar, peta dan daftar rincian belanja, dan jelaskan bahwa: surat pengantar tersebut akan memberikan gambaran umum tentang maksud dan tujuan survey, sedangkan peta dan daftar rincian belanja akan membantu responden dalam menjawab beberapa pertanyaan selama wawancara. Daerah yang diberi tanda pada peta merupakan daerah (region) yang merupakan objek survey ini.

1. Apakah anda akan mendaki ke puncak Gunung Gede atau Pangrango? (lingkari) Y/T

2. Untuk menuju ke taman nasional ini, apakah anda datang dari: (lingkari salah satu)
   a. Tempat tinggal permanen, atau
   b. Rumah peristirahatan

3. Tolong sampaikan kepada saya:
   a. Dimana tempat tinggal permanen anda? (lingkari)
      1). Bogor 2). Sukabumi 3). Cianjur 4). Lainnya:.....
   b. Dimana rumah peristirahatan anda? (lingkari)
      1). Bogor 2). Sukabumi 3). Cianjur 4). Lainnya:.....

4. Apa tujuan utama anda datang ke taman nasional ini? Anda boleh menyebutkan lebih dari satu pilihan.
   a. Pendakian/jalan
   b. Camping
   c. Studi/penelitian
   d. Melihat air terjun/danau
   e. Sekedar santai
   f. Melihat aneka satwa/tumbuhan
   g. Piknik
   h. Lainnya:.....

APPENDIX A, A-2 (cont'd.)

Nomor I__I__I__I__I
Tanggal I__I__I__I

Merujuk pertanyaan 1, apabila perjalanan ke taman nasional dimulai dari:
a. **TEMPAT TINGGAL PERMANEN,** sampaikan: untuk wawancara selanjutnya, apabila saya menyebut perjalanan berarti mengacu pada selang waktu sejak anda meninggalkan tempat tinggal permanen anda sampai dengan anda kembali ke tempat tersebut.
b. **RUMAH PERISTIRAHATAN,** sampaikan: untuk wawancara selanjutnya, apabila saya menyebut perjalanan berarti mengacu pada selang waktu sejak anda meninggalkan rumah peristirahatan anda sampai dengan anda kembali ke tempat tersebut atau ke tempat tinggal permanen apabila anda tidak kembali ke rumah peristirahatan.

5. Berapa banyak tempat rekreasi lain di dalam daerah yang ditandai dalam peta yang sudah atau akan anda kunjungi selama perjalanan ini? Catat dan lingkari:
   a. Kebun Raya Cibodas
   b. Taman Mandalawangi
   c. Taman Safari
   d. Taman Rekreasi Selabintana
   e. Camping Ground Situgunung
   f. Perkebunan Gn. Mas
   g. Telaga Warna
   h. Lainnya: .....

6. Perjalanan anda ke taman nasional ini dapat disebut sebagai (lingkari salah satu):
   a. Tujuan utama
   b. Tujuan kedua
   c. Sambil lalu (kurang penting)
   d. Kebetulan saja
   e. Lainnya: .....

7. Berapa malam telah anda luangkan sejak anda meninggalkan tempat tinggal permanen atau rumah peristirahatan anda selama perjalanan ini? I__I__I
   Berapa malam lagi akan anda luangkan dalam perjalanan ini? I__I__I
   Apabila tidak ada, lanjutkan ke pertanyaan nomor 10.
   Apabila ada, lanjutkan ke pertanyaan nomor 8.

KHUSUS UNTUK RESPONDEN YANG BERMALAM

8. Berapa malam, dari total yang telah atau akan anda luangkan, telah atau akan anda luangkan di dalam daerah yang diberi tanda dalam peta? I__I__I

APPENDIX A, A-2 (cont'd.)

Nomor I___I___I___I
Tanggal I___I___I___I

9. Apa tipe penginapan yang telah atau akan anda gunakan di dalam daerah yang diberi tanda selama perjalanan ini? Lingkari "Y" disamping tipe penginapan yang digunakan, dan tanyakan berapa malam pada masing-masing tipe penginapan tersebut.

Y I___I___I	Hotel/motel	Y I___I___I	Rumah teman
Y I___I___I	Perkemahan di dalam TN	Y I___I___I	Rumah sewaan
Y I___I___I	Perkemahan di luar TN	Y I___I___I	Rumah peristirahatan
Y I___I___I	Rumah famili	Y I___I___I	Lainnya:.....

UNTUK SEMUA RESPONDEN

10. Apakah anda pelajar/mahasiswa? Lingkari "Y" atau "T". Y/T
(yang dimaksud pelajar/mahasiswa di sini adalah mereka yang sedang dalam pendidikan formal hingga saat wawancara ini dan belum bekerja)

11. Selama perjalanan menuju dan meninggalkan taman nasional ini, macam transportasi apa yang anda gunakan? Lingkari salah satu:
Transportasi pribadi: a. Kendaraan pribadi b. Sepeda motor c. Kendaraan kantor
Transportasi umum: a. Bus b. Sewa kendaraan c. Mini-cap d. Lainnya:.....

12. Anda melakukan perjalanan ini : (lingkari jawaban yang tepat)
a. Bersama keluarga anda
b. Bersama pasangan anda
c. Bersama sanak saudara
d. Bersama teman atau kelompok sekerja
e. Sendiri
f. Lainnya:.....

PERTANYAAN-PERTANYAAN BERIKUT BERKAITAN DENGAN BELANJA YANG DIKELUARKAN OLEH RESPONDEN SEHUBUNGAN DENGAN PERJALANANNYA KE TAMAN NASIONAL SEJAK SAAT YANG BERSANGKUTAN MENINGGALKAN TEMPAT TINGGAL PERMANEN/RUMAH PERISTIRAHATAN HINGGA KEMBALI KE TEMPAT TERSEBUT. Apabila responden melakukan perjalanan dalam bentuk grup (spending unit), jumlah belanja yang diperhitungkan adalah belanja grup; lingkari huruf "G" pada jenis belanja yang sesuai. Apabila sebagian dari belanja tersebut merupakan belanja pribadi, lingkari huruf "I" pada jenis belanja yang sesuai. Pertanyaan-pertanyaan berikut disusun ke dalam tiga kolom. Kolom I adalah untuk tipe belanja (grup atau pribadi), kolom II untuk belanja yang dibelanjakan di dalam daerah yang diberi tanda pada peta, dan kolom III untuk belanja yang dibelanjakan di luar daerah yang diberi tanda pada peta. Apabila responden sama sekali tidak membelanjakan apapun, baik untuk sebagian atau keseluruhan jenis belanja, isilah 0 (nol) pada kolom yang sesuai (jangan biarkan kolom tersebut tidak terisi/kosong).

APPENDIX A, A-2 (cont'd.)

Nomor I__I__I__I
Tanggal I__I__I__I

13. Termasuk anda, berapa orang yang termasuk dalam grup (spending unit) anda?
    a. Kelompok umur ≥ 19 tahun: I__I__I
    b. Kelompok umur 7-18 tahun: I__I__I
    c. Kelompok umur ≤ 6 tahun: I__I__I

14. Untuk perjalanan ini, mohon sebutkan berapa besar belanja yang telah dan akan anda belanjakan sesuai dengan jenis belanja yang akan saya sebutkan berikut ini: (apabila responden berangkat dari rumah peristirahatan, belanja dimaksud hanya yang berkaitan dengan perjalanannya menuju taman nasional dari rumah peristirahatan, tidak termasuk belanja selama tinggal di rumah peristirahatan, belanja perjalanan dari tempat tinggal permanen menuju ke rumah peristirahatan, dan lain-lain).

Rincian belanja berikut ini dikelompokkan ke dalam lima kategori: **TRANSPORTASI, PENGINAPAN, MAKANAN DAN MINUMAN, DI LUAR PASAR, BELANJA LAIN-LAIN.**

	JENIS BELANJA	**TIPE**	**Di DALAM DAERAH YANG DIBERI TANDA**	**Di LUAR DAERAH YANG DIBERI TANDA**
A.	**TRANSPORTASI**			
	TRANSPORTASI PRIBADI:			
a.	Bahan bakar dan oli.	G / I	Rp.	Rp. .....
b.	Reparasi dan cuci kendaraan.	G / I	Rp.	Rp. .....
c.	Perlengkapan kendaraan.	G / I	Rp.	Rp. .....
d.	Parkir dan toll (jalan, jembatan, dll).	G / I	Rp.	Rp. .....
	TRANSPORTASI UMUM:			
a.	Karcis/ongkos kendaraan.	G / I	Rp.	Rp. .....
b.	Sewa kendaraan.	G / I	Rp.	Rp. .....
c.	Karcis/ongkos kendaraan untuk kegiatan rekreasi.	G / I	Rp.	Rp. .....
B.	**PENGINAPAN**			
a.	Hotel, motel, rumah sewaan, villa, dll	G / I	Rp.	Rp. .....
b.	Camping ground (luar taman nasional).	G / I	Rp.	Rp. .....

APPENDIX A, A-2 (cont'd.)

Nomor I___I___I___I
Tanggal I___I___I___I

C.	**MAKANAN DAN MINUMAN**			
a.	Toko eceran, pedagang kaki lima, pedagang asongan, dan tempat pembelian makanan dan minuman lainnya.	G / I	Rp.	Rp. .....
b.	Restoran, rumah makan, katering, warung, bar, dan tempat makan dan minum lainnya.	G / I	Rp.	Rp. .....
D.	**BELANJA DI LUAR PASAR**			
a.	Buah-buahan.	G / I	Rp.	Rp. .....
b.	Sayur-sayuran.	G / I	Rp.	Rp. .....
c.	Tanaman pangan lainnya.	G / I	Rp.	Rp. .....
d.	Tanaman keras (termasuk tanaman hias).	G / I	Rp.	Rp. .....
e.	Ikan (termasuk ikan hias).	G / I	Rp.	Rp. .....
E.	**BELANJA LAIN-LAIN**			
a.	Sewa perlengkapan/peralatan rekreasi, sewa kuda, dll.	G / I	Rp.	Rp. .....
b.	Rokok.	G / I	Rp.	Rp. .....
c.	Asuransi.	G / I	Rp.	Rp. .....
d.	Sewa pemandu wisata.	G / I	Rp.	Rp. .....
e.	Karcis/ongkos masuk areal rekreasi.	G / I	Rp.	Rp. .....
f.	Karcis/ongkos masuk tempat-tempat atraksi di dalam areal rekreasi.	G / I	Rp.	Rp. .....
g.	Belanja rekreasi dan hiburan lainnya (bilyar, golf, bioskop, mancing, dll).	G / I	Rp.	Rp. .....
h.	Foto film atau video tape.	G / I	Rp.	Rp. .....
i.	Cuci & cetak foto/proses video tape.	G / I	Rp.	Rp. .....
j.	Sofenir/buah tangan.	G / I	Rp.	Rp. .....
k.	Pakaian (termasuk sepatu, dll).	G / I	Rp.	Rp. .....
l.	Belanja lainnya (uraikan).	G / I	Rp.	Rp. .....

15. Berapa kali anda mengunjungi taman nasional ini selama bulan Januari sampai dengan April pada tahun yang lalu? I___I___I

16. Berapa kali anda mengunjungi taman nasional ini selama 12 bulan pada tahun yang lalu? I___I___I

APPENDIX A, A-2 (cont'd.)

Nomor I___I___I___I
Tanggal I___I___I___I

17. Berapa kali anda akan mengunjungi taman nasional ini selama 12 bulan pada tahun yang akan datang? I___I___I

Terima kasih atas partisipasi anda dalam penelitian ini. **TERIMA KASIH ATAS WAKTU YANG TELAH ANDA LUANGKAN DALAM WAWANCARA INI.**
Akhiri wawancara dan catat:
1. Waktu wawancara berakhir: .....
2. Paraf pewawancara : .....

APPENDIX A

A-3. A summary of the primary data, GPNP.

A total of 934 respondents were interviewed in the survey conducted from January 22 to April 17, 1994. Nine hundred and twenty-six visitors (99.1%) participated, while eight visitors (0.9%) declined to participate during the survey. Forty-five out of 926 samples were not usable, leaving a sampling frame of 881 samples (questionnaires). The following data are summarized from the samples presenting the respondents' responses sequential to the questions addressed in the questionnaire. Spending data are not included in the summary. The word "res" is used to abbreviate "respondent".

Question 1: Hiking to the top of the GPNP.
Yes = 143 res
No = 738 res

Question 2: The respondent' departures.
Permanent house = 824 res
Vacation house = 57 res

Question 3: The origin of respondents.

Bogor = 105 res	Sukabumi = 200 res
Cianjur = 55 res	Jakarta = 416 res
Bandung = 21 res	Tangerang = 46 res
Bekasi = 7 res	Depok = 2 res
Purwakarta = 2 res	Palembang = 1 res
Cilegon = 1 res	Banten = 1 res
Semarang = 2 res	Kerawang = 4 res

Question 4: The primary purpose of visit (a respondent may have more than purpose).

Hiking/walking = 121 res	Camping = 134 res
Studying/research = 78 res	Waterfall/lake = 562 res
Pleasure = 157 res	Flora & fauna watching = 33 res
Picnicking = 304 res	Others = 2 res

Question 5: Other recreation sites visited (a respondent may have more than one visit).

Cibodas Botanical Garden = 70 res	Mandalawangi Park = 19 res
Safari Garden = 12 res	Selabintana Park = 63 res
Situgunung Campground = 78 res	Gn Mas Estate = 10 res
Telaga Warna = 16 res	Others = 20 res

APPENDIX A, A-3 (cont'd.)

Question 6: The intention of visitation.
Primary purpose = 770 res
Secondary purpose = 102 res
Unimportant = 4 res
By accidence = 5 res
Others = 0 res

Question 7: Number of nights spent.

Before destination:	0 = 789 res
	1 = 54 res
	2 = 34 res
	3 = 2 res
	4 = 1 res
	6 = 1 res
After destination:	0 = 700 res
	1 = 71 res
	2 = 36 res
	3 = 71 res
	6 = 1 res
	7 = 2 res

Question 8: Number of nights spent within the B-C-S region.

0 = 646 res	1 = 79 res
2 = 63 res	3 = 82 res
4 = 7 res	6 = 1 res
7 = 2 res	8 = 1 res

Question 9: Type of lodging used.

Hotel/motel = 10 res	In-site campground = 94 res
Out-site campground = 49 res	Family's house = 6 res
Friend's house = 9 res	Rental house = 11 res
Vacation house = 13 res	Others = 36 res

Question 10: The occupation of respondents.
Students = 463 res
Nonstudents = 418 res

Question 11: The transportation used (a respondent might use more than one type).
Private transportation:

Private car = 266 res	Motor cycle = 23 res
Office car = 28 res	

APPENDIX A, A-3 (cont'd.)

Public transportation:

Bus = 199 res	Rental car = 292 res
Mini-cap = 187 res	Others = 9 res

Question 12: Group type of visitors.

Immediate family = 39 res	Spouse = 37 res
Relatives = 136 res	Friends or business associates = 669 res
Alone = 0 res	Others = 0 res

Question 13: The age class of visitors (number of group members).

Adults (≥ 19 yrs) = 23,189 (reported by 837 res)
Teenagers (7-18 yrs) = 2,265 (reported by 239 res)
Children or infants (≤ 6 yrs) = 133 (reported by 128 res)

The rest questions were associated with spending information (not included in this summary) and were explored throughout the chapters of this study.

APPENDIX B

APPENDIX B.

Table B-1a. Visitation data in the GPNP for the last five years, GPNP.

Year	Recreation		Hiking		Other[a]		Total	
	Domestic	Foreigner	Domestic	Foreigner	Domestic	Foreigner	Domestic	Foreigner
1988/1989	51246	1430	19483	337	494	154	71223	1921
1989/1990	64226	289	1072	814	799	12	66097	1115
1990/1991	37860	240	16493	137	5049	47	59402	424
1991/1992	64207	1160	10177	128	889	4	75273	1292
1992/1993	31340	2083	13516	378	1938	60	46794	2521
Total	248879	5202	60741	1794	9169	277	318789	7273

[a] Consists of research/education, camping, and other activities.
Sorce: The Development Program of the GPNP in the Sixth Five-Year Plan, the GPNP, 1994.

Table B-1b. Visitation data in two recreation sites near the GPNP, GPNP.

Recreation site	Year	Domestic	Foreigner	Total
Cibodas B. G.[a]	1989	279,710	4,952	284,662
	1990	299,263	5,298	304,561
	1991	217,594	3,852	221,446
	1992	322,651	5,712	328,363
	1993	372,613	6,597	379,210
Mandalawangi P.[b]	1993	68,169	660	69,829

[a] Derived from monthly and yearly reports (1989-1993) of Cibodas Botanical Garden.
Data of foreign visitors from 1989 to 1992 were estimated using the proportion in 1993.
[b] Derived from the 1993 yearly report of Cianjur Sub-Devision, Perum Perhutani.

APPENDIX B.

Table B-2. The 66 sector classification for the Indonesian input-output table 1990, GPNP.

I-O code (66 sectors)	Sector description	I-O code (161 sectors)
1	Paddy	1
2	Beans	5-7
3	Maize	2
4	Root crops	3-4
5	Vegetables and fruits	8-9
6	Other food crops	10
7	Rubber	11
8	Sugarcane	12
9	Coconut	13
10	Oil palm	14
11	Tobacco	16
12	Coffee	17
13	Tea	18
14	Clove	19
15	Fibre crops	15
16	Other estate crops	20
17	Other agriculture	21
18	Livestock	22-23, 25
19	Slaughtering	44
20	Poultry and its product	24
21	Wood	26
22	Other forest products	27-28
23	Fishery	29-31
24	Coal and metal ore mining	32, 35-40
25	Crude oil, natural gas and geothermal mining	33-34
26	Other mining and quarrying	41-43
27	Manufacture of food processing and preserving	45-48
28	Manufacture of oil and fat	49
29	Rice milling	50
30	Manufacture of flour, all kinds	51-54
31	Sugar factory	55
32	Manufacture of other food products	56-61
33	Manufacture of beverages	62-63
34	Manufacture of cigarettes	64-65
35	Yarn spinning	66

APPENDIX B.

Table B-2 (cont'd.)

I-O code (66 sectors)	Sector description	I-O code (161 sectors)
36	Manufacture of textile, wearing apparel and leather	67-73
37	Manufacture of bamboo, wood and rattan products	74-79
38	Manufacture of paper, paper products and cardboard	80-83
39	Manufacture of fertilizer and pesticide	85-86
40	Manufacture of chemicals	84, 87-93
41	Petroleum refinery	94-95
42	Manufacture of rubber and plastic wares	96-99
43	Manufacture of non metallic mineral products	100-102, 104
44	Manufacture of cement	103
45	Manufacture of basic iron and steel	105-106
46	Manufacture of non ferrous basic metal	107-108
47	Manufacture of fabricated metal products	109-112
48	Manufacture of machine, electrical machinery and apparatus	113-120
49	Manufacture of transport equipment and its repair	121-126
50	Manufacture of other products not elsewhere classified	127-131
51	Electricity, gas and water supply	132-133
52	Construction	134-138
53	Trade	139
54	Restaurant and hotel	140-141
55	Railway transport	142
56	Road transport	143
57	Water transport	144-145
58	Air transport	146
59	Services allied to transport	147
60	Communication	148
61	Financial intermediaries	149-150
62	Real estate and business services	151-152
63	General government and defense	153
64	Social and community services	154-156
65	Other services	157-160
66	Unspecified sector	161

Source: Indonesian Input-Output Table 1990, Volume: I, Central Bureau of Statistics, 1994.

APPENDIX B.

Table B-3. Average trip spending (Rp. per person per day) within the B-C-S region for 28 detailed expenditure items brought by the resident visitors (4 visitor segments), GPNP.

Item	R/N/I (n = 192)			R/S/I (n = 107)			T/V/I (n = 36)			O/V/I (n = 22)		
	Rp.	%[a]	%[b]	Rp.	%[a]	%[b]	Rp.	%[a]	%[b]	Rp.	%[a]	%[b]
TRANSPORTATION												
Gas and oil	924.02	49.5	11.3	505.38	17.4	5.3	57.04	2.3	0.3	990.94	43.1	11.4
Repairs & washing	54.11	2.9	0.7	70.01	2.4	0.7	0.00	0.0	0.0	9.09	0.4	0.1
Spare parts	0.00	0.0	0.0	37.38	1.3	0.4	0.00	0.0	0.0	0.00	0.0	0.0
Parking & tolls	63.91	3.4	0.8	57.82	2.0	0.6	0.00	0.0	0.0	291.11	12.7	3.4
Fares/tickets	273.22	14.6	3.3	783.84	26.9	8.2	2,071.02	82.1	9.5	330.30	14.4	3.8
Rent	537.32	28.8	6.6	1,456.89	50.0	15.3	393.30	15.6	1.8	675.08	29.4	7.8
Recreation vehicle fares	14.30	0.8	0.2	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0
Subtotal	1,866.88	100.0	22.8	2,911.32	100.0	30.6	2,521.36	100.0	11.6	2,296.52	100.0	26.5
LODGING												
Hotels	732.02	100.0	8.9	62.30	95.7	0.7	0.00	0.0	0.0	0.00	0.0	0.0
Campgrounds	0.00	0.0	0.0	2.80	4.3	0.0	34.72	100.0	0.2	73.48	100.0	0.8
Subtotal	732.02	100.0	8.9	65.10	100.0	0.7	34.72	100.0	0.2	73.48	100.0	0.8
FOOD AND BEVERAGE												
Grocery	1,145.07	61.1	14.0	1,530.16	64.2	16.1	6,996.45	87.9	32.1	1,869.57	67.7	21.6
Restaurant	728.10	38.9	8.9	853.52	35.8	9.0	967.01	12.1	4.4	891.33	32.3	10.3
Subtotal	1,873.17	100.0	22.9	2,383.68	100.0	25.0	7,963.46	100.0	36.5	2,760.90	100.0	31.9
OUTSIDE MARKET												
Fruits	334.00	77.0	4.1	488.06	54.0	4.9	257.72	38.4	1.2	88.82	8.2	1.0
Vegetables	63.74	14.7	0.8	126.17	14.6	1.3	386.11	57.5	1.8	29.72	2.7	0.3
Other food crops	5.21	1.2	0.1	4.67	0.5	0.0	0.00	0.0	0.0	45.45	4.2	0.5
Plants	26.04	6.0	0.3	267.29	30.9	2.8	0.00	0.0	0.0	909.09	83.8	10.5
Fishes	4.73	1.1	0.1	0.00	0.0	0.0	27.78	4.1	0.1	12.38	1.1	0.1
Subtotal	433.72	100.0	5.3	866.19	100.0	9.1	671.61	100.0	3.1	1,085.46	100.0	12.5
MISCELLANEOUS												
Equipment rental	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	89.54	3.7	1.0
Cigarettes	535.09	16.3	6.5	409.01	12.4	4.3	954.69	9.0	4.4	245.83	10.1	2.8
Insurances	150.34	4.6	1.8	167.52	5.1	1.8	2,015.05	19.0	9.2	130.18	5.3	1.5
Guide fees	44.27	1.3	0.5	0.00	0.0	0.0	0.00	0.0	0.0	27.27	1.1	0.3
Admission fees	800.96	24.4	9.8	837.01	25.4	8.8	1,550.92	14.6	7.1	304.80	12.5	3.5
Attraction fees	0.00	0.0	0.0	4.67	0.1	0.0	0.00	0.0	0.0	12.58	0.5	0.1
Other recreation fees	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0
Film purchase	754.81	23.0	9.2	825.68	25.0	8.7	2,335.02	22.0	10.7	340.92	13.9	3.9
Film developing	723.21	22.0	8.8	707.53	21.5	7.4	2,795.41	26.3	12.8	468.80	19.2	5.4
Souvenirs	170.83	5.2	2.1	109.14	3.3	1.1	0.00	0.0	0.0	632.58	25.9	7.3
Clothing	0.00	0.0	0.0	56.07	1.7	0.6	347.22	3.3	1.6	45.45	1.9	0.5
Other expenses	100.97	3.1	1.2	179.72	5.5	1.9	622.42	5.9	2.9	146.93	6.0	1.7
Subtotal	3,280.48	100.0	40.1	3,296.35	100.0	34.6	10,620.73	100.0	48.7	2,444.88	100.0	28.2
Total	8,186.27		100.0	9,522.64		100.0	21,811.58		100.0	8,661.24		100.0

[a] Percentages within the average subtotal (aggregate) spending.

[b] Percentages to the total average spending.

APPENDIX B.

Table B-4. Total trip spending (Rp/total population) within the B-C-S region for 28 detailed spending categories brought by the resident visitors (4 visitor segments), GPNP.

Items	R/N/I (N = 7,522)	R/S/I (N = 8,797)	T/V/I (N = 5,256)	O/V/I (N = 1,135)	Total (N = 22,710)
TRANSPORTATION					
Gas and oil	6,950,478.44	4,445,827.86	299,802.24	1,124,716.90	12,820,825.44
Repairs & washing	407,015.42	615,877.97	0.00	10,317.15	1,033,210.54
Spare parts	0.00	328,831.86	0.00	0.00	328,831.86
Parking & tolls	480,731.02	508,642.54	0.00	330,409.85	1,319,783.41
Fares/tickets	2,055,160.84	6,895,440.48	10,885,281.12	374,890.50	20,210,772.94
Rent	4,041,721.04	12,816,261.33	2,067,184.80	766,215.80	19,691,382.97
Recreation vehicle fares	107,564.60	0.00	0.00	0.00	107,564.60
LODGING					
Hotels	5,506,254.44	548,053.10	0.00	0.00	6,054,307.54
Campgrounds	0.00	24,631.60	182,488.32	83,399.80	290,519.72
FOOD AND BEVERAGE					
Grocery	8,613,216.54	13,460,817.52	36,773,341.20	2,121,961.95	60,969,337.21
Restaurant	5,476,768.20	7,508,415.44	5,082,604.56	1,011,659.55	19,079,447.75
OUTSIDE MARKET					
Fruits	2,512,348.00	4,117,523.82	1,354,576.32	100,810.70	8,085,258.84
Vegetables	479,452.28	1,109,917.49	2,029,394.16	33,732.20	3,652,496.13
Other food crops	39,189.62	41,081.99	0.00	51,585.75	131,857.36
Plants	195,872.88	2,351,350.13	0.00	1,031,817.15	3,579,040.16
Fishes	35,579.06	0.00	146,011.68	14,051.30	195,642.04
MISCELLANEOUS					
Equipment rental	0.00	0.00	0.00	101,627.90	101,627.90
Cigarettes	4,024,946.98	3,598,060.97	5,017,850.64	279,017.05	12,919,875.64
Insurances	1,130,857.48	1,473,673.44	10,591,102.80	147,754.30	13,343,388.02
Guide fees	332,998.94	0.00	0.00	30,951.45	363,950.39
Admission fees	6,024,821.12	7,363,176.97	8,151,635.52	345,948.00	21,885,581.61
Attraction fees	0.00	41,081.99	0.00	14,278.30	55,360.29
Other recreation fees	0.00	0.00	0.00	0.00	0.00
Film purchase	5,677,680.82	7,263,506.96	12,272,865.12	386,944.20	25,600,997.10
Film developing	5,439,985.62	6,224,141.41	14,692,674.96	532,088.00	26,888,889.99
Souvenirs	1,284,983.26	960,104.58	0.00	717,978.30	2,963,066.14
Clothing	0.00	493,247.79	1,824,988.32	51,585.75	2,369,821.86
Other expenses	759,496.34	1,580,996.84	3,271,439.52	166,765.55	5,778,698.25
Total	61,577,122.94	83,770,664.08	114,643,241.28	9,830,507.40	269,821,535.70

Note: The entries are calculated by multiplying the entries of column 2, 5, 8, and 11 in Appendix B, Table B-3 by the population sizes of the corresponding segments (e.g., the gas & oil spending for R/N/I (Rp. 6,950,478.44) = Rp. 924.02*7,522).

APPENDIX B.

Table B-5. Total trip spending (Rp, total population) within the B-C-S region for 5 aggregate spending categories brought by the resident visitors (4 visitor segments), GPNP.

Item	R/N/I (N=7,522)		R/S/I (N=8,797)		T/V/I (N=5,256)		O/V/I (N=1,135)		Total (N=22,710)	
	Rp.	%	Rp.	%	Rp.	%	Rp.	%	Rp.	%
Transportation	14,042,671.36	22.8	25,610,882.04	30.6	13,252,268.16	11.6	2,606,550.20	26.5	55,512,436.70	20.6
Lodging	5,506,254.44	8.9	572,684.70	0.7	182,488.32	0.2	83,399.80	0.8	6,344,837.04	2.4
Food and bev.	14,089,984.74	22.9	20,969,232.96	25.0	41,855,945.76	36.5	3,133,621.50	31.9	80,048,869.38	29.7
Outside market	3,262,441.84	5.3	7,619,873.43	9.1	3,529,982.16	3.1	1,231,997.10	12.5	15,644,312.00	5.8
Miscellaneous	24,675,770.56	40.1	28,997,990.95	34.6	55,822,556.88	48.7	2,774,938.80	28.2	112,271,380.57	41.6
Total	61,577,122.94	100.0	83,770,664.08	100.0	114,643,241.28	100.0	9,830,507.40	100.0	269,821,835.70	100.0

APEENDIX B.

Table B-6. Technical coefficients table for sectors in the B-C-S region at purchasers prices in 1990, GPNP.

Sector	1	2	3	4	5	6	7	8	9	10
1	0.0194	0	0	0	0	0	0	0	0	0
2	0	0.063027	0	0	0.000227	0	0	0	0	0
3	0	0	0.021953	0	0	0	0	0	0	0
4	0	0	0	0.009721	0	0	0	0	0	0
5	0	0	0	0	0.018535	0.000268	0	0	0	0
6	0	0	0	0	0	0.045855	0	0	0	0
7	0	0	0	0	0	0	0.027663	0	0	0
8	0	0	0	0	0	0	0	0.077417	0	0
9	0	0	0	0	0.000265	0	0	0	0.004294	0
10	0	0	0	0	0	0	0	0	0	0.004762
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0
17	0.000467	0.000575	0.002682	0.000713	9.87E-06	0	0.000459	6.88E-06	0.003623	1.84E-05
18	0.001798	0.003781	0.012378	0.006336	0.004203	0.000671	1.07E-05	5.41E-06	0.000683	0.001398
19	0	0	0	0	0	0	0	0	0	0
20	0	5.78E-05	6.5E-05	0.000175	0.001738	0	0	0	0	0
21	2.65E-05	7.96E-05	6.55E-05	4.74E-05	3.85E-06	0.000388	0.000221	1.22E-05	0.000248	8.61E-05
22	5.61E-07	3.35E-05	0	0	0	0	4.54E-06	0	0	0
23	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0.000777	0.002448
29	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0
36	0.000403	0.000836	0.000667	0.000447	0.001953	0.001485	0.002457	9.61E-05	0.005639	0.000418
37	0	0	0.000151	0.000227	0.002008	0.001117	0.000546	0	0.000381	0.001191
38	0	0	0	0	0.000184	0.001117	0.000757	0.000156	0.001025	0.004826
39	0.069139	0.054186	0.064903	0.019606	0.034798	0.016554	0.03411	0.093185	0.011093	0.116702
40	0	0	0	0	8.13E-05	0.000127	0.083801	2.86E-05	6.58E-05	0.000206
41	4.68E-05	0.000105	9.81E-05	5.16E-05	0.001485	0.001485	0.013569	0.00551	0.00233	0.016708
42	0.000361	0	0	0	0.000549	0.001371	0.002152	1.64E-05	0.002031	0.0017
43	0	0	0	0	0	0	0.000531	0	0	0.000313
44	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	0.002587	0.001724	0.004339	0.002593	0.001788	0.008798	0.018124	0.001994	0.009268	0.010893
48	4.86E-05	8.62E-06	4.55E-05	1.42E-06	0.000183	0.000749	0.00061	0.013349	0.001034	0.008375
49	0	0	0	0	0	0	0	6.75E-05	0	0
50	0	0	0	0	2.37E-05	0.001485	0.000395	2.76E-05	6.9E-05	0.001952
51	0	0	0	0	0	0	0.000223	3.03E-05	0.000859	0.001788
52	0.000838	0.002688	0.003328	0.000164	0.000873	0.001838	0.010464	0.015564	0.014892	0.018665
53	0	0	0	0	0	0	0	0	0	0
54	0	0.001545	0.002812	0.000259	0.000148	0.001879	0.002026	0.000546	0.003066	0.001094
55	0	0	0	0	0	0	2.14E-05	1.76E-05	6.07E-06	0.000124
56	0.000315	0.000978	0.003396	0.000877	0.000443	0.002429	0.021097	0.004987	0.007179	0.003806
57	0	0.000176	0	3.1E-05	1.08E-05	0	0.000351	0	7.51E-05	0
58	0	0	0.000261	0	4.11E-05	0	0.000191	0.000205	0.000279	0.001286
59	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	3.35E-05	0	3.17E-05	1.94E-05	3.52E-05	7.76E-05
61	0.001425	0.000619	0.0012	0.000338	5.02E-05	0.001082	0.002952	0.002716	0.000379	0.001787
62	0.000284	0.001417	0.00022	0	1.92E-05	0.001513	0.000236	0.001515	0.000269	0.000403
63	0	0	0	0	0	0	0	0	0	0
64	0	0	0	0	0.000111	0	2.79E-05	7.24E-05	0.000148	0
65	0.002041	0.002102	0.004584	0.004157	0.000513	0.000268	0.015756	0.002778	0.00697	0.038307
66	0	0	0	0	0	0	0	0	0	0

Note: This table is adjusted from the 1990's Indonesian 66-sector input-output table by applying the Simple Location Quotient method with GDP as a weighted factor. The sector names are identified in Appendix B, Table B-2.

APPENDIX B.

Table B-6 (cont'd.)

Sector	11	12	13	14	15	16	17	18	19	20
1	0	0	0	0	0	0	0	0.017851	0	0.000114
2	0	0	0	0	0	0	0	0.003546	0	0.00073
3	0	0	0	0	0	0	0	0.001807	0	0.002503
4	0	0	0	0	0	0	0	0.001723	0	0.001293
5	0.004345	0	0	0	0	0	0	0.002791	0	0.001119
6	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0.02587	0	0
9	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0
11	0.009753	0	0	0	0	0	0	0	0	0
12	0	0.245639	0	0	0	0	0	0	0	0
13	0	0	0.011579	0	0	0	0	0	0	0
14	0	0	0	0.014355	0	0	0	0	0	0
15	0	0	0	0	0.00238	0	0	0	0	0
16	0	0	6.49E-05	0	0	0.002637	0.000808	0.001098	0	0
17	0.000347	0.001318	2.29E-05	0.001322	0.001675	0.000274	0.009576	0.002737	0	5.85E-05
18	0.004012	0.001888	7.57E-05	0.000346	0.0008	0.002212	0.000219	0.000788	0.559228	0
19	0	0	0	0	0	0	0	1.25E-05	2.75E-05	0
20	0.003709	0	0	0.004582	0	0	0	0.003741	0.183417	0.013159
21	0.000313	0.000353	5.19E-05	0.000153	0.001127	0.000459	0.000155	0.000654	7.21E-05	3.16E-05
22	1.01E-06	0	0	0	0	0	0	3.76E-07	0	6.08E-07
23	0	0	0	0	0	0	0	0	0	0.000262
24	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	6.8E-07	0	0
27	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0.003395	0	0.000412
29	0	0	0	0	0	0	0	0.036614	0	0.007614
30	0	0	0	0	0	0	0	8.63E-05	0	0
31	0	0	0	0	0	0	0	8.67E-05	0	0
32	0	0.001168	0.006907	0	0	0	0	0.089572	0	0.302828
33	0	0	0	0	0	0	0	0	0	0
34	0.004562	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0
36	0.001699	0.00157	0.000471	0.010316	0.006457	0.002761	0.000151	0.000503	0.000414	0.000125
37	0.009776	0.001728	0.008933	0.001109	0.002136	0.001541	0.000151	9.68E-06	0	0.002589
38	0.002418	0.002464	8.7E-05	8.75E-05	0.000335	0.000182	0.00024	0.000186	0.000211	0.000368
39	0.229198	0.027501	0.038705	0.05481	0.036357	0.04786	0.060853	0	0	4.37E-06
40	0.000328	0.000205	2.56E-05	2.86E-05	0	0	0	0.008871	0.0002	0.019332
41	0.016191	0.002332	0.002932	0.00433	0.004426	0.003258	0.001037	0.011871	0.001927	0.009212
42	0.008005	0.001018	0	8.2E-05	0.005173	0.000235	0.000206	0.002012	0.000481	0.001021
43	1.13E-05	0.000874	1.02E-05	5.73E-05	0	4.96E-05	0.000584	0.000265	0	7.08E-05
44	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	0.023635	0.00458	0.000593	0.00181	0.005556	0.005479	0.000172	0.001763	0.000121	0.000411
48	0.012253	0.001777	0.000849	3.02E-05	1.92E-05	0.000217	0.000275	0.000501	0.001828	0.000984
49	0	0	0	0	0	0	0	0	0	0
50	0	0.000123	1.02E-05	6.68E-05	0.000115	2.57E-05	0	0.000117	0.00026	0.000129
51	0.004457	0.000575	0.001639	0.000427	0.000101	0.00036	0.000436	0.003927	0.003151	0.002905
52	0.013694	0.002633	0.013256	0.001676	0.009013	0.017029	0.005903	0.004516	0.000353	0.003222
53	0	0	0	0	0	0	0	0	0	0
54	0.000736	0.002382	0.000627	0.001342	0.001752	0.000593	0.000247	0.000343	0.000426	0.000726
55	8.44E-05	2.73E-05	6.85E-05	7.61E-06	0	0	0	4.03E-06	3.74E-05	0
56	0.000184	0.000835	0.000426	0.000715	0.000486	0.002336	7.23E-05	0.000181	0.003698	0.000732
57	0	0	0	0	0	0	0	0	0.00146	0
58	0.000892	0.002132	0.01137	0.000493	0.002126	0.00016	5.92E-05	0.000345	0.000334	0.000147
59	0	0.000149	1.47E-05	0	0	0	0	0	0.000645	0
60	1.39E-05	0.000221	5.84E-05	1.73E-05	3.87E-05	1.13E-05	1.21E-05	1.81E-05	1.57E-05	9.51E-06
61	0.000874	0.00066	0.000764	0.001284	0.000628	0.000622	0.000225	0.000833	0.000306	0.000215
62	0.007378	0.003971	0.000134	0	0.0005	4.64E-05	0	3.66E-06	0.002116	0.000877
63	0	0	0	0	0	0	0	0	0	0
64	0.004483	0.001573	1.08E-05	0.001103	0	0	0	0.001011	0	0.00017
65	0.030917	0.005281	0.002796	0.001199	0.005226	0.003627	0.000218	0.003341	0.000878	0.001602
66	0	0	0	0	0	0	0	0	0	0

APPENDIX B.

Table B-6 (cont'd.)

Sector	21	22	23	24	25	26	27	28	29	30
1	0	0	0	0	0	0	4.77E-06	0	0.884716	0
2	0	0	0	0	0	0	0.033711	0.000739	0	0.001799
3	0	0	0.000147	0	0	0	1.27E-05	0.002211	0	0.095937
4	0	0	7.89E-05	0	0	0	0.000261	0	0	0.073964
5	0	0	5.92E-05	0	0	0	0.016656	0	0	0.004089
6	0	0	1.21E-05	0	0	0	0.000822	0	0	0.087348
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0.005432	0.112803	0	0.007159
10	0	0	0	0	0	0	0.003423	0.246257	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0.000505
15	0	0	0	0	0	0	0	9.54E-05	0	0
16	0	0	0	0	0	0	0.00252	0.000419	0	0.000358
17	0	0	0	0	0	0	3.36E-05	0.000372	0	9.15E-05
18	0	0	0	0	0	0	0.022389	0	0	0
19	0	0	0	0	0	0	0.013892	0.001092	0	0.001737
20	0	0	7.72E-05	0	0	0	0.000328	0.000648	0	0.0083
21	0.000682	1.24E-05	0.000532	4.63E-05	0	0.000232	0	1.4E-05	2.18E-06	0
22	0.000114	2.56E-05	0.00016	0	0	0	0	4.69E-05	0	0
23	0	0	0.066722	0	0	0	0.261695	1.2E-05	0	6.24E-05
24	0	0	0	0.000979	8.21E-07	0	0	0	0	0
25	0	0	0	0	8.45E-05	0	0	0	0	0
26	0	0	0.000101	0	0	2.13E-05	0	5.76E-06	0	0
27	0	0	0	0	0	0	0.02651	0	0	0.008645
28	0	0	3.97E-05	0	0	0	0.01341	0.120299	0	0.005049
29	0	0	0.000821	0	0	0	0.00031	0	0.003346	0.035133
30	0	0	2.21E-06	0	0	0	0.003176	0	0	0.182736
31	0	0	7.37E-05	0	0	0	0.032291	0	0	0.038629
32	0	0	0.02118	0	0	0	0.03713	0	0	0.005275
33	0	0	0	0	0	0	1.66E-05	0	0	0
34	0	0	0	0	0	0	0	0	0	0
35	0	0	0.001971	0	0	0	0	0	0	0.000367
36	0.000638	0.001175	0.004383	0.001246	0.002354	0.00046	0.000589	0.000287	0.002918	0.001518
37	0	0	0.002949	0	0	0.001377	0.000424	0.000144	0	0.000162
38	0.004035	0.005922	0.000722	0.000707	0.000167	0.001352	0.00227	0.000629	5.23E-05	0.003755
39	0	0	0.002072	1.04E-05	4.12E-07	1.06E-05	0	0	0	0.000145
40	0.000588	0.0018	0.000982	0.016473	0.005481	0.032603	0.010629	0.00408	5.34E-06	0.004024
41	0.030281	0.012749	0.053705	0.027883	0.004188	0.032279	0.014988	0.007998	0.003732	0.011159
42	1.79E-06	0.00018	0.002305	7.42E-06	0	0.000432	0.011307	0.001158	0.000114	0.002909
43	0.000157	0.000141	0.000114	0.000161	0	0	0.000337	5.86E-05	0	6.82E-05
44	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0.000101	0	0	0	0	0
46	0	0.001698	0.000132	0	0	0	1.43E-05	0	0	5.43E-06
47	0.006467	0.00433	0.001904	0.00021	0.00046	0.00203	0.02619	0.006025	0	0.000878
48	0.029876	0.002535	0.001257	0.036085	0.006391	0.033867	0.005625	0.001486	0.000679	0.001971
49	0	0	0.016542	4.6E-05	0.000705	0	0	0	0	0
50	0.001126	0.003318	0.000241	3.75E-05	2.49E-05	3.63E-06	1.47E-05	3.7E-06	0	1.36E-05
51	0.001579	0.003323	0.000966	0.001846	0.000133	0.000426	0.006938	0.002831	0.000621	0.004904
52	0.010881	0.021102	0.003008	0.005225	0.006526	0.011787	0.001093	0.002407	4.75E-05	0.001086
53	0	0	0	0	0	0	0	0	0	0
54	0.00737	0.0014	0.002689	0.001115	0.006127	0.01158	0.006614	0.002469	0.000469	0.002104
55	6.06E-05	0	1.46E-05	0.000672	5.64E-06	0.000293	0.000138	6.22E-05	1.71E-05	8.38E-06
56	0.003262	0.004878	0.000322	0.009101	0.000782	0.009267	0.013718	0.008178	0.000836	0.006218
57	0.001457	0.000156	9.91E-05	0.005053	0.00014	0	0.005092	0.001888	0.000347	0.001721
58	0.002282	0	0.00013	0.011441	0.002399	0.001096	0.001326	0.000212	5.59E-05	0.000308
59	0.000241	0	0	0.00024	0.000207	3.79E-05	0.002322	0.000822	0.00015	0.000729
60	3.73E-05	7.91E-05	4.3E-05	5.27E-05	0.000128	5.25E-05	0.000302	0.00018	2.22E-05	0.000335
61	0.00101	0.000263	0.001306	0.000355	0.000954	0.000339	0.002206	0.00103	0.000703	0.001075
62	0.004852	0.015977	0.000922	0.008093	0.023561	0.004534	0.006893	0.002947	9.23E-05	0.001729
63	0	0	0	0	0	0	0	0	0	0
64	0	0	0.001107	0.0003	0.000201	0.000133	0.002939	0.000201	1.55E-05	8.64E-05
65	0.020761	0.050066	0.001576	0.007436	0.006365	0.016376	0.02412	0.01108	0.000185	0.002228
66	0	0	0	0	0	0	0	0	0	0

APPENDIX B.

Table B-6 (cont'd.)

Sector	31	32	33	34	35	36	37	38	39	40
1	0	0.000137	0	0	0	0	0	0.000222	0	4.33E-05
2	0	0.165945	0.002272	0	0	0	0	0	0	0
3	0	0.047992	0.001399	0.00071	0	0	0	0	0	0
4	9.29E-06	0.001337	0	0	0	0	0	0	0	0
5	0	0.00213	0.014718	0	0	0	0	0	0	0.000628
6	0	0.003116	0.011113	0	0	0	0	0	0	1.79E-05
7	0	0	0	0	0	2.93E-05	0	0	0	0.000423
8	0.425745	4.61E-05	9.02E-06	0	0	0	0	0	0	0
9	0.0183	0.000357	0	0	0	1.55E-06	2.62E-05	0	0.000604	5.1E-05
10	0	0.00042	0	0	0	0	0	0	0	0.011916
11	0	0	0	0.070408	0	0	0	0	0	0
12	0	0.04741	0	0	0	0	0	0	0	0
13	0	0.022544	0.008139	0	0	0	0	0	0	0
14	0	0.000512	0	0.086518	0	0	0	0	0	0.000786
15	0	3.96E-07	0	0	0.012085	0.002508	3.82E-05	0	0	0
16	0	0.012247	0.004481	0.000128	0	2.37E-06	1.55E-06	0	0	0.002935
17	0.012856	0.001001	3.14E-05	0.000244	0	0	0	0	2.38E-05	0.003156
18	0	9.64E-05	0.002344	0	0.002204	0.000462	0	0	0	1.19E-05
19	0	0.000298	0	0	0	0.007618	0	0	0	1.8E-06
20	0	0.000356	0.000215	0	0	0	0	0	0	0.000139
21	0.000578	8.54E-05	0	0	0	0	0.040808	0.000543	0	4.53E-05
22	0	0	0	5.62E-05	0	5.78E-05	0.003081	0	3.24E-05	0.000208
23	0	0.00397	0	0	0	0	0	0	0	3.55E-06
24	6.01E-06	0	0	0	0	0	0	0	0	1.36E-05
25	0	0	0	0	0	0	0	3.72E-05	0.000986	0
26	5.03E-05	3.15E-05	0	0	0	1.37E-08	7.71E-07	7.98E-05	0.001928	0.000258
27	0	0.003246	0.000608	0	0	0	0	0	0	0.000739
28	0.000897	0.022734	0	0	0	5.23E-05	1.22E-05	2.06E-05	4.53E-06	0.007133
29	0	0.025678	0.002977	0	0	0	0	0	0	0.000295
30	0	0.051919	0.002955	7.01E-06	0.000388	0.001014	0.006926	0.001396	0	0.001085
31	0.005508	0.029244	0.134556	0.001172	0	0	0	2.84E-06	0	0.001628
32	5.18E-05	0.039812	0.052382	0	0.000178	8.28E-06	0	0	0	0.000201
33	0	2.62E-05	0.016778	0	0	0	0	0	0	0.000108
34	0	0	0	0.111919	0	0	0	0	0	0
35	0	5.24E-06	0	0	0.094762	0.299351	0.001327	0.000353	0.003668	0.000359
36	0.006152	0.000338	9.05E-05	1.16E-05	0.001278	0.212421	0.001521	4.4E-05	0.001212	0.000579
37	0.000945	0.000884	0.004215	1.62E-05	0.00309	0.001588	0.067326	0.001357	0.000537	0.001527
38	0.001117	0.002665	0.005068	0.057599	0.002854	0.00343	0.001024	0.391336	0.021924	0.012755
39	0	0.000316	0.000695	7.48E-05	0	6.04E-07	2.38E-05	8.75E-06	0.004825	0.000456
40	0.004841	0.009021	0.047079	0.005222	0.326121	0.063733	0.03011	0.067371	0.415022	0.436224
41	0.013183	0.014671	0.013215	0.003577	0.030071	0.018677	0.021748	0.03535	0.028944	0.011203
42	0.000146	0.003059	0.003438	0.004059	0.009086	0.006851	0.002234	0.001807	0.010116	0.009507
43	0.001007	0.001694	0.021498	6.86E-05	3.9E-05	0.001078	0.000315	9.71E-05	9.87E-06	0.01441
44	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	4.4E-05	9.12E-05	1.14E-05	0	0.000108
46	0	6.56E-06	0	0.000752	0	1.47E-05	1.06E-05	0.000114	0	0.000438
47	0.00112	0.001975	0.033306	0	0.002481	0.000594	0.001918	0.001791	0.002622	0.004005
48	0.008288	0.001309	0.005661	0.001329	0.003787	0.00552	0.008615	0.000658	0.018654	0.00582
49	0	0	0	0	0	0	0	0	0	0
50	1.95E-05	3.22E-05	8.54E-05	1.25E-05	8.12E-05	0.001216	1.3E-05	0.000412	4.48E-05	0.002721
51	0.000292	0.004841	0.026159	0.001574	0.014428	0.009153	0.004417	0.018205	0.005132	0.01348
52	0.007134	0.00143	0.003418	0.000935	0.001191	0.001261	0.001935	0.000836	0.000142	0.003372
53	0	0	0	0	0	0	0	0	0	0
54	0.004337	0.001751	0.007736	0.004368	0.001771	0.002885	0.01732	0.004477	0.009944	0.006626
55	5.75E-05	0.000124	0.000234	7.88E-05	0.000145	0.000179	0.000161	0.000767	0.000189	0.000355
56	0.005953	0.005128	0.009502	0.004297	0.002799	0.003678	0.014807	0.007465	0.008482	0.009407
57	0.001248	0.001623	0.001855	0.0012	0.000661	0.001108	0.003	0.002161	0.005015	0.001754
58	0.000497	0.000378	0.002077	0.001123	0.000803	0.000773	0.000408	0.000609	0.001792	0.002552
59	0.000569	0.000723	0.00091	0.001032	0.000323	0.000529	0.001429	0.001216	0.002268	0.000803
60	0.000198	0.000184	0.000478	0.000308	0.000256	0.000175	0.000147	0.000587	0.001434	0.001069
61	0.001112	0.001088	0.002401	0.001313	0.001711	0.001572	0.001955	0.002069	0.001143	0.002321
62	0.001772	0.002595	0.005492	0.002893	0.002481	0.003223	0.002982	0.00331	0.013829	0.012024
63	0	0	0	0	0	0	0	0	0	0
64	1.03E-06	0.000385	0.002243	0.000575	0.001962	0.000495	0.000248	0.004562	0.0012	0.005951
65	0.005358	0.000744	0.002317	0.004416	0.000785	0.000914	0.001855	0.001008	0.004769	0.001983
66	0	0.000264	0.01937	0.045984	0	1.47E-05	0.011256	0.018534	1.09E-05	0.000817

APPENDIX B.

Table B-6 (cont'd.)

Sector	41	42	43	44	45	46	47	48	49	50
1	0	0	4.33E-05	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0
7	0	0.181308	0	0	0	0	0	0	0	0.000103
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0.003747
10	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0.000458
15	0	0	0	0	0	0	0	0	0	0.008763
16	0	0	0	0	0	0	0	0	0	0
17	2.96E-06	0	0	0	0	0	0	0	0	4.14E-05
18	0	0	0.000403	0	0	0	0	0	0	4.62E-05
19	0	0	0	0	0	0	0	0	0	0.00231
20	0	0	0	0	0	0	0	0	0	0.01487
21	0	0	0.000896	8.03E-05	0	0	0	1.3E-07	8.98E-05	0.000138
22	0	8.64E-07	0	0	0	0	0	3.71E-06	7.18E-06	3.26E-06
23	0	0	0	0	0	0	0	0	0	7.62E-05
24	1.73E-06	0	0.001456	0.00136	0.000301	0.007132	0	4.81E-07	9.99E-09	0
25	0.016351	0	0	0.001009	0.000334	0	0	0	0	0
26	2.44E-06	1.57E-06	0.00542	0.008444	3.91E-05	2.21E-07	3.15E-06	4.73E-07	0	2.51E-06
27	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0
29	0	0	0.000357	0	0	0	0	0	0	0
30	0	1.84E-05	0	0	0	0	0	9.36E-05	0	0.000163
31	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0
35	0	0.000757	0	0.001302	0	0	1.09E-05	4.24E-05	6.3E-07	0.004888
36	2.39E-05	0.025795	0.000443	0.000255	3E-05	6.96E-06	0.000179	0.001201	0.001853	0.052399
37	4.64E-05	7.46E-05	0.002221	1.39E-05	4.77E-06	4.97E-07	0.006622	0.001031	0.009256	0.011615
38	0.000128	0.001459	0.019329	0.048191	0.000196	1.84E-05	0.004954	0.003351	8.02E-05	0.003251
39	1.91E-05	1.45E-05	0.000122	0.000817	1.21E-05	1.99E-06	1.78E-05	1.22E-05	0	5.55E-05
40	0.002979	0.275128	0.069962	0.012676	0.043384	0.010415	0.028089	0.023093	0.013119	0.124026
41	0.017263	0.016006	0.064893	0.06971	0.051138	0.03185	0.019812	0.003569	0.004883	0.008436
42	0.000528	0.145917	0.003535	9.29E-05	0.001258	1.54E-05	0.006793	0.011584	0.012407	0.015864
43	8.83E-05	0.000156	0.009912	0	0.00335	0.000292	0.000558	0.005344	0.004646	0.011653
44	0	0	0.037785	0	0	0	8.88E-05	0	0	0.000761
45	2.98E-05	1.14E-05	0.000105	0	0.285641	0.000327	0.284199	0.009845	0.090989	0.00967
46	3.28E-06	2.13E-06	2.37E-05	0	0.000433	0.320264	0.136679	0.016545	0.008224	0.108876
47	0.001109	0.003558	0.000463	0	0.00466	0.000285	0.075064	0.008682	0.022903	0.034646
48	0.009178	0.002001	0.004543	0.002816	0.012362	0.002378	0.002473	0.516655	0.041347	0.001907
49	0.000525	0	0	0	0	0	0	0.000255	0.326338	0
50	9.58E-06	0.000152	0.000232	8.51E-05	0.000305	0.000326	0.000115	0.010056	0.01824	0.044511
51	0.003307	0.004389	0.021279	0.061845	0.049579	0.012774	0.010491	0.001858	0.006782	0.005037
52	0.002506	0.001787	0.004771	0.004481	0.000715	0.001011	0.002386	0.000632	0.001146	0.000183
53	0	0	0	0	0	0	0	0	0	0
54	0.006679	0.00315	0.006031	0.025162	0.016753	0.004801	0.00428	0.002738	0.003208	0.007134
55	3.41E-05	0.000253	0.000351	0.000846	0.000659	0.000375	0.000241	0.000177	0.000472	0.001073
56	0.00113	0.005073	0.009593	0.031169	0.012369	0.007293	0.0133	0.005452	0.003034	0.005369
57	0.000117	0.001244	0.00209	0.002948	0.000965	0.000592	0.00131	0.000903	0.000883	0.001438
58	0.001371	0.000606	0.000603	0.000421	0.0004	0.001633	0.000564	0.00032	0.000359	0.001284
59	0.000144	0.000649	0.00198	0.00198	0.001707	0.001221	0.002026	0.000858	0.000393	0.000606
60	0.000205	0.000208	0.000631	0.001142	0.000228	0.000203	0.00118	0.000187	0.000261	0.000359
61	0.000856	0.000967	0.001245	0.003238	0.001822	0.001933	0.000765	0.000651	0.001294	0.001385
62	0.002248	0.00329	0.009759	0.013064	0.00272	0.006308	0.010132	0.002921	0.005322	0.012738
63	0	0	0	0	0	0	0	0	0	0
64	0.000392	0.000479	0.000414	0.005726	6.38E-05	0.000628	0.00059	0.00016	0.001279	0.000649
65	0.005137	0.004076	0.002476	0.001907	0.001132	0.000273	0.00332	0.001895	0.000271	0.000675
66	0.004205	0.020447	0.00093	0	0.049041	0.004635	0	0	0	0.020995

APPENDIX B.

Table B-6 (cont'd.)

Sector	51	52	53	54	55	56	57	58	59	60
1	0	0.001828	3.44E-06	0	0	0	0	0	0	0
2	0	0	0	0.005451	0	0	0.000108	0	0	0
3	0	0	0	0.000951	0	0	5.25E-06	0	0	0
4	0	0	0	0.004158	0	0	3.57E-05	0	0	0
5	0	0	1.3E-05	0.031045	0	0	0	0	0	0
6	0	3.25E-05	0	6.46E-05	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0.000539	0	0	0	0	0	0
9	0	0	3.9E-06	0.004562	0	0	6.83E-06	0	0	0
10	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0.000164	0	0	0	0	0	0
13	0	0	0	6.67E-05	0	0	0	0	0	0
14	0	0	0	0.000118	0	0	0	0	0	0
15	0	0	0	0	0	0	3.94E-06	0	0	0
16	0	0	0	0.002942	0	0	4.99E-06	0	0	0
17	0	1.11E-05	0	0.000837	0	1.5E-05	0	0	0	0
18	0	0	0	0.002512	0	0.000175	1.58E-05	0	0	0
19	0	0	0	0.066911	0	0	0.000202	0	0	0
20	0	0	0	0.057245	0	0	0.000309	0	0	0
21	0	0.003014	5.04E-07	0.000131	0.000136	0	0	0	0	0
22	0	5.12E-06	0	0.000118	0	0	0	0	0	0
23	0	0	0	0.024049	0	0	0.000234	0	0	0
24	0.002343	0	0	0	1.83E-05	0	0	0	0	0
25	0.00133	0	0	0	0	0	0	0	0	0
26	0	0.002644	8.77E-06	7.91E-06	0	0	0	0	0	0
27	0	0	0	0.019539	0	0	0.000599	0	0	0
28	0	0	6.76E-06	0.01978	0	0	4.97E-05	0	0	0
29	0	0	0	0.050189	0	0	0.000868	0	0	0
30	0	0	5.99E-05	0.008008	0	0	0.001013	0	9.17E-05	0.00011
31	0	0	0	0.018631	0.000304	0	0.000917	0	0	0
32	0	0	8.91E-06	0.027773	0.000425	2.46E-05	0.001551	0.000148	0.000101	0
33	0	0	1.87E-05	0.018486	0.000627	0	0.000712	0.000717	0.000733	0
34	0	0	0	0.01028	0	0	0.000205	0.000125	0	0
35	0	6.39E-06	6.14E-07	0	0	0	0	0	0	0
36	0.000256	0.001062	0.002257	0.004035	0.003477	0.000977	0.000491	0.000352	0.004721	0.001654
37	0	0.08323	0.001223	0.000364	0	8.63E-06	0	2.03E-05	0.001289	0.0002
38	0.003502	0.002537	0.013163	0.005913	0.008464	0.00076	0.001322	0.019491	0.002675	0.013628
39	0	0	1.24E-05	0.000508	0	4.75E-06	7.95E-06	0	3.37E-05	0
40	0.00983	0.007629	0.000959	0.00337	0.0034	0.00069	0.001337	0.000295	0.003067	0.000879
41	0.261455	0.075222	0.013125	0.021907	0.13697	0.119841	0.154029	0.149386	0.041494	0.008467
42	1.68E-06	0.006842	0.003242	0.001098	0.000239	0.000804	0.000176	0.000269	0.000832	0.000337
43	0.000315	0.055003	0.000206	0.00252	0.008177	8.77E-05	2.01E-05	2.65E-05	0.000103	0.000245
44	0	0.032283	0	0	0	0	0	0	0	0
45	0	0.075617	0	0	2.43E-05	0	0	0	0	0
46	0	0.013321	0	0	0	0	0	0	0	0.000215
47	0.000695	0.123444	7.38E-05	0.002624	0.002328	2.12E-05	0.000149	3.9E-05	0.001378	0.000245
48	0.065727	0.046825	0.000855	0.003271	0.005222	0.000706	0.00163	0.000444	0.024733	0.006479
49	0	0	0	0	0.125381	0	0.042347	0.106349	0.002287	0
50	7.49E-05	0.001597	0.000434	0.000596	0.001927	0.000483	0.00105	0.000785	0.000594	0.00031
51	0.148322	0.00049	0.011257	0.026236	0.020411	0.002034	0.00428	0.00027	0.015264	0.013271
52	0.013123	0.001527	0.008193	0.009173	0.08864	0.001737	0.004311	0.0021	0.045248	0.048546
53	0	0	0	0	0	0	0	0	0	0
54	0.000544	0.004056	0.011563	0.00288	0.014429	0.007754	0.001624	0.040841	0.008874	0.01026
55	2.11E-05	1.16E-07	0.000289	5.31E-05	0.000136	6.46E-05	2.97E-05	2.39E-05	0.000325	0.000846
56	0.000108	5.12E-06	0.017449	0.001455	0.001487	0.018192	0.000185	0	0.002682	0.003138
57	2.57E-05	0	0.001799	3.04E-05	0.000809	0.002415	0.007664	0	0.000514	0.001276
58	0.000586	0.000739	0.00387	0.0003	0.0011	0.000132	0.000735	0.081362	0.002007	0.009744
59	1.61E-06	0	0.000106	0.000206	0.012361	0.014416	0.162219	0.082421	0.022989	0.001176
60	0.000308	0.000206	0.001079	0.001564	0.001852	0.000595	0.001542	0.000954	0.004442	0.011167
61	0.000471	0.001092	0.002623	0.000438	0.002565	0.001742	0.001123	0.002729	0.000511	0.002747
62	0.004468	0.008256	0.016819	0.021306	0.020067	0.01783	0.009043	0.073568	0.033893	0.033934
63	0	0	0	0	0	0	0	0	0	0
64	0.000555	0.000486	0.000245	0.001244	0.016984	0.000813	0.000997	0.003374	0.009674	0.004456
65	0.010418	0.000668	0.009614	0.004851	0.010552	0.159041	0.001521	0.00099	0.019771	0.008183
66	0	3.18E-05	0.002059	0.000629	0	0	2.63E-06	0	0	0.000134

APPENDIX B.

Table B-6 (cont'd.)

Sector	61	62	63	64	65	66
1	0	0	0	0	2.79E-05	0
2	0	0	0	0.000832	4.98E-05	0
3	0	0	0	0.00055	5.1E-06	0
4	0	0	0	0.00058	0.000104	0
5	0	0	0	0.006559	0.000696	0
6	0	0	0	0	3.53E-06	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0.000281	1.73E-05	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	1.03E-05	0	0
16	0	0	0	0.000376	0	0
17	1.47E-07	2.99E-07	0	5.91E-07	5.72E-05	0
18	0	0	0	0.000749	6.97E-05	0
19	0	0	0	0.004753	0.000398	0
20	0	0	0	0.002754	0	0
21	0	0	0	2.22E-05	0	0
22	0	0	0	1.34E-06	3.19E-05	0
23	0	0	0	0.001853	7.29E-07	0
24	0	0	0	0	0	0
25	0	0	0	0	0	0
26	0	0	0	3.45E-05	0	0
27	0	0	0	0.00106	0	0
28	0	0	0	0.00037	2.65E-05	0
29	0	0	0	0.007362	0	0
30	0	0	0	0.001586	2.23E-05	0
31	0	0	0	0.002736	3.49E-05	0
32	2.85E-05	0	0	0.001394	0.005888	0
33	8.43E-05	9.6E-05	0	0.000103	0.000377	0
34	2.46E-06	0	0	0	0	0
35	0	0	0	0.001253	0.003166	0
36	0.000167	0.000623	0	0.004084	0.013049	0.002743
37	0	1.16E-05	0	0.00052	0.000858	0.001907
38	0.02698	0.004866	0	0.083975	0.003123	0.007225
39	1.64E-06	0.000384	0	0.000118	0.00024	0.000825
40	0.000922	0.002679	0	0.068643	0.014684	0.217521
41	0.001909	0.003645	0	0.006924	0.025283	0.031107
42	0.000323	0.000645	0	0.002281	0.089182	0.015854
43	1.59E-05	0.000256	0	0.000331	0.000844	0
44	0	0	0	0	0	0
45	0	0	0	0	0.00207	0
46	0	0	0	0	0.006369	0
47	1.82E-05	0.000682	0	0.000904	0.008919	0.000137
48	0.001151	0.022108	0	0.005188	0.063343	0.001077
49	0	0	0	0	0.109808	0
50	0.000716	0.001879	0	0.009625	0.020498	0
51	0.009142	0.00398	0	0.007533	0.019964	0.011537
52	0.014375	0.077113	0	0.01354	0.004989	0
53	0	0	0	0	0	0
54	0.021507	0.004057	0	0.002777	0.004465	0
55	0.000166	0.000122	0	8.26E-05	7.26E-05	0
56	0.005651	0.001741	0	0.001275	0.001034	0.005354
57	2.56E-05	0.000138	0	7.53E-05	0.000224	0
58	0.005346	0.003526	0	0.000599	0.001163	0
59	1.82E-05	0.000121	0	5.74E-05	0.000106	0
60	0.001775	0.001121	0	0.000374	0.001206	0.001356
61	0.008732	0.002094	0	0.000688	0.000505	0
62	0.04588	0.014892	0	0.00565	0.021412	0
63	0	0	0	0	0	0
64	0.00602	0.007032	0	0.007169	0.001352	0
65	0.015002	0.009827	0	0.007791	0.026016	0.00602
66	0	0.000151	0	0	0.000931	0.228938

APPENDIX B.

Table B-7. "Margining" spending for selected retail goods in the B-C-S region, GPNP.

Retail good	Total spending (rupiahs)	Impacted industry	Charges* (%)	Charges (rupiahs)
Oil and gas	6,523,433.61	Wholesale, retail trade	30.4	1,983,123.82
		Transportation	1.0	65,234.34
Spare parts	30,056.45	Wholesale, retail trade	44.6	13,405.18
		Transportation	1.9	571.07
Cigarettes	14,538,860.85	Wholesale, retail trade	11.3	1,642,891.28
		Transportation	1.5	218,082.91
Photo films	20,082,660.35	Wholesale, retail trade	48.7	9,780,255.59
		Transportation	0.3	60,247.98
Souvenirs	6,977,941.84	Wholesale, retail trade	45.4	3,167,985.60
		Transportation	0.5	34,889.71
Clothings	3,931,116.60	Wholesale, retail trade	46.0	1,808,313.64
		Transportation	0.2	7,862.23
Total	52,084,069.70			18,782,863.34

* Deived from national (the U.S.) personal consumption expenditures published by Bureau of Economic Analysis, U.S. Department of Commerce (Stynes and Propst, 1992).

APPENDIX B.

Table B-8. National income- and employment-output ratios in 1990 by selected sectors, GPNP.

Selected sectors (I-O code)	Income (millions of rupiahs)	Employment (number of persons)	Output (millions of) rupiahs)	Income-Output Ratio	Employment-Output Ratio (persons/million of rupiahs)
Maize (3)	213,866	3,188,914	1,600,424	0.13363	1.99254
Root Crops (4)	243,876	3,449,498	2,656,676	0.09180	1.29843
Vegetable and Fruit (5)	1,041,713	10,730,653	7,773,695	0.13400	1.38038
Other Food Crops (6)	7,562	167,504	74,518	0.10148	2.24783
Other Agriculture (17)	193,877	161,360	688,479	0.28160	0.23437
Fishery (23)	621,948	1,039,600	4,713,533	0.13195	0.22056
Trade (53)	4,556,120	9,913,035	30,800,754	0.14792	0.32184
Restaurant and Hotel (54)	1,676,193	468,193	14,787,382	0.11335	0.03166
Road Tranport (56)	1,751,845	1,848,513	10,964,070	0.15978	0.16860
Services Allied to Transport (59)	471,012	182,420	2,579,488	0.18260	0.07072
Financial Intermediaries (61)	3,346,918	230,855	11,517,034	0.29061	0.02004
Other Services (65)	2,566,634	4,200,799	12,746,225	0.20136	0.32957
Unspecified Sectors (66)	23,870	363,549	173,099	0.13790	2.10024

Note : This table is derived from the 1990's Indonesia 66-sector Input-Output Model.

APPENDIX C

APPENDIX C

C-1. UCRIHS approval letter.

MICHIGAN STATE
UNIVERSITY

December 16, 1993

TO: Adi Susmianto
1512-K Spartan Village

RE:

IRB #:	93-579
TITLE:	RECREATIONAL EXPENDITURES IN GUNUNG GEDE PANGRANGO NATIONAL PARK AND THEIR REGIONAL ECONOMIC IMPACTS
REVISION REQUESTED:	N/A
CATEGORY:	1-C
APPROVAL DATE:	12/13/1993

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project including any revision listed above.

Renewal: **UCRIHS approval is valid for one calendar year, beginning with the approval date shown above.** Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

Revisions: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

Problems/ Changes: Should either of the following arise during the course of the work, investigators must notify UCRIHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of any future help, please do not hesitate to contact us at (517) 355-2180 or FAX (517) 336-1171.

Sincerely,

David E. Wright, Ph.D.
UCRIHS Chair

DEW:pjm

cc: Dr. Larry Leefers

OFFICE OF
RESEARCH AND GRADUATE STUDIES
University Committee on Research Involving Human Subjects (UCRIHS)
Michigan State University
225 Administration Building
East Lansing, Michigan
48824-1046
517/355-2180
FAX 517/336-1171

MSU is an affirmative-action equal-opportunity institution

APPENDIX C

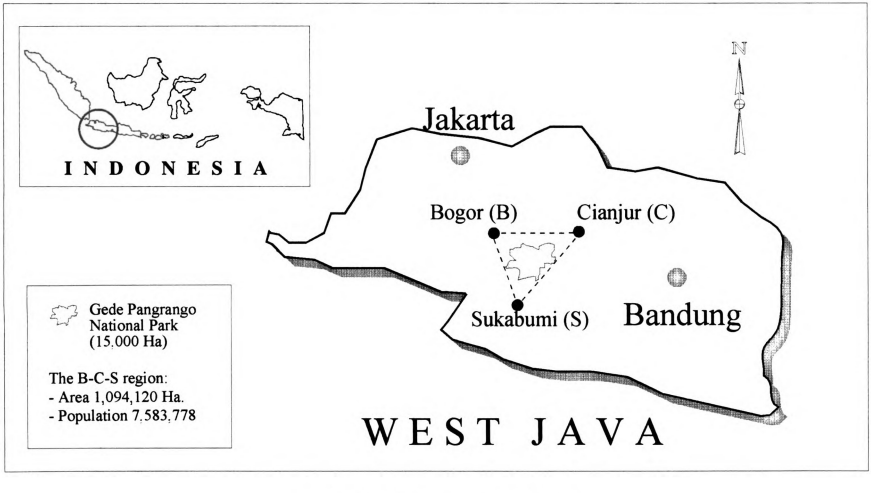

Figure 1: Map of the study location. GPNP

REFERENCES

Archer, B. 1973. The Impact of Domestic Tourism. In: Assessing the Impacts of Travel and Tourism--Measuring Economic Benefits. In: Travel, Tourism, and Hospitality Research: A Handbook for Managers and Researchers, J.R.B. Ritchie and C.R. Goeldner, Eds.1987. John Wiley & Sons, Inc., Canada.

Archer, B. 1977. Tourism Multipliers: the State of the Art. In: Role of Economic Impact Assessment Procedures in Recreational Fisheries Management. In: Social Assessment of Fisheries Resources, D.R. Talhem, Ed. Transaction of the American Fisheries Society 116: 450-460.

Armstrong, H. and J. Taylor. 1978. Regional Economic Policy and Its Analysis. Philip Allan Publishers Limited, Oxford.

Bhattacharyya, G.K. and R.A. Johnson. 1977. Statistical Concepts and Methods. John Willey & Sons, Inc. Canada.

Bergstrom, J.C., H.K. Cordell, A.E. Watson, and G.A. Ashley. 1990. Economic Impacts of State Parks on State Economics in the South. Southern Journal of Agricultural Economics. Southern Agricultural Economics Association. pp. 69-77.

Biro Pusat Statistik (Central Bureau of Statistics). 1994. Tabel Input-Output Indonesia 1990 (The 1990 Indonesian Input-Output Table), Jilid I (Volume I). Maret 1994, Jakarta.

Biro Pusat Statistik (Central Bureau of Statistics). 1994. Tabel Input-Output Indonesia 1990 (The 1990 Indonesian Input-Output Table), Jilid II (Volume II). Maret 1994, Jakarta.

BKKBN. 1992. Kumpulan Data Kependudukan & Keluarga Berencana Indonesia (The Indonesian Demography and Family Planning Data). Januari 1992, Jakarta.

Blair, P.B. 1991. Urban & Regional Economics. Richard D. Irwin, Inc., Boston, MA 02116.

Block, A.H. 1977. Impact Analyses and Local Area Planning: An Input/Output Study. Center for Community Economic Development, Cambridge, Massachusetts.

Bradley, I.E. and J.P. Gander. 1969. Input-Output Multipliers: Some Theoretical Comments. Journal of Regional Science 9(2): 309-317.

Bromly, D.W. 1972. An Alternative to Input-Output Models: A Methodological Hypothesis. Land Economic XLVIII (2): 125-133.

Brown, T.L. and N.A. Connelly. 1992. Assessing Changes in Tourism the Northeast. In: Measuring Tourism Impacts at the Community Level, S.D. Reiling, Ed. Miscellaneous Report 374, December 1992. Maine Agricultural Experiment Station, University of Maine. pp. 3-9.

Bureau of Economic Analysis. 1986. Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II). U.S. Department of Commerce, May 1986.

Bushnell, R.C. and M. Hyle. 1985. Computerized Models for Assessing the Economic Impact of Recreation and Tourism. In: Assessing the Economic Impacts of Recreation and Tourism, D.B. Propst, Comp. Southeastern Forest Experiment Station. Asheville, North Carolina. pp. 46-51.

Chadwick, R.A. 1987. Concepts, Definitions and Measures Used in Travel and Tourism Research. In: Travel, Tourism, and Hospitality Research: A Handbook for Managers and Researchers, J.R.B. Ritchie and C.R. Goeldner, Eds. 1987. John Wiley & Sons, Inc., Canada. pp. 47-59.

Chappelle, D.E. 1985. Strategies for Developing Multipliers Useful in Assessing Economic Impacts of Recreation and Tourism. In: Assessing the Economic Impacts of Recreation and Tourism, D.B. Propst, Comp. Southeastern Forest Experiment Station. Asheville, North Carolina. pp. 46-51.

Chappelle, D.E., S.E. Heinen, L.M. James, K.M. Kittleson, and D.D. Olson. 1986. Economic Impacts of Michigan Forest Industries: A Partially Survey-Based Input-Output Study. Research Report No. 472, Natural Resources. The Michigan State University Agricultural Experiment Station, East Lansing, Mich. pp. 1-16.

Clawson, M. and J.L. Knetsch. 1966. Economic of Outdoor Recreation. The Johns Hopkins Press, Baltimore.

Czamanski, S. and E.E. Malizia. 1969. Applicability and Limitations in the Use of National Input-Output Tables for Regional Studies. Papers of the Regional Science Association XXIII (?): 65-77.

Departemen Kehutanan (Ministry of Forestry of Indonesia). 1994. Rencana Pembangunan Kehutanan Pelita VI (The Forestry Development Plan in the Sixth Five Year Development Plan). Rapat Kerja Nasional Departemen Kehutanan Tahun 1994. April 1994, Jakarta.

Diamond, J. and D.E. Chappelle. 1981. Application of an Input-Output Model Based on Secondary Data in Local Planning: The Case of Manistee County. Research Report No. 409, Development and Public Affairs. The Michigan State University Agricultural Experiment Station, East Lansing, Mich. pp. 2-15.

DiPasquale, D. and K.R. Polenske. 1980. Output, Income, and Employment Input-Output Multipliers. In: Economic Impact Analysis: Methodology and Applications, S. Pleeter, Ed. Martinus Nijhoff Publishing, Boston. pp. 85-113.

Fakultas Kehutanan Institut Pertanian Bogor (Bogor Agriculture University). 1986. Desain Enginering Taman Nasional Gunung Gede Pangrango (The Gunung Gede Pangrango Engineering Design). Kerjasama Dengan Proyek Pembinaan Kelestarian Sumber Daya Alam Hayati di Pusat. Direktorat Jenderal Perlindungan Hutan dan Pelestarian Alam Departemen Kehutanan. Bogor, Indonesia.

Fakultas Kehutanan Institut Pertanian Bogor (Bogor Agriculture University). 1992. Studi Penentuan Nilai Ekonomi Kawasan Konservasi Dan Prospek Pengembangannya (A Study of Economical Values of Conservation Areas and Their Possible Prospects). Kerjasama Dengan Biro Perencanaan Sekretariat Jenderal Departemen Kehutanan. Juni 1992, Bogor.

Frechtling, D.C. 1987. Assessing the Impacts of Travel and Tourism--Introduction to Travel Impact Estimation. In: Travel, Tourism, and Hospitality Research: A Handbook for Managers and Researchers, J.R.B. Ritchie and C.R. Goeldner, Eds. 1987. John Wiley & Sons, Inc., Canada. pp. 325-331.

Frechtling, D.C. 1987. Assessing the Impacts of Travel and Tourism--Measuring Economic Benefits. In: Travel, Tourism, and Hospitality Research: A Handbook for Managers and Researchers, J.R.B. Ritchie and C.R. Goeldner, Eds. 1987. John Wiley & Sons, Inc., Canada. pp. 333-350.

Furukawa, S. 1986. International Input-Output Analysis : Compilation and Case Studies of Interaction between ASEAN, Korea, Japan, and the United States (1975). Institute Developing Economics, Tokyo, Japan.

Garhart, R.E. and F. Giarratani. 1987. Nonsurvey Input-Output Estimation Techniques: Evidence on the Structure of Errors. Journal of Regional Science 27(2): 245-252.

Garrison, C.B. 1974. A Case Study of the Local Economic Impact of Reservoir Recreation. Journal of Leisure Research 6(1): 7-18.

Hamilton, J.R., N.K. Whittlesey, M.H. Robinson, and J. Ellis. 1991. Economic Impacts, Value Added, and Benefits in Regional Project Analysis. American Journal of Agricultural Economics 73(2): 334-343.

Hannigan, K. 1994. A Regional Analysis of Tourism Growth in Ireland. Journal of the Regional Studies Association 28(2): 208-213.

Hoover, E.M. 1975. An Introduction to Regional Economics. Second Edition. Alfred A. Knopf, Inc., New York.

Hushak, L.J. 1987. Use of Input-Output Analysis in Fisheries Assessment. In: Social Assessment of Fisheries Resources, D.R. Talhelm, Ed. Transaction of the American Fisheries Society 116: 441-449.

Isard, W. 1975. Introduction to Regional Science. Prentice-Hall, Inc. Englewood Cliffs, New Jersey.

Johnson, P. and B. Thomas. 1990. Measuring the Local Employment Impact of a Tourist Attraction: An Empirical Study. Journal of the Regional Studies Association 24(5): 395-402.

Kalter, R.J. and W.B. Lord. 1968. Measurement of the Impact of Recreation Investments on a Local Economy. American Journal of Agricultural Economics 50(2): 243-255.

Kantor Statistik Kabupaten Bogor (Bogor Statistical Office). 1993. Produk Domestik Regional Bruto Kabupaten Bogor 1988-1992 (Gross Regional Domestic Product of Bogor 1988-1992). Kerjasama Dengan Badan Perencanaan Pembangunan Daerah Kabupaten Tk. II Bogor.

Kantor Statistik Kabupaten Bogor (Bogor Statistical Office). 1993. Kabupaten Bogor Dalam Angka Tahun 1991 (Bogor in the 1991 Figures). Kabupaten Dati II Bogor.

Kantor Statistik Kabupaten Cianjur (Cianjur Statistical Office). 1993. Kabupaten Cianjur Dalam Angka Tahun 1992 (Cianjur in the 1992 Figures). Kabupaten Dati II Cianjur.

Kantor Statistik Kabupaten Sukabumi (Sukabumi Statistical Office). 1993. Kabupaten Sukabumi Dalam Angka Tahun 1992 (Sukabumi in the 1992 Figures). Kabupaten Dati II Sukabumi.

Leigh, R. 1970. The Use of Location Quotients in Urban Economic Base Studies. Land Economics XLVI (2): 202-205.

Leontief, W.W. 1953. Dynamic Model, in Studies in the Structure of American Economy. In: Agro-Industry Structure and Its Contributions to Regional Income and Employment in Indonesia, A. Santika. 1990. Unpublished Ph.D. Dissertation, Michigan State University, East Lansing, Mich.

Miernyk, W.H. 1965. The Elements of Input-Output Analysis. Random House, New York.

Miller, R.E. and P.D. Blair. 1985. Input-Output Analysis: Foundations and Extensions. Prentice-Hall, Inc., Englewood Cliffs. New Jersey 07632.

Ministry of Forestry of Indonesia. 1989. The Fifth Five Year Development Plan of Forestry 1989/1990-1993/1994. Jakarta, Indonesia.

Nicholson, W. 1985. Microeconomics Theory: Basic Principles and Extensions. Third Edition. The Dryden Press, New York.

Nourse, H.O. 1968. Regional Economics: A Study in the Economic Structure, Stability, and Growth of Regions. McGraw-Hill, Inc. New York, St. Louis, San Francisco, Toronto, London, and Sydney.

Oppermann, M. 1994. Regional Aspects of Tourism in New Zealand. Journal of the Regional Studies Association 28(2): 155-213.

Pedersen, L.D. 1990. Use of IMPLAN to Estimate Economic Impact Stemming from Outdoor Recreation Expenditures in the Upper Lake States. Unpublished Ph.D. Dissertation, Michigan State University, East Lansing, Mich.

Peterson, W.C. and P.S. Esterson. 1992. Income, Employment, and Economic Growth. Seventh Edition. W.W. Norton & Company, Inc. New York, London.

Pleeter, S. 1980. Methodologies of Economic Impact Analysis: an Overview. In: Economic Impact Analysis: Methodology and Applications, S. Pleeter, Ed. Martinus Nijhoff Publishing, Boston. pp 7-31.

Propst, D.B. and D.G. Gavrilis. 1987. Role of Economic Impact Assessment Procedures in Recreational Fisheries Management. In: Social Assessment of Fisheries Resources, D.R. Talhelm, Ed. Transaction of the American Fisheries Society 116: 450-460.

Propst, D.B., D.G. Gavrilis, H.K. Cordell, and W.J. Hansen. 1985. Assessing the Secondary Economic Impacts of Recreation and Tourism: Work Team Recommendations. In: Assessing the Economic Impacts of Recreation and Tourism, D.B. Propst, Comp. Southeastern Forest Experiment Station. Asheville, North Carolina. pp. 52-62.

Purwita, T. 1993. Rencana Bisnis Pengusahaan Wisata Alam (Ecotourism) di Taman Nasional Gunung Gede Pangrango (Business Plan of Ecotourism in the Gunung Gede Pangrango National Park). Sekolah Tinggi Manajemen Prasetiya Mulya. Jakarta, Indonesia.

Randall, A. 1981. Resource Economics: An Economic Approach to Natural Resource and Environmental Policy. Grid Publishing, Inc., Columbus, Ohio.

Ritz, P.M. 1979. The Input-Output Structure of the U.S. Economy. In: Assessing the Impacts of Travel and Tourism--Measuring Economic Benefits, D.C. Frechtling. In: Travel, Tourism, and Hospitality Research: A Handbook for Managers and Researchers, J.R.B. Ritchie and C.R. Goeldner, Eds. 1987. John Wiley & Sons, Inc., Canada.

Schaffer, W.A. 1976. Input-Output Models for Regional Planning. Martinus Nijhoff Social Sciences Division, Leiden.

Schaffer, W.A. 1980. The Role of Input-Output Models in regional Impact Analysis. In: Economic Impact Analysis: Methodology and Applications, S. Pleeter, Ed. Martinus Nijhoff Publishing, Boston. pp 156-167.

Schaffer, W.A. 1985. Using Input-Output Analysis to Measure the Impact of Tourist Expenditures: The Case of Hawaii. In: Assessing the Economic Impacts of Recreation and Tourism, D.B. Propst, Comp. Southeastern Forest Experiment Station. Asheville, North Carolina. pp. 7-15.

Schaffer, W.A. and K. Chu. 1969. Nonsurvey Techniques for Constructing Regional Interindustry Models. Papers of the Regional Science Association XXIII (?): 83-101.

State Secretary of the Republic of Indonesia. 1990. Act of The Republic of Indonesia No. 5 of 1990 Concerning Conservation of Living Resources And Their Ecosystems. August 10, 1990, Jakarta.

Stevens, B.H. and A. Rose. 1985. Regional Input-Output Methods for Tourism Impact Analysis. In: Assessing the Economic Impacts of Recreation and Tourism, D.B. Propst, Comp. Southeastern Forest Experiment Station. Asheville, North Carolina. pp. 16-21.

Stevens, B.H., G.I. Treyz, D.J. Ehrlich, and J.R. Bower. 1980. Estimation of Regional Purchase Coefficients and Their Use in the Construction of Non-Survey Input-Output Impact Models. Regional Science Research Institute Discussion Paper Series: No. 119 (September, 1980). pp. 1-44.

Stynes, D.J. and D.B. Propst. 1992. A System For Estimating Local Economic Impacts of Recreation and Tourism. In: Measuring Tourism Impacts at the Community Level, S.D. Reiling, Ed. Miscellaneous Report 374, December 1992. Maine Agricultural Experiment Station, University of Maine. pp. 36-49.

Stynes, D.J. and D.B. Propst. 1992. Micro-Implan Recreation Economic Impact Estimation System: USERS' MANUAL. Department of Park and Recreation Resources, Michigan State University. Michigan State University Agricultural Experiment Station.

Taman Nasional Gunung Gede Pangrango (GPNP). 1992. Laporan Tahunan Taman Nasional Gunung Gede Pangrango 1991/1992 (The Annual Report of Gunung Gede Pangrango National Park 1991/1992). In: Rencana Bisnis Pengusahaan Wisata Alam (Ecotourism) di Taman Nasional Gunung Gede Pangrango, T. Purwita. 1993. Jakarta, Indonesia.

Taman Nasional Gunung Gede Pangrango (GPNP). 1994. Program Pengembangan Taman Nasional Gunung Gede Pangrango Pelita VI (The Development Program of Gede Pangrango National Park in the Sixth Five-Year Development Plan). Januari 1994, Cibodas.

The World Bank. 1994. Indonesia Environment and Development: Challenges for the Future. Report No. 12083-IND. March 21, 1994. Environment Unit Country Department III, East Asia and Pacific Region.

The World Bank. 1994. Indonesia Stability, Growth and Equity in Repelita VI. Report No. 12857-IND. July 20, 1994. Country Department III, East Asia and Pacific Region.

Tyrrell, T.J. 1985. Data Consideration in Assessing Economic Impacts of Recreation and Tourism. In: Assessing the Economic Impacts of Recreation and Tourism, D.B. Propst, Comp. Southeastern Forest Experiment Station. Asheville, North Carolina. pp. 40-45.

Walsh, R.G. 1986. Recreation Economic Decisions: Comparing Benefit and Costs. Venture Publishing, Inc., State College, Pennsylvania.

Wells, M. and K. Brandon. 1992. People and Parks: Linking Protected Area Management with Local Communities. The International Bank for Reconstruction and Development/The World Bank, Washington, D.C. 20433.