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MANUAL
FOR THE IMPLEMENTATION OF THE FEE SYSTEM GUIDELINES IN PROTECTED AREAS[1]

Department of Environment and Natural Resources

Philippine Economic – Environmental and Natural Resources Accounting System

Environmental and Natural Resources Accounting Project

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A

MANUAL
FOR THE IMPLEMENTATION OF THE FEE SYSTEM GUIDELINES IN PROTECTED AREAS[1]

ENRAP IV TECHNICAL PAPER

by:

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Table of Contents

Foreword
Preface
List of Figures and Tables

1. BACKGROUND 1

2. OBJECTIVES 1

3. THE ROLE OF ECONOMIC INSTRUMENTS IN PROTECTED AREA MANAGEMENT 2
   3.1 Legal Framework 2
   3.2 Economic Framework 3
      3.2.1 Nature of Resource Utilization in Protected Areas 3
      3.2.2 Demand and Supply of Goods and Services in Protected Areas 3
      3.2.3 Optimal Resource Pricing and Resource Allocation 5
      3.2.4 Resource Pricing and Environmental Costs 6
      3.2.5 Resource Pricing and Revenue Generation 7

4. THE GUIDELINES AND PRINCIPLES FOR DETERMINING FEES FOR ACCESS TO AND SUSTAINABLE USE OF RESOURCES IN PROTECTED AREAS 7
   4.1 Guidelines in Estimating Protected Area Entrance Fee 7
   4.2 Guidelines in the Estimation of Facilities User Fee 20
   4.3 Guidelines in the Estimation of Resource User Fee 24
   4.4 Guidelines for the Estimation of Development Fee, Concession Charge and Royalty 32

5. STATISTICAL PROCEDURES IN ESTIMATING THE FEE 36
   5.1 Statistical Problem 36
   5.2 Definition of the Universe or Population 36
   5.3 Questionnaire 36
   5.4 Sampling Design 37
      5.4.1 Sample Survey 37
      5.4.2 Basic Concepts and Definitions in Survey Sampling 37
   5.5 Preparation of the Manual of Instruments 37
   5.6 Organization and Training of Field Personnel 38
   5.7 Steps in Processing 38
      5.7.1 Editing the Returns 38
      5.7.2 Preparing the Schedule for Tabulation 38
      5.7.3 Coding 38
      5.7.4 Computing 38
      5.7.5 Tabulation of Data 38
   5.8 Presentation of Data 39
      5.8.1 Textual Presentation 39
      5.8.2 Tabular Presentation 39

5.8.3 Graphical Presentation..... 39
5.9 Organization of Data..... 39
5.10 Statistical Measurements..... 39

References
Appendices

List of Tables, Annex, Appendices and Figures

Table A.1	Results of the Contingent Valuation Model, Hundred Islands National Park
Table A.2	Results of the Travel Cost Model, Hundred Islands National Park
Table A.1	Results of the Contingent Valuation Model, Mt. Pulag National Park
Table A.2	Results of Fee Travel Cost Model, Mt. Pulag National Park
Annex A	Computation of Excess Profit
Appendix A	DENR Administrative Order No. 99
Appendix B.1	Survey of Tourists at Hundred Islands National Park
Appendix B.2	PAMB Resolution: HINP
Appendix C	Survey of Visitors at Mt. Pulag National Park
Appendix D.1	Survey of Fish Cage Operators at Paoay Lake
Appendix D.2	PAMB Resolution: Paoay Lake National Park
Appendix E	Lecture Notes on Statistics
Figure 1	Increasing Demand for Environmental Good or Service
Figure 2	Divergence Between Private Production and Consumption Decisions in the Presence of Environmental Externality

FOREWORD

The establishment of the National Integrated Protected Areas System Act through Republic Act 7586 or NIPAS Act in 1992 provided for the protection and conservation of our country's outstanding, remarkable and biologically important public forests that are habitats of rare and endangered species of plants and animals. Since then the Department of Environment and Natural Resources (DENR) through the Protected Areas and Wildlife Bureau (PAWB) and the Protected Areas and Wildlife Service has continuously pursued ways to ensure the attainment of this objective. Policies and guidelines have been formulated concerning biodiversity conservation, biodiversity monitoring and evaluation system for protected areas, and the establishment of an integrated protected area fund.

Financing of programs and projects is critical to the sustainable management of protected areas. Cognizant of this fact, PAWB is developing market-based instruments to help fund the management of these areas. The formulation of appropriate instruments for prescribing fees for the enjoyment and sustainable use of resources in protected areas is one of the instruments currently being tested towards this end.

With assistance from the Environmental and Natural Resources and Accounting Project (ENRAP), PAWB drafted the "Guidelines and Principles for Determining Fees for Access to and Sustainable Use of Resources in Protected Areas". It is expected that this manual will be a valuable reference to those directly involved in the management of protected areas.

REYNALDO C. BAYABOS
Director

PREFACE

This manual represents the collaborative work between the Environmental and Natural Resources Accounting Project (ENRAP) and the Department of Environment and Natural Resources (DENR), particularly the Protected Areas and Wildlife Bureau (PAWB) and the Planning and Policy Studies Office (PPSO). The PAWB-ENRAP-PPSO collaboration in the formulation of economic instruments for protected areas dates back to 1997 when the DENR identified market-based instruments as one of the Key Result Areas of its bureaus.

The formulation of economic instruments for protected areas included the following major activities. First, an inventory of uses and users of resources in protected areas was conducted by PAWB. Second, with the assistance of ENRAP, PAWB drafted the "Guidelines and Principles for Access to and Sustainable Use of Resources in Protected Areas", which was then presented in various consultations within and outside the DENR bureaucracy. Third, as provided for in the proposed fee system guidelines, pilot sites were identified where various user fees were estimated. ENRAP took the lead in a number of sites while PAWB took over in several other sites. Fourth, with the experience and lessons from the initial sites, this manual was developed as a training guide for the Protected Area Superintendents (PASus) around the country.

This manual has benefited from the feedback of training participants, particularly PASUs, regional and provincial staff of the DENR, and other interested groups in three training venues. The first training was held on May 17 - 21, 1999 in Lagos del Sol Resort in Cavinti, Laguna with Luzon PASus as participants. This was followed by a training of Visayas and Mindanao PASus on July 18 - 24, 1999 at Chali Beach Resort, Cugman, Cagayan de Oro City. DENR Region VII requested a separate training for their staff on November 10 - 13, 1999 at Metro Park Hotel, Cebu City.

While this manual was envisioned to contribute to the sustainable financing of protected areas in the country, the principles outlined will find application outside of these special areas. The estimation of fees for government-operated sites such as those of the Philippine Tourism Authority, local government units-managed sites and facilities and even for privately-owned and operated resorts. All of these users are encouraged to give feedback to PAWB for further iteration of the manual in the future.

1. *Background*

The guidelines and principles in operationalizing the provisions of the National Integrated Protected Areas System (NIPAS) Act with respect to the Integrated Protected Area Fund (IPAF) were formulated by the Protected Areas and Wildlife Bureau (PAWB) with assistance from the Environmental and Natural Resources Accounting Project (ENRAP). DENR Administrative Order entitled "**Guidelines and Principles in Determining Fees for Access to and Sustainable Use of Resources in Protected Areas**" was drafted. A copy is in *Appendix A*.

One of the provisions of the fee system guidelines is for the PAWB to "develop a manual to be used by the Protected Area Management Boards (PAMBs) in the implementation of the guidelines and principles after pilot testing in a sufficient number of areas". Lessons and experiences from the collaborative pilot testing of the guidelines and principles by ENRAP, PAWB, PPSO & PAMBs served as initial inputs into the development of this manual.

The development of this user manual is in recognition of the innovative and trailblazing approaches to natural resource pricing, particularly in the context of the NIPAS Act. The guidelines and principles are based on resource economics concepts which are expected to be unfamiliar to most of its intended implementors. There is, therefore, a need not only to provide a step-by-step guide in implementing the fee system guidelines but also to educate the intended users as well as other stakeholders in protected areas. These would pave the way for the smooth implementation of the provisions of the Administrative Order when it comes into effect.

This manual, while intended primarily for the use of PAMB and Protected Area (PA) staff, may also find application in natural resource pricing situations elsewhere.

2. *Objectives*

It is expected that this manual will serve the following ends:

a) Establish the role of economic instruments in protected area management;
b) Clarify and explain the resource economics concepts employed in the guidelines and principles;
c) Simplify the guidelines and principles in determining fees for various uses and users of resources in protected areas; and,
d) Present case studies to illustrate how the guidelines and principles are implemented.

It should be emphasized that this manual is being developed with the benefit of ongoing pilot testing efforts in a limited number of sites. However, the time available for the project and the need to train the PA staff and other stakeholders made the development of this manual imperative at this time. It is expected that this manual will be improved from the subsequent experiences of PAMBs, PASus and other users, who are encouraged to give feedback to the developers.

3. *The Role of Economic Instruments in Protected Area Management*[1]

The fundamental framework for the conservation of biodiversity recognizes the need for its protection as well as the consideration of the influences and demands of man on its components. Thus, the goal in managing biodiversity is to achieve a balance between conservation and sustaining human needs. Strategies for biodiversity conservation cover a range of approaches that include the following:

a) *in-situ* and *ex-situ* conservation;
b) ecological restoration and rehabilitation;
c) proper land-use planning;
d) equitable access and benefit sharing; and,
e) proper resource pricing.

The last strategy involves the formulation of economic instruments, in particular fees that may be charged to various users of protected area resources.

3.1 Legal Framework

In 1992, the Philippine Congress enacted Republic Act No. 7586 establishing the National Integrated Protected Areas System (NIPAS) for the Philippines. The NIPAS law mandates the creation of a system of protected areas to conserve biodiversity. The NIPAS Act provides the basic framework for the conservation and management of protected areas in general.

One of the innovative features of the NIPAS is the establishment of an Integrated Protected Area Fund (IPAF) to finance projects of the system. All funds generated from the protected areas shall accrue to the IPAF. Each protected area will have such a fund and will contribute 25 percent of its income to a central fund. This central IPAF will allocate funds to subsidize the operations of other protected areas that earn little or no income at all. The IPAF Governing Board manages the central fund while PAMB manages this at the PA level.

The NIPAS law and its Implementing Rules and Regulations prescribed the formulation of economic instruments in protected areas. It empowered the Secretary of the DENR to "... fix and prescribe reasonable NIPAS fees to be collected from government agencies or any person, firm or corporation deriving benefits from the protected areas."

Further, the Secretary can " ... accept in the name of the Philippine Government and in behalf of NIPAS funds, gifts or bequests of money for immediate disbursement or other property in the interest of the NIPAS, its activities, or its services".

The current basis for the collection of protected area entrance fees and for the use of its facilities is the DENR Administrative Order 47 (series of 1993). This AO sets the entrance fees to and for the use of facilities (where applicable) in Ninoy Aquino Parks and Wildlife Nature Center, Hinulugang Taktak National Park, Calauit Game Preserve and Wildlife Sanctuary, El Nido Marine Reserve and Mt. Pulag National Park. The management boards of a few other protected areas have also initiated the collection of fees from visitors and resource users, in the context of the above provisions of the NIPAS law.

[1] This section is based primarily on the report "A Framework for the Formulation of Market-Based Instruments and other Mechanisms for the Sustainable Financing and Management of Protected Areas in the Philippines".

The IPAF proviso in the NIPAS Act gives impetus to the realization of conservation goals of protected areas. It is intended to motivate PA managers to generate additional funds needed to meet management objectives. Presently, however, the income that is generated from protected areas is not enough to augment the subsidy from national government. The fees being collected for entrance and use of facilities are miniscule in amounts, while the use of other resources in PAs like water are free of charge. There is, therefore, a need for more realistic policy guidelines on proper pricing of biodiversity resources, and the application of appropriate market-based instruments to generate adequate income for the management of protected areas.

3.2 Economic Framework

3.2.1 Nature of Resource Utilization in Protected Areas

Sustainable resource utilization in buffer zones, sustainable use zones and multiple use zones in protected areas may be classified into three broad categories: resource extraction, recreation, and education/research. Resource extraction involves the collection of renewable natural resources such as forest resources, fisheries, wildlife, and water. Recreational uses are generally non-consumptive in nature. Examples are when visitors derive pleasure from recreational activities such as swimming, diving, and trekking. These activities do not entail harvesting of resources. Protected areas also provide venues for scientists and students for the observation of wildlife and habitats and the collection of specimens for education and research purposes. Such uses are also primarily non-consumptive although may involve minimal extraction.

Of the above uses, resource extraction and recreation may be the more dominant activities in protected areas. The prevalence of resource extraction activities may be attributed to the considerable number of indigenous peoples and tenured migrants who depend on protected areas for their existence and livelihood. With respect to recreation, protected areas are getting an increasing share of local and foreign visitors brought about by the intense ecotourism activities. Moreover, nature-based recreation such as diving and mountain climbing are increasingly becoming more popular in the country.

3.2.2 Demand for and Supply of Goods and Services in Protected Areas

The most probable scenario with respect to the supply of and demand for goods and services in protected areas is described in this section. At the supply side, the quantity of goods that may be extracted and the number of visitors that may be allowed in protected areas at any given time are subject to carrying capacity limits. Carrying capacity is usually guided by the rate at which renewable resources regenerate. For recreational purposes, carrying capacity may refer to the stress absorptive capacity whereby the area does not experience unacceptable instability and degradation. With stable biophysical influences in the protected area and in the absence of enhancement measures, it is reasonable to assume that the carrying capacity(ies) is(are) fairly constant.

On the contrary, the demand for goods and services is expected to change over time. For extracted goods, shifts in demand will emanate from population growth and economic development, among others. For recreational services, the number of visitors will also increase because of several reasons such as the growing environmental awareness and increasing personal disposable income. The mix of goods and services demanded from protected areas also changes over time. It is expected that where recreational demand becomes more important relative to

extraction, extraction activities incompatible with recreational activities will have to stop. An important decision dimension pertains to the best allocation of protected area resources among competing uses.

Thus, in protected areas the following situations exist:

a) a relatively constant supply of goods and services;
b) an increasing demand for recreational activities and quantities of extracted goods; and,
c) a changing combination of these goods and services.

Figure 1 presents a generic decision environment for resource extraction and recreation. The x-axis represents the quantity of goods available for all users. If the resource in question is the quantity of forest products and other renewable natural resources, the supply is measured in terms of quantity (weight or volume) per unit time. If the resource is land, it is the area available for conversion to other uses. If for recreation, the x-axis is the maximum number of visits that may be accommodated at any given time.

The y-axis represents the marginal benefits derived by those extracting or using the resource. In *Figure 1*, only two users or visitors (A and B) are represented. The curves labeled $B_1, \ldots, B_t$ and $A_1, \ldots, A_t$ show the relationship between the marginal benefits derived for each additional level of the good or service. It is downward sloping because as more of the good is used, its additional benefit to the user declines. In the case of recreation, the marginal benefit declines as the visitor returns to a place already visited. The area under the curve indicates the benefits derived from consumption of the resource. Social welfare may be defined by the sum of these benefits across users. In this case, it is the total benefits derived by A and B.

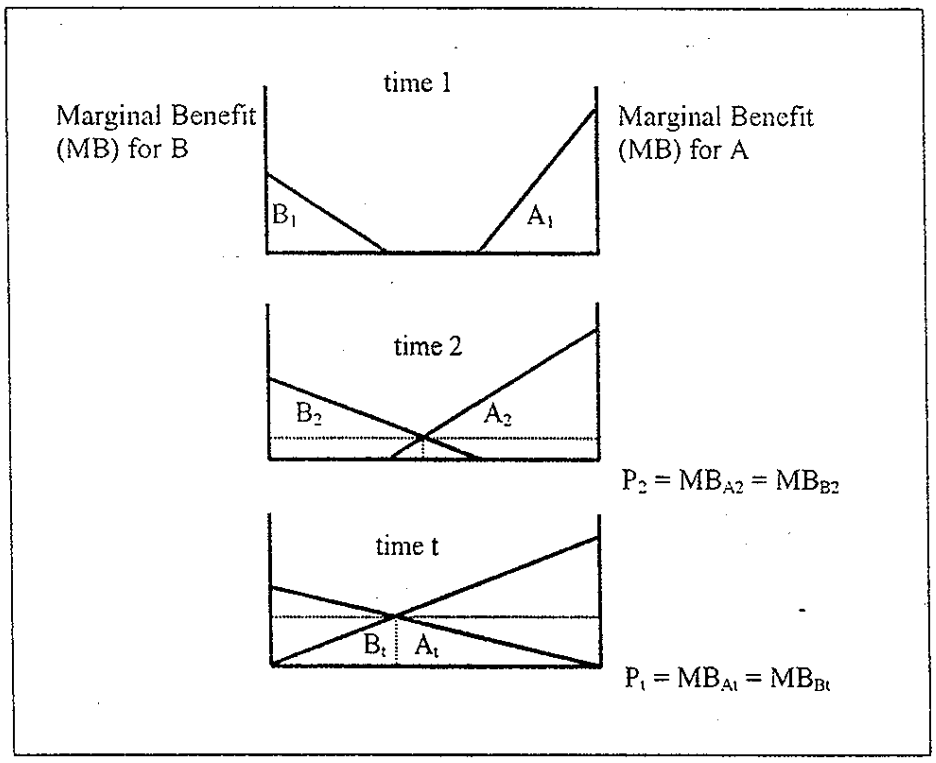


Figure 1 **Increasing Demand for Environmental Good or Service with Fixed Supply (adopted from Peskin 1989)**

3.2.3 *Optimal Resource Pricing and Resource Allocation*

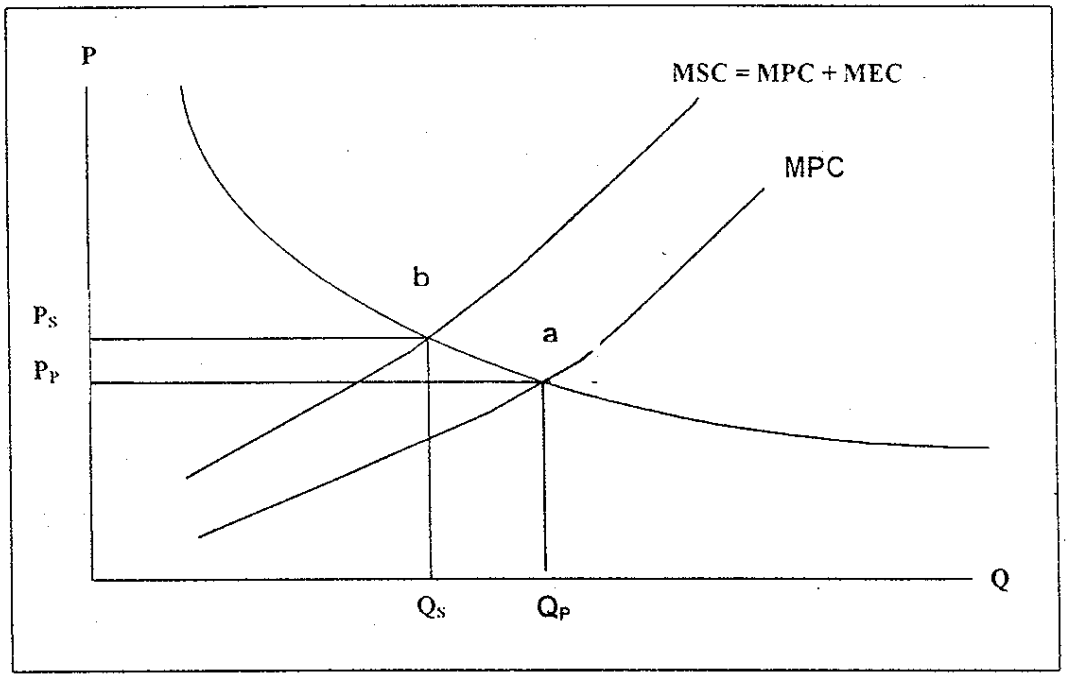
There are three panels shown in *Figure 1* representing different time periods. In the uppermost panel, at time 1, the quantity that is demanded is less than the fixed supply. This means that the good or service is not scarce with A consuming q_A and B consuming q_B. At time 2 in the middle panel, the resource falls short of the total requirements because of the increase in individual requirements. Each is forced to consume a smaller quantity whereby an additional unit would have benefit to both users. The optimal allocation of the resource is where the marginal benefit is equal for both users. The scarcity of the resource becomes more pronounced in the bottom panel at time *t*.

If the price of the good or service is equated to the user's marginal benefit, the curves may be interpreted as the demand for the resource. At time 1, total demand is less than the supply while in subsequent periods, supply falls short of demand. Resource pricing is the tool for allocating the available resource in such a way that societal benefits are maximized. At time 1, a positive price may not be imposed, as each user is able to consume the desired quantity. When the resource becomes scarce as in the middle and bottom panels, a positive price may be imposed. That price is where the respective demand curves intersect. At time 2, the price is P_2 which is also equal to both the marginal benefits derived by A and B. Similarly at time t, the price is P_t.

Note that any other price or a price that is different for A and B will not maximize social welfare. If price is zero as is the case in most protected areas, total consumption is greater than the supply implying extraction of the resource. While total welfare is greater, it will surely be at the expense of lower future consumption (and lower welfare) as this level is not sustainable. This means that the available supply will decrease over time and therefore will be inconsistent with the assumption of fixed supply. This will certainly reduce social welfare over time. If price is greater than the optimal price, total consumption is lower than the available supply and consequently social welfare is not maximized.

Thus, the price that is charged to the users is an effective resource allocation mechanism to maximize social welfare. Further, it is also a tool to restrict utilization to a target level as illustrated in the middle and bottom panels. At time 2, if price is set at P_2 both A and B adjust their respective levels of consumption such that the sum is equal to the available supply. The same observation may be made at time t. Note that the price should be increased, as the resource becomes scarcer to ensure that the amount consumed is within the target level.

Resource allocation in protected areas has temporal dimensions. It may be within the same or different time periods or generations. Although the foregoing analysis covers different time periods, it essentially pertains to a single generation. Under certain assumptions, the case of intergenerational resource allocation may be irrelevant. First, if the rate of resource utilization is maintained within the "fixed" supply, then the same quantity is available to all generations. Second, if the protected area is declared in perpetuity, the same composition of goods and services is available to all generations. Third, if the combination of goods and services demanded is unchanging from one generation to another, then the above analysis holds.



Source: Manasan and de los Angeles, 1995

Figure 2 Divergence Between Private Production and Consumption Decisions in the Presence of Environmental Externality.

MSC = Marginal Social Cost of Production
MPC = Marginal Private Cost of Production
MEC = Marginal Environmental Cost
Q = Quantity; P = Price

3.2.4 Resource Pricing and Environmental Costs

The optimal price as discussed above does not include the environmental costs that may be brought about by economic and other development activities inside protected areas. These are social costs that do not normally matter in decisions by private individuals, but should be imposed on project proponents. Owing to the special nature of protected areas, it is expected that projects that meet the sustainability criterion will be undertaken. To ensure this, the law requires an Environmental Compliance Certificate (ECC) for projects in environmentally sensitive areas.

Nonetheless, the model was extended to include environmental impacts in resource pricing. This is represented in *Figure 2*. We have the usual private demand and supply (MPC) curves but added the marginal environmental cost (MEC) associated with the economic activity undertaken in the protected area. The result is a lower production of the environmental amenity or good at a higher price. Where applicable, a tax or fee representing the environmental damages arising from the use of natural resources in protected areas should be assessed on top of their direct costs.

3.2.5 *Resource Pricing and Revenue Generation*

From an economic perspective, resource pricing should be primarily viewed as an allocation mechanism to maximize aggregate social benefits from resource utilization. It is also viewed as a means to raise revenues to finance the activities of protected areas. Thus, economic instruments such as fees and taxes present opportunities for sustainable financing of protected areas.

If the fees are equated to the optimal price, the total amount is equal to the fee multiplied by the level of consumption. This is applicable in a situation where the resource is scarce. In the top panel where the resource is not scarce, the fee may be based on the marginal benefits derived by the users. A positive price in this case, however, will result in a lower level of consumption (less than the sum of q_{B1} and q_{A1}) and therefore in a lower level of social welfare. The positive side of this is that revenues are raised to finance protected area management.

4. *The "Guidelines and Principles for Determining Fees for Access to and Sustainable Use of Resources in Protected Areas"*

The draft guidelines and principles are in *Appendix A*. This section, however, brings together the relevant provisions in determining each type of fee for easy referencing. It also gives a brief background on the drafting of the Administrative Order. The succeeding subsections are in a question-and-answer format, which hopes to clarify every provision in the Administrative Order.

The guidelines were formulated after a review of the current uses and users of resources in protected areas based on available information from the PA profile and from PAWB. The identified types of fees also followed from the same review.

There are six types of fees that may be used. These are: a) Protected Area Entrance Fee, b) Facilities User Fee, c) Resource User Fee, d) Development Fee, e) Concession Charge, and f) Royalty. The types of uses that are covered by each fee as well as the guidelines and principles are described in the succeeding sections. For some uses, however, more than one type of fee may be applied. The choice depends on the available information and the ease in administering the fee.

4.1 Guidelines in Estimating Protected Area Entrance Fees

What is a protected area entrance fee?

A protected area entrance fee is a fee paid to enter a protected area *(Sec. 7.1)*. It covers only the access to a protected area. If applicable, an additional facilities user fee shall cover access to and the use of man-made facilities in the protected area *(Sec. 8.1.3)*.

What activities are covered by the protected area entrance fee?

This type of fee covers only entry into a protected area which is usually for recreational purposes *(Sec. 7.1)*. *Recreational use* is the use of resources primarily for personal enjoyment but which does not entail any form of extraction, except, for example, in recreational or sports fishing where a regulated number of fish may be taken *(Sec. 5.1)*. Recreational use shall include, but not to be limited to land and water-based

activities, snorkeling, scuba diving, swimming, boating, mountain climbing, trekking, picnicking, bird watching, filming and photography; and all other similar activities as may be determined and allowed by the PAMB *(Sec 6.2)*.

What are the guidelines in estimating the protected area entrance fee?

The specific principles in setting entrance fees are enumerated below.

a) *Cost-recovery principle*. For protected area entrance fees, collected revenues shall cover, as much as possible, a reasonable proportion of all costs incurred in protecting, maintaining and enhancing the natural attractions of the protected area. For facilities user fees, collected revenues shall cover, as much as possible, a reasonable proportion of all costs incurred in providing and maintaining the man-made facilities in the protected area *(Sec. 8.1.1)*.

b) *Willingness-to-pay principle*. For protected area entrance fees, these shall be based on the willingness-to-pay (WTP) estimates of the visitors based on appropriate surveys *(Sec. 8.1.2)*. These surveys (e.g., travel cost or contingent valuation methods) shall arrive at an estimate of the WTP for a natural resource good or service, taking into account factors such as income, occupation and nationality *(Appendix to the Administrative Order)*.

A three-tiered system of protected area entrance fees shall be developed: lower rates for Filipino students and senior citizens; normal rates for other Filipino visitors but lower rates for minors; and higher rates for all foreign visitors *(Sec. 8.1.7)*.

There are two methods in estimating the Protected Area Entrance Fee. How do we choose between the two?

For protected area entrance fees, the WTP principle shall be the primary basis for computing fees. However, if information is not available, the cost-recovery principle shall be the basis of computation *(Sec. 8.1.4)*.

How do you implement the Cost-Recovery Principle in estimating the protected area entrance fee?

In the *Cost-Recovery Principle*, the entrance fee is determined by simply dividing the "total" annual costs of protected area management by the average number of visitors per year.

However, there are several things to note. The first is what constitutes the cost to be "recovered". Ideally, expenditures for maintenance and enhancement of the natural tourist attractions should be included as part of the costs. The accounting books will show the breakdown of these expenditures, which may include salaries and wages of park rangers, capital expenditures and the like.

Second, if the number of visitors in the protected area is small, the computed entrance fee may be too high. It may be advisable that only a "proportion" of the "costs" should be recovered from the visitors. Deciding on the proportion is a decision that should be made vis-à-vis available regular budgetary allocations and required expenditures for park management.

The third issue is that trying to recover as much cost as possible may prescribe a high fee that may discourage visitors from using the park. This shows the weakness of the cost-recovery principle as a basis for determining entrance fees – it may not give the highest fee that is "acceptable" to visitors. The WTP principle addresses this shortcoming.

How do you implement the Willingness-to-Pay Principle in estimating the protected area entrance fee?

The objective of the WTP principle is to estimate the maximum amount that visitors are willing to pay to enter a protected area for recreational purposes. There are two suggested procedures in implementing this guideline. One is the Contingent Valuation Method (CVM) and the other is the Travel Cost Method (TCM). Both are survey-based approaches. The steps in undertaking the survey are outlined below. How each step is implemented will differ between CVM and TCM.

Step 1: Estimate the total number of visitors in one season. One season may correspond to one year.

Step 2: Decide on the number of visitors that will be sampled in the CVM or TCM survey. The number of visitors should be statistically significant. Consult a statistician in determining the sample size.

Step 3. Design and pre-test a CVM or a TCM questionnaire. This step requires an expert in preparing and administering surveys. The questionnaires used in pilot-testing the guidelines may be used as reference. It is noted though that these questionnaires covered more than the required data for estimating entrance fees.

Step 4. Implement the survey until the required sample respondents are covered.

Step 5. Encode the questionnaire in a database program.

Step 6. Process the data and obtain estimates of WTP. A separate section on statistical analysis is included in this manual.

Both CVM and TCM are commonly used in other countries in estimating recreational benefits in general, and park entrance fees in particular. The downside in CVM and TCM and other approaches that require surveys is that they tend to be costly. The advantage, however, is that they provide an economic basis for setting entrance fees, which may come in handy during public consultations when tackling any proposed increase in protected area entrance fees.

Applications of the use of CVM and TCM are in the case studies for estimating park entrance fees of Hundred Islands National Park and Mt. Pulag National Park.

What are the differences between the TCM and CVM? If implemented in the same protected area, will they arrive at the same estimate of WTP to visit a protected area?

In CVM, a scenario is created wherein visitors are directly asked their WTP to visit a protected area. The scenario may describe several situations. The visitors may be told of PAMB's need to raise funds to maintain the PA's natural attractions at their current level or to finance planned enhancement projects. Thus, in CVM the scenario resembles that of a market whereby visitors reveal the price they are willing to pay in exchange for visiting a PA, which is the commodity they are buying.

In TCM, the WTP to visit a protected area is equated to the total expenses that are incurred during the recreational visit. There is no scenario that is described, only a documentation of the actual expenditures. The total expenses may be interpreted as the price of the recreational visit to a PA. It is expected that the higher the prices, the fewer the number of visits will be. If transportation cost is the biggest expense item, it is expected that those residing further away from the park will visit the protected area less frequently than those nearby. While this may be a straightforward exercise, complications arise when dealing with multi-purpose trips.

In theory, both CVM and TCM, although employing very different approaches, should give very similar WTP figures when applied to the same PA. One approach would suffice in estimating entrance fees in any PA.

Case Study 1: Estimation of Park Entrance Fees
Hundred Islands National Park (HINP)

a) Facts

Geographical Location:	Alaminos, Pangasinan
Unique Feature(s):	Group of islets numbering 100, some with wide beachfronts, 3 developed
No. of visitors (1997):	92,217 paying visitors
Peak months:	December to May
Facilities:	Available PTA-managed picnic and lodging facilities at three islands and at Lucap Point; privately-managed facilities at Lucap Point also available
Management:	Jointly managed by PAMB with the Philippine Tourism Authority

Current Entrance Fee Structure: PhP5 for adults per day, free entrance for children

b) Chronology of Activities

- Presented pilot testing activity to PAMB on Nov. 28, 1997
- Developed survey questionnaire (*Appendix B.1*)
- Hired and trained two enumerators from the area in addition to PTA staff
- Conducted survey from December 1997 to March 1998
- Covered total 446 respondents broken down into the following:
  - 357 local Filipino residents;
  - 67 balikbayans; and
  - 17 foreigners
- Data encoding conducted between Mar 1998 and July 1998
- Data analysis and report writing conducted between August 1998 and January 1999
- Presented the results to PAMB on Jan. 25, 1999
- PAMB Action: Resolution passed by the PAMB to increase the fees (*Appendix B.2*)

c) Results

Willingness To Pay (WTP) to enter HINP: Contingent Valuation Method (CVM)

Average WTP at current level of services:

All respondents	PhP5.90
Locals only	PhP4.30
Balikbayans only	PhP9.3
Foreigners	PhP26.8

Average WTP at current level, without 0 bids:

All respondents	PhP13.62
Locals only	PhP13.43
Balikbayans only	PhP15.2
Foreigners only	PhP32.5

Average WTP at improved level of services:

All respondents	PhP24.6

Locals only	PhP16.4
Balikbayans only	PhP59.4
Foreigners only	PhP61.2

Improved services include provision of maps and information, collection of litter and general cleanliness in the Park, upgrading of facilities and enforcement of environmental rules and regulations

Travel Cost Model (TCM)

Breakdown of Travel Costs/Visitor

	Amount	Percent to Total
Trip expenses (Gas, toll, vehicle rental, etc.)	PhP62.96	26%
On-site expenses (Boat, food, etc.)	74.56	72%
Entrance fee	4.90	2%
Total Expenses	242.42	100%

Analysis showed that entrance fees account for only a small portion of total expenses. Thus, increasing entrance fees would have a minor impact on the number of visits to the Park.

Table A.1 Results of the Contingent Valuation Model, Hundred Islands National Park

Independent Variable	Estimated Coefficient	T-ratio
Constant	-16.766	-1.013
No. of Years of Education (E_i)	0.74	1.418
Participation in activities at the site (B_{ij})	**** 12.999	3.141
Satisfaction with services at HINP (A_{i1})	-0.019	-0.01
No. of Visits in 1997 (A_{i2})	0.028	0.052
Length of Stay During Visits in 1997 (A_{i3})	0.993	0.616
Concern about protecting HINP (I_{i1})	2.253	0.616
Concern for activities affecting HINP water quality (I_{i2})	2.074	0.938
Place of origin (I_{i3})	**** -6.261	-2.971
Income (P_{i1})	* 0.409E-04	1.554
Household size (P_{i2})	** -0.629	-1.735
Employment status (P_{i3})	-0.264	-0.076
Age (D_{i1})	** 0.168	1.863
Gender (D_{i2})	*** 4.515	2.411
Civil status (D_{i3})	-3.392	-1.42
Interviewer dummy (S_{i1})	-2.557	-1.283
Category dummy (Filipino or otherwise) (S_{i2})	**** -24.502	-5.542

Level of Significance:
**** - significant at 99 percent confidence level
*** - significant at 95 percent confidence level
** - significant at 90 percent confidence level
* - significant at 85 percent confidence level

Estimated Equation: $WTP_{ik} = f(E_i, B_{ij}, A_{ia}, I_{im}, P_{ip}, D_{iq}, S_r) + \varepsilon_i$

Table A.2 Results of the Travel Cost Model, Hundred Islands National Park

Independent Variable	Estimated Coefficient	T-ratio
Constant	0.986	1.104
Total Expenses per person (C_i)	**** -4.6E-04	-2.718
Annual Household Income (S_{i1})	**** -1.9E-07	-2.626
Employment Status (S_{i2})	**** -0.4331	-2.832
No. of Years of Education (S_{i3})	-0.0257	-0.818
Age (S_{i4})	**** -0.0281	-5.106
Gender (S_{i5})	**** 0.4092	3.769
Civil Status (S_{i6})	**** 0.5448	5.335
Index of Rating of Facilities of HINP (R_i)	*** 0.2817	2.542
Perceived Importance Attributed to HINP (P_i)	* -0.1788	-1.442

Level of Significance:
**** - significant at 99 percent confidence level
*** - significant at 95 percent confidence level
** - significant at 90 percent confidence level
* - significant at 85 percent confidence level

Estimated Equation: $V_i = V(C_i, S_i, R_i, P_i) + \varepsilon_i$

d) Recommendations

- The study recommends the imposition of the following new set of fees:

Type of Visitor	Off-Peak Season (June – March)	Peak Season (April and May)
Locals		
Students	PhP 5.00	PhP10.00
Adults	PhP10.00	PhP20.00
Foreigners	PhP40.00	PhP80.00

- Peak season fees, which are double the off-peak fees, are intended to reduce congestion in the islands.
- Students should be able to prove their status to avail of the lower fees.

e) Other Relevant Survey Results

Socio-economic and demographic profile

- Tourists are 80 percent local, with mean age of 37 years.
- Average number of household members is six.
- Average individual gross monthly income for locals is PhP22,373.
- Average gross monthly household income for locals is PhP35,593.
- Most locals and *balikbayans* are married, most foreigners are single.
- Respondents are typically male.
- Most respondents have a college degree in accounting, business, finance and management.

- Around 90 percent of respondents are employed, many own their businesses.
- Locals come mostly from Pangasinan (48 percent), 25 percent are from Metro Manila.

Environmental Attitude

- Very few were members of organizations, but most showed strong support for actions for improving the environment, in particular HINP.
- Many remained neutral on issues of limiting fishing activities.

Primary Reasons for Visiting HINP

For locals and *balikbayans*

Curiosity
Natural attributes and uniqueness of the Park
Site accessibility
Recommended by friends or relatives

For foreigners

Recommended by friends or relatives
Safety/ peacefulness/ recreation
Curiosity

Top-Ranked Activities Undertaken in HINP

Picnicking; Swimming/ sunbathing; Beachcombing; Boating; Island Hopping

Top Five Substitute Sites

Baguio, Tagaytay, San Fabian, Batangas, Laguna

Rating of Facilities

At the Islands

- "Good" rating was given to boat rides, peace and quiet, availability of litter bins and picnic tables and sheds
- Toilet facilities and water supply were rated poorly
- Most visitors did not use lodging facilities

At Lucap Point

- "Good" rating was given to peace and quiet, personal safety, cleanliness and availability of litter bins.
- Most visitors did not use lodging facilities, public toilet facilities, restaurants and water supply services.

Preferred Types of Development

- Preferred facilities include those for safety and hygiene (lifeguards, first aid kits, and shower rooms); provision of more picnic tables/ sheds; and water supply
- Convenience stores on the islands were the least preferred type of development
- In general, most visitors will use additional facilities installed in the area but are not willing to pay for such facilities

Case Study 2: Estimation of Park Entrance Fees
Mt. Pulag National Park

a) Facts

Location: Cordillera Region, covering the provinces of Benguet, Ifugao and Nueva Vizcaya

Area: 11,550 hectares

Unique Features: Highest peak in Luzon, third highest in Philippines
Flora, a succession of pine, mossy and natural grassland at highest level
Consists of three mountains: Mt. Pulag; Mt. Tabayoc; and Mt. Panatoan
Accessed through Baguio City via paved and dirt roads and trails

No. of visitors (9/97 to 8/98): approximately 1,000

Peak months: November to May

Management: Protected Area Management Board (PAMB)

Current Entrance Fee Structure:
PhP50 entrance for PAMB
PhP25 green fee for municipality of Kabayan

b) Chronology of Activities

- Presented pilot testing activity to DENR-CAR on April 2, 1998
- Developed survey questionnaire (see *Appendix C*)
- Hired and trained PAWB and Park Rangers as enumerators
- On-site survey from April 3 to 11, 1998 (by team) continued by PA staff thereafter, covering a total of 130 visitors
- Mail-in survey from May to September 1998, covering 200 questionnaires. This was necessary due to insufficient number of visitors covered on-site
- Data encoded between August to November 1998
- Data analyzed and report written between November 1998 to February 1999
- Presented preliminary results to PAMB in February 1999
- PAMB Action: Formation of a committee to study the recommendations for future implementation

c) **Results**

Willingness to Pay (WTP) to enter MPNP: Contingent Valuation Method (CVM)

	With 0 bids	W/o 0 bids
Incremental WTP at current level	PhP30.69	PhP39.04
Incremental WTP with improved services:		
Road/ Trail conditions	PhP 9.99	PhP13.53
Maps and information	PhP 9.35	PhP11.58
Enforcement of environmental laws	PhP12.71	PhP14.66

Frequency of Incremental WTP at Current Level of Services:

Amount	Frequency
0	71
10	7
25	75
50	92
100	27

Travel Cost Model (TCM)

Breakdown of Travel Costs/Visitor

	Amount	Percent to Total
Trip expenses (Gas, toll, fare, food, etc.)	PhP2,075	83 percent
On-site expenses (food, film, etc.)	378	15 percent
Entrance fee	46	2 percent
Total Expenses	2,499	100 percent

Note: Not all visitors paid the entrance fee.

Table A.1 Results of the Contingent Valuation Model, Mt. Pulag National Park

Independent Variable	Estimated Coefficient	T-ratio
Constant	-23.64	19.32
No. of Years of Education (E_{i1})	0.14	1.12
Membership in an Environmental Organization (E_{i2})	2.45	3.89
Dummy Variable for Camping (B_{i1})	1.83	4.25
Dummy Variable for Picnicking (B_{i2})	-9.73	8.07
Satisfaction with MPNP Services (A_{i1})	* 0.181	0.12
Degree of Satisfaction with Park Services (A_{i2})	0.07	0.15
No. of Visits to MPNP (A_{i3})	-0.72	0.80
Length of Stay (A_{i4})	1.13	1.57
No. of Intended Visits to MPNP (A_{i5})	**** 4.39	1.49
Annual Household Income (P_{i1})	**** 1.5E-05	0.00
Household Size (P_{i2})	* -1.268	0.81
Employment Status (P_{i3})	** 10.56	5.42
Age (D_{i1})	* 0.47	0.29
Gender (D_{i2})	1.29	4.30
Civil Status (D_{i3})	3.84	5.48

Level of Significance:
**** - significant at 99 percent confidence level
*** - significant at 95 percent confidence level
** - significant at 90 percent confidence level
* - significant at 85 percent confidence level

Estimated Equation: $WTP_{il} = f(E_{ij}, B_{ik}, A_{ia}, P_{ip}, D_{iq}) + \varepsilon_i$

Table A.2 Results of the Travel Cost Model, Mt. Pulag National Park

Independent Variable	Estimated Coefficient	T-ratio
Total Expenses Per Person (C_i)	** -3.74E-04	-1.937
Annual Household Income (S_{i1})	** -2.91E-07	-1.913
Employment Status (S_{i2})	0.0413	0.25
No. of Years of Education (S_{i3})	0.0356	1.217
Age (S_{i4})	**** 0.0222	2.968
Civil Status (S_{i5})	*** -0.2903	-2.256
Gender (S_{i6})	**** 0.4799	3.281
Importance of Camping in Visiting MPNP (H_i)	**** 0.6504	2.816
Index of Rating of Facilities in MPNP (R_i)	0.0038	1.115

Level of Significance:
**** - significant at 99 percent confidence level
*** - significant at 95 percent confidence level
** - significant at 90 percent confidence level
* - significant at 85 percent confidence level

Estimated Equation: $V_i = V(C_i, S_i, H_i, R_i) + \varepsilon_i$

d) Recommendations

The study recommends that entrance fees be increased to PhP125, with PhP25 going to the LGU and PhP100 to the PAMB. MPNP visitors are relatively well-off and have both the ability and willingness to pay for higher entrance fees. Moreover, entrance fees are a small part of their total budget when visiting MPNP. Thus, increasing entrance fees will not adversely affect decisions to visit the Park.

The suggested improvements in Park management and services may merit serious consideration by the PAMB as visitors are willing to pay for these services.

e) Other Relevant Results

Socio-Economic and Demographic Profile

- Most respondents were male, single and young, with average age of 28 years.
- Average gross own income was PhP15,125 per month, while average gross household income reaches PhP36,315 per month .
- One-fourth were still enrolled in school, most of whom were in college.
- For those who had graduated, most had college degrees mostly in engineering and accounting while 10 percent with had post-graduate degrees.
- For those employed, many were employees, followed by licensed professionals.
- Most respondents (62 percent) are currently residing in Metro Manila, while 12 percent were from Benguet.
- 88 percent of respondents belonged to one or more organizations mostly to sports-related groups and environmental groups.

Travel Profile

- 82.2 percent of respondents first heard about MPNP from their friends and/or relatives.
- Respondents were second-time visitors on the average, who had intentions of going back at least twice within the next two years.
- Ave. stay of visitor at the Park is three days, with one day for travel time.
- Most came from residence (79.8 percent), traveling an average of 376 km using bus and hired vehicles after a one-day layover at Baguio City.
- Average number of people in a group is 15, most of which were friends.

Primary Reasons for Choosing MPNP

- Scenery
- Climate
- Challenge of climb

Most Cited Substitute Sites

Mt. Banahaw, Quezon; Mt. Makulot, Batangas; Mt. Makiling; Mt. Fami, Laguna; Mt. Cristobal, Quezon

Activities Conducted at the Site, In Order of Frequency

Mountain climbing, Sightseeing, Camping, Photography, Picnicking, Research

Satisfaction Level with Services

Excellent:	Peace and quiet
Good:	Access to the Park, Availability of water for drinking/ refill, Personal safety
Fair:	Road/trail conditions, Cleanliness, Comfort Rooms, Camping Areas, Park amenities

Preferred Types of Development

- One third of respondents did not want any further development in the area
- For those who preferred development, the following types were stated:
  Comfort rooms, first aid stations, campsites, hikers' rest areas, signal stations, and better roads to rangers' station

4.2 Guidelines in the Estimation of Facilities User Fee

What is a facilities user fee?

A *facilities user fee* is a fee paid for the privilege of using man-made facilities inside a protected area *(Sec. 7.2)*. It is separate from the protected area entrance fee *(Sec. 8.1.3)*.

What facilities are covered by facilities user fee?

All types of uses of man-made facilities inside a protected area are covered by the *facilities user fee*. Man-made facilities include but are not limited to swimming pools, picnic sheds, lodging rooms, cottages, pavilions, and the like.

What are the guidelines in estimating the facilities user fee?

The *Cost-Recovery Principle* is specified as the basis for setting *facilities user fees*. This principle states that the collected revenues shall cover, as much as possible, a reasonable proportion of all costs incurred in providing and maintaining the man-made facilities in the protected area *(Sec. 8.1.1)*.

Distinction is made between private and government-managed facilities in setting fees. For man-made facilities managed by private entities, *facilities user fees* shall be determined by the private entity but shall be comparable to fees charged for the use of similar facilities in a comparable location. For man-made facilities managed by the government, *facilities user fees* shall be determined using the cost-recovery principle and shall be comparable to the fees for the use of privately managed facilities with similar characteristics *(Sec. 8.1.6)*.

All *facilities user fees* shall be determined in consultation with the PAMB *(Sec. 8.1.5)*.

How do you implement the Cost-Recovery Principle in estimating the facilities user fee?

Just like in the estimation of the protected area entrance fee, the facilities user fee may be determined by dividing the "total" annual costs of providing the facilities by the average number of users per year. The component of costs includes the repair and maintenance and depreciation of the facilities. Salaries and wages in repairing and maintaining the facilities are also part of the total cost.

There are other considerations, however, in determining facilities user fees. First is the competitiveness of the fees compared to those in substitute sites. A survey of the substitute sites is necessary. The information to be collected in such a survey will include the quality of facilities, fee structure and visitor profile of substitute sites. It should be noted, however, that there is a premium for facilities located within the confines of the protected area, assuming that this provides greater enjoyment to visitors.

The implementation of this principle is illustrated in the case of Hundred Islands National Park (*Box 3*).

Case Study 3: Facilities User Fee
Hundred Islands National Park

a) Facts

Geographical Location:	Alaminos, Pangasinan
Unique Feature(s):	Group of islets numbering 100, some with wide beachfronts, 3 developed
Peak months:	December to May
Facilities:	Available PTA-managed picnic and lodging facilities at three islands and at Lucap Point; privately-managed facilities at Lucap Point also available
Management:	Jointly managed by PAMB with the Philippine Tourism Authority (PTA)

Current Facilities User Fee Structure:

Type of Facility	No. of Units	Rental Rates (PhP)	Yearly Usage (1998)	Occupancy/Usage Rate in percent (1998)
A. Lucap Point				
1. Guestroom				
a. Aircon: 3 pax	2	858.00	166	23
b. Aircon: 6 pax		1,149.00		
c. Non-aircon: 3 pax	2	575.00	56	8
2. Family Room				
a. Aircon: 8 pax	2	1,980.00	40	5
b. Non-aircon: 8 pax		1,650.00		
3. Bathhouse	1	5.00	30,869	
4. Souvenir Stalls	7	350.00	7	100
B. Islands				
1. Pavilions	3	300.00	165	15
2. Picnic Tables	28	25.00	3,319	32
3. Picnic Sheds	12	50.00	804	18
4. Lodging				
a. Nipa Huts	4	575.00	368	25
b. VIP Guesthouse	1	1,916.00	119	33

b) Chronology of Activities

- Presented pilot testing activity to PAMB on Nov. 28, 1997.
- Surveyed private resorts at Lucap Point in December 1997.
- Conducted survey of visitors from December 1997 to March 1998.
- Conducted survey of PTA-HINP facilities, in coordination with PTA, from April 1998 to May 1999.
- Data analysis and report writing conducted between February and June 1999.

c) Results

Bathhouse: Monthly expenses are fully covered by revenues generated.

Souvenir stalls: Rental rates should be PhP130.00 more; otherwise, there should be eight stalls instead of seven.

Picnic tables: WTP of visitors is higher (PhP55.00) than full cost recovery rate (PhP38.00 to PhP47.00); with current rate, use rate should increase to 50 percent from 32 percent.

Picnic sheds: full cost recovery rate is PhP105.00; with present rate, occupancy rate should increase to at least 39 percent from 18 percent.

Pavilions: rental rates should be PhP733.00 per use; otherwise, occupancy rate should increase to 37 percent.

Lodging facilities:

- Room rental rates assuming constant occupancy rates required for full cost recovery: For island lodging facilities, full cost recovery rates are higher than visitors' willingness to pay, based on the survey of visitors in 1998; for Lucap Point lodging facilities, full cost recovery rates are higher than the average prices of privately-run facilities in the area.
- Occupancy rates assuming constant room rental rates required for full cost recovery: For island lodging facilities, occupancy rates should increase to more than 100 percent; for Lucap Point lodging facilities, occupancy rates should increase to more than double the current rates.

d) Recommendations

- For bathhouse, full cost recovery is already achieved.
- For souvenir stalls, full cost recovery can be achieved easily.
- For picnic tables, sheds and pavilions, adopting the new rates mandated by PTA-HINP can approximate full cost recovery.
- For lodging facilities at Lucap Point, room rental rates should approximate the average rental rates being observed by private facilities in the area, i.e. PhP432 per person per night for air-conditioned rooms, and PhP245 per person per night for non-air-conditioned rooms.
- For lodging facilities at the islands, rates should be consistent with the average willingness of visitors to pay, i.e. PhP500 per person per night.

Recommended Rates:

Type of Facility	Recommended Rate (PhP)	Projected Revenues (PhP) (assuming constant 1998 occupancy rates)
A. Lucap Point		
1. Guestroom		
a. Aircon	2,600.00	431,600.00
b. Non-aircon	700.00	39,200.00
2. Family Room	3,500.00	140,000.00
3. Bathhouse	10.00	308,690.00
4. Souvenir Stalls	480.00	3,360.00
B. Islands		
1. Pavilions	500.00	82,500.00
2. Picnic Tables	75.00	248,925.00
3. Picnic Sheds	150.00	120,600.00
4. Lodging		
a. Nipa Huts	1,000.00	368,000.00
b. VIP Guesthouse	4,000.00	476,000.00
C. Entrance Fees	10.00	922,200.00
Total		3,141,075.00
Precent (%) Increase over 1998 Revenues		*245*

To further reduce the deficit, PTA-HINP is recommended to undertake an aggressive advertising and promotional campaign of its facilities, so as to target an increase in the number of visitors, especially from Metro Manila.

4.3 Guidelines in the Estimation of Resource User Fee

What is a resource user fee?

A *resource user fee* is a fee paid for the sustainable commercial use of a specified quantity of resources within a protected area over a specified period of time *(Sec. 7.3)*. Resources refer to all living and non-living, renewable or non-renewable, including but not limited to terrestrial, aquatic or both, surface or subsoil resources found within protected areas (5.14). Resource user fee covers extractive uses of these resources. In turn, *extractive use* is defined as the use of resources involving gathering, tapping, diverting, or any form of removal of resources within the designated multiple use zone, sustainable use zone and buffer zone *(Sec. 5.5)*.

Are all extractions of resources subject to a resource user fee?

Only commercial extraction rates are subject to a *resource user fee* while *subsistence uses* shall be exempt from the payment of user fees *(Sec. 2.2)*. *Commercial use* is defined as the use of resources in excess of subsistence use *(Sec. 5.2)*. *Subsistence use*, on the other hand, is the use of resources to satisfy the minimum basic requirements of households of indigenous cultural communities and tenured migrants including but not limited to food, dwelling, clothing, medical assistance and recreation *(Sec. 5.16)*.

The rate of subsistence use shall be specified for each resource and where possible, for each household of indigenous people and tenured migrants. Such rate shall not exceed the rural annual per capita threshold income by region as may be determined by the National Economic and Development Authority (NEDA) *(Sec 9.2)*.

The collection and research of biological and genetic resources in protected areas for scientific and/or related purposes shall be governed by the provisions of Executive Order No. 247 (Prescribing Guidelines and Establishing a Regulatory Framework of Biological and Genetic Resources, their By-Products and Derivatives ...) and its implementing rules and regulations, if applicable *(Sec. 2.5)*.

Who belong to the Indigenous Cultural Communities and who are the Tenured Migrants?

Indigenous Cultural Communities/Indigenous People (ICCs/IPs) refer to a group of people or homogenous societies identified by self-ascription and ascription by others, who have continuously lived as an organized community on communally bounded and defined territory, and who have, under claims of ownership since time immemorial, occupied, possessed and utilized such territories, sharing common bonds of language, customs, traditions and other distinctive cultural traits, or who have, through resistance to political, social and cultural inroads of colonization, non-indigenous religions and cultures, became historically differentiated from the majority of Filipinos. ICCs/IPs shall likewise include peoples who are regarded as indigenous on account of their descent from the populations which inhabited the country, at the time of conquest or colonization, or at the time of inroads of non-indigenous religions and cultures, or the establishment of present state boundaries, who retain some or all of their own social, economic, cultural and political institutions, but who may have been displaced from their traditional domains or who may have resettled outside their ancestral domains (Section 3(h), RA 8371) *(Sec. 5.8)*.

Tenured Migrants or communities within protected areas are those who have actually and continuously occupied the area five years before the designation of such as protected area in accordance with the NIPAS Act and are solely dependent on the resource for subsistence (Sec. 4(1), RA 7586) *(Sec. 5.18)*.

Are there other privileges accorded to any group in the extraction of resources?

Pending the issuance of certification by the National Commission on Indigenous People (NCIP) in accordance with the Indigenous Peoples Rights Act (IPRA), IPs in protected areas shall be given preferential access to and be levied lower fees for the commercial extraction of allowable resources in protected areas *(Sec. 2.3)*. Prior to the full implementation/operation of the IPRA Law, free and prior informed consent from indigenous people shall be sought in the gathering of biological and other resources within protected areas *(Sec. 2.4)*.

Is there any limit to the rate of extraction of resources in a protected area?

Sustainability is one of the overriding principles in the use of any resource in a protected area. *Sustainable Use* is the use of components of biological diversity in a way and at a rate that does not lead to the decline in the species used, thus, maintaining its potential to meet the needs and aspirations of the present and future Filipino generations (*Sec. 5.14*).

For the extraction of renewable resources such as forest flora and fauna and other forest products, surface and ground water, fisheries, geothermal energy and similar resources, sustainable use shall be the rate of extraction that is lower than either the rate of regeneration or the rate that shall endanger life forms inside the protected area. The rate of use shall be within the carrying capacity of the protected area and its immediate surroundings when taken individually or collectively or in relation to other uses of the area and that any form of use shall maintain the socio-economic and cultural aspect of the area *(Sec. 2.1.1)*.

What are the guidelines in estimating the resource user fee?

The PAMB shall, to the extent feasible, enter into co-production, joint venture or production-sharing agreements with interested parties in the commercial extraction and/or development of resources in protected areas *(Sec. 8.2.1)*. The government share of the protected area through the Integrated Protected Areas Fund (IPAF) in these agreements shall be a reasonable proportion of the *excess profits* derived from the commercial extraction of resources *(Sec. 8.2.2)*.

How do you implement the guidelines in estimating the resource user fee?

The computation of excess profits in the utilization of resources in protected areas is shown in the *Technical Box*. The objective is to obtain a basis for negotiating a reasonable government share in the private use of public resources. The actual implementation of the guidelines is shown in the case of Paoay Lake National Park.

At this juncture, the formula for the computation of excess profit is explained. Gross sales are computed by multiplying the quantity of production by the unit cost. We tackle the case of rattan gathering if this is permitted inside the protected area.

Gross sales = (price per lineal meter) X (harvest in meters)
Note that there may be price differences according to the diameter of rattan.
Cost of production = salaries and wages + transport cost + storage cost + equipment cost (for cutting and gathering) + other expenses

Margin for profit and risk = 30 percent of cost of production (maximum margin).
Total cost = cost of production + margin for profit and risk
Excess profit = gross sales – total cost.

There is a need to express the revenues and costs over a period of time, say one year. Given the total lineal meter of rattan harvested in one year, the excess profit may be expressed per lineal meter. The PAMB may then negotiate with the resource user its share of the extraction of rattan per lineal meter harvested. (Note that this does not take into account scale economies, i.e., unit costs may go down with the volume of rattan harvested. In such case, the unit excess profit may be underestimated.)

As may be seen in the formula, the excess profit is the value of the natural resource in its current use. It is already "net" of all costs incurred by the project proponent in undertaking the activity. Hence, government can actually expropriate all the excess profit in its favor. However, it should not capture the entire amount if government wants to encourage innovation in the private sector. The private sector should share in the benefits of technical innovation in the extraction and use of natural resources in protected areas.

It should be noted that the excess profit is computed for the current use of the resource. It may be that the current use is not the best use, i.e., it does not give the highest excess profit. For instance, the use of water for crop irrigation may be inferior to its use for domestic purposes. Assuming for instance water is scarce, the PAMB may prioritize the use of water for domestic purposes if it wants to maximize the fees it can collect. Here, the concept of cost-benefit analysis of alternative uses of a resource becomes important as the PAMB can influence how resources in a protected area may be used in a most efficient manner.

Technical Box
The Computation of Excess Profit

The excess profit per year that arises from a natural resource based activity shall be computed using the following formula:

Excess Profit = gross sales (GS) of natural resource-based product or service
Less cost of production
Less margin for profit
Less margin for risk

where: GS = (quantity of product or service) x (farm-gate price)
Cost of Production includes: payment for wages; material cost, e.g., gasoline; rentals for equipment, buildings, etc.; depreciation; and payments for taxes normally paid by any business enterprise (e.g., income taxes, permit fees, etc.)
Margin for Profit = normal return to entrepreneurial capital, usually determined through prevailing conditions in the financial market
Margin for Risk = a premium to cover losses from natural calamities and other causes

The margin for profit and risk shall be set at a maximum of 30 percent of the total cost of production.

Information to be used in computing for excess profits shall be based on a hypothetical company operating at an efficient level. Such information may be supplemented with data on the cost of the next-best-alternative. The cost of the next-best-alternative is the cost of providing equivalent goods and/ or services for the same market without using the resources of or derived from the protected area.

Case Study 4: Resource User Fee
Paoay Lake National Park

a) **Facts**

Location: Paoay, Ilocos Norte

Area: 387.5 hectares

Unique Features: Deepest part is 7.5 meters, shallow part ranges from 3-5 meters.
Natural body of freshwater without tributaries.
Water source is from ground water flow and surface run-off.
Decrease in water level increases water temperature, affecting aquatic organisms thriving therein.

Users: 71 fishcage operators, with 145 fishcages, covering 20,092 sq m, solely devoted to tilapia culture (as of survey period).
297 farmers irrigating from the Lake, with 129 ha farmed (as of survey period).

Current Fee Structure: Annual fee for fishcages = PhP200 per 150 sq m; irrigation service fees, minimal

Limitations on Fishcage Ownership: Maximum of 3 fishcages per farmer is allowed by the PAMB: Maximum total area of fishcages per barangay is 2 ha.

Management: Protected Area Management Board (PAMB)

b) **Chronology of Activities**

- Presented the pilot testing activity to PAMB on Jan. 13, 1998
- Developed survey questionnaire (*Appendix D.1*)
- Trained enumerators from PAWB, PPSO and DENR-Region I
- Conducted survey from Jan. 13 to 17, 1998; reference year is 1997
- Covered 23 fishcage operators (100 percent of those that have completed one-year cropping) and nine farmers as key informants
- Data encoded between February to May 1998
- Data analysed and report written between June to September 1998
- Presented the results to PAMB in October 1998

c) **Costs and Earnings Analysis**

Fish farming

- Production/cage/crop: 90 kg for first crop) and 98 kg for second crop; range 15-350 kg of tilapia
- Disposal: 92 percent sold; remainder given away, consumed or paid to laborers
- Average farm gate price: PhP66.8 per kilogram (higher than prevailing market price in Metro Manila)
- Total value of production was PhP191,025 equal to PhP6,162 per cage.
- Cost of production was about PhP5,963, or PhP64.6 to produce one kg. of tilapia
  Material inputs (feeds and fry/fingerling) = PhP4,651 (78 percent of total)
  Fixed costs = PhP1,073 (18 percent of total)
  Paid labor costs = PhP239 (4 percent of total)

- Average gross profit = PhP199 per fishcage per cropping
- For farmers who earned positive profits, average production and market price are higher by 36 percent and 8 percent, respectively, compared to total sample; value of production is higher by almost 50 percent; thus, average gross profit is higher by 16 times at PhP3,334 per cage per crop.

Crop farming

- All crops combined (palay, mongo, corn, garlic)
  Gross revenues/ha/crop = PhP42,657
  Costs/ha/crop = PhP39,585
  Gross profit/ha/crop = PhP3,072
  Four farmers experienced negative profits for the year
  For farmers with positive profits, average gross profit was PhP22,680 per hectare
- Comparison of farmers according to source of irrigation water
  Lake users garnered average gross profits of PhP7,813 per hectare.
  Deepwell and water pump users had negative gross profits at (PhP11,619).
  Lake users had higher average gross revenues and lower average costs.
- Agricultural production was poor due to El Niño

Estimates of Excess Profit

Fish farming

- Using 30 percent of total production costs for margin for profit and risk, and imputed labor costs at PhP2,679 per cropping, rents are estimated to be negative at PhP95 per cropping per cage
- With sensitivity analysis on survival rate (base = 38 percent):
  with 50 percent increase in survival rate, excess profit/year = PhP3,643
  with 75 percent increase in survival rate, excess profit/year = PhP5,631
  with doubling of survival, excess profit/year = PhP9,600
  Potential survival rate is double the current rate.

Crop farming

- Using 30 percent of total production costs for margin for profit and risk (PhP5,695) and imputed family labor, and land rent, resource rents are negative at PhP(22,279) per hectare. Poor results attributed to El Niño.
- For garlic production, sensitivity analysis on production (base = 1,383 kg/ha)
  Increase to 8 tons per hectare, excess profit = PhP3,116
  Increase to 10 tons per hectare, excess profit = PhP12,862
  Increase to 12 tons per hectare, excess profit = PhP22,609
  Production increases were based on normal production yields for garlic in the country, as per Bureau of Soils and Water Management (BSWM) figures.

c) **Recommendations**

- For fish farmers, the study recommends targeting a share of less than 10 percent of the resource rent if the fee is based on potentials of fish cage culture, i.e., PhP300; the fee may be increased gradually to PhP250 in 1999 and PhP300 in year 2000
- For crop farmers, annual irrigation fees may be waived for subsistence crops, i.e. palay and corn, and assessed for commercial crops, i.e. garlic and mongo; fees may be based on

less than 2 percent of potential rents from national average production, i.e. PhP400 per hectare for garlic and mongo

e) **Other Relevant Results**

Socio-economic and demographic profile

Fishcage Operators

- Operators are from coastal barangays, though most fishcages were in *Barangay* Nanguyudan.
- Ave. age of fish farmers is 39 years old, married with at least a high school diploma.
- Farmer is usually in first or second year of fish farming.
- Most have second source of livelihood aside from fishcage operations.
- Average own monthly income is PhP4,700.
- Average household monthly income is higher by PhP2,000.
- Current ownership ranges from 1 to 5 fishcages per farmer.

Farmers

- Two irrigation associations represented in the survey: Pasil and Baay
- Average age of farmer is 50 years old, and completed secondary education.
- Average individual monthly income is a little over PhP3,000 and increases to PhP6,800 accounting for contribution of other household members.
- Typical family size is 6 persons per household.
- Each farmer typically tills one hectare of land.

Fish Farming and Crop Farming Activities

Fish Farming

- Typical fishcage measures 11.24 m by 9.69 m by 4.1 m.
- Fishcage assembly consists of fine meshed nets like an upside down mosquito net, supported by bamboo posts securely fastened into the lake bottom.
- Fish culture activities start with the construction of fish cage, then stocking with fry/ fingerlings.
- Stocking density ranges from 333 to 5,000 pieces per cage, with an average of 2,427, equal to 22.3 pieces per square meter of cage area or 5.4 pieces per cubic meter of water volume.
- Farmers usually travel to Central Luzon to purchase stocking materials.
- Survival rates are low at 30 percent - 45 percent for the two crops, attributed to the lengthy transport time for the fry and fingerlings and the lack of time to acclimatize them in the Lake.
- Supplementary feeds are given to hasten growth of fingerlings.
- Tilapia fry or fingerlings are fed twice a day, once at daybreak and once in the afternoon.
- Most farmers use commercial feed preparations at the rate of 215-250 per cage per crop.
- Rearing is from 3 to 6 months, with an average of 4.7 months.
- Ave. size of harvest ranges from 6.5 to 8.6 pieces per kilogram.

- Harvesting is advanced or delayed, depending on the market price and the farmer's demand for cash.

Crop Farming

a) Irrigation System
   - Neither irrigation system pays irrigation fees for use of Paoay Lake for irrigation purposes
   - In Pasil, there are three sources of funds for the association:
     - donations from members: labor for repairs is provided by members themselves:
     - 3 ha of farmland are owned by association: this is rented out to members
     - - one third of harvest goes to association as rental fee: and
     - penalties are assessed from members who do not attend meetings, at PhP20 per absence.
   - In Baay, NIA provided for the upgrading of the irrigation system: amortization of the loan is borne by the members.
   - All farmers indicated deepwell and/or water pump as their alternative source of irrigation.

b) Cropping Pattern
   - Four main crops are planted:
     - *palay* from July to October/ November
     - garlic from November to March
     - corn from November to April
     - mongo from January to April
   - All farmers plant *palay*, with their second crop varying among corn, garlic and mongo.
   - *Palay* requires greatest frequency of irrigation per hectare per cropping.
   - All three other crops have similar irrigation requirements.

f) **Directions for Future Work**

A study on the hydrogeology of the Lake has to be conducted to determine the optimal allocation of water among the different users, based on the optimal level of water for the Lake.

4.4 *Guidelines for the Estimation of Development Fees, Concession Charges and Royalty*

What is a development fee?

A *development fee* is a fee paid for the use of land or other resources for the privilege of undertaking small, medium, and other bigger scale development *(Sec. 7.5)*.

What is a concession charge?

A concession fee or charge is a fee paid for the use of land or other resources for the privilege of undertaking micro and cottage-scale development for a specified period of time and for a specified nature of development *(Sec. 7.4)*.

What is a royalty?

Royalty is a fee paid based on the gross output value or gross sales from products out of resources derived from a protected area *(Sec. 7.6)*.

In what activities or resources do you apply the above fees?

The *Development of Land and Other Resources* involves all forms of improvement or enhancement of land and other resources within a protected area for any purpose *(Sec. 5.4)*. Specific development activities would include the construction of kiosks for vending food and souvenir items, construction of tourist and lodging facilities, and shops for rental of recreational equipment such as boats *(Sec. 6.4)*. Further, it shall also include existing activities relating to the use of geothermal energy, water resources for electric power generation, use of fishpens and fishcages, use of highways, relay stations and similar communication or transportation structure *(Sec. 6.4)*.

Development activities as may be allowed by the PA Management Plan may be classified in accordance with Department of Trade and Industry (DTI) guidelines *(Sec 9.3)*.

a) *Micro-Scale Development* refers to any development that requires an investment of PhP150,000 and below *(Sec. 5.11)*.
b) Cottage *Scale Development* requires an investment of PhP150,000 to PhP1.5 million *(Sec. 5.3)*.
c) *Small-Scale Development* requires an investment of above PhP1.5 million to PhP15 million *(Sec. 5.15)*.
d) *Medium-Scale Development* requires an investment of above PhP15 million to PhP60 million *(Sec. 5.9)*.

The classification of development projects in protected areas in terms of investments shall be regularly updated in accordance with DTI guidelines *(Sec. 9.3)*.

What are the guidelines in estimating development fee, concession charge and royalty?

The PAMB shall, to the extent feasible, enter into co-production, joint venture or production-sharing agreements with interested parties in the commercial extraction and/or development of resources in protected areas *(Sec. 8.2.1)*.

The government share of the protected area through the Integrated Protected Areas Fund (IPAF) in these agreements shall be a reasonable proportion of the excess profits derived from the commercial extraction of resources *(Sec. 8.2.2)*. The computation of the excess profits shall be guided by the formula specified in the previous section. The corresponding government share from the excess profit shall be determined consistent with the appropriate instrument agreed upon by the contracting parties *(Sec. 9.1)*.

Further, all types of development are required to undergo EIA System as prescribed under PD 1586 and other pertinent laws and regulations *(Sec. 8.2.3)*.

How do you implement the guidelines in estimating the above fees?

The choice between *development fee* and *concession fee* depends on the scale of development, based on DTI Guidelines. A *development fee* or a *concession fee* may be imposed as a *royalty*, expressed as a percentage of gross revenue or output. The basis for the *development fee*, *concession fee*, and *royalty* is excess profit.

The procedure for computing excess profit is already described in *Section 4.3* and needs no further elaboration in this section.

Case Study 5: Development Fee
Mt. Kitanglad Range Natural Park

a) **Facts**

Location: Bukidnon, Mindanao
Area: 30,642 ha
Unique Features: Second highest peak in the country, making it an ideal location for telecom/broadcast towers as their gateway to Mindanao
Users: telecommunication and broadcast companies
Current Fee Structure: individual MOAs between PAMB and the companies with one-time payment of administrative fee of PhP5,000 and other non-cash terms and conditions, e.g. reforestation
Management: Protected Area Management Board (PAMB)

b) **Chronology of Activities**

- Presented the pilot testing activity to PAMB in May 1998
- Interviewed seven companies at Malaybalay and Cagayan de Oro; reference year is 1997
- Interviewed companies at their Manila offices
- Procured copies of the individual MOAs from the PAMB
- Gathered secondary data from relevant government offices
- Data analyzed and report written between March and July 1999
- Presented the results to PAMB in August 1999
- Presented the results to the stakeholders in October 1999
- Final negotiations between PAMB and the stakeholders held in November 1999

c) **Study Results**

Valuation of the Terms and Conditions of the Memoranda of Agreement

- Five out of seven private companies have MOA with the PAMB, one with DENR.
- Five out of six MOAs require reforestation, one requires rehabilitation of visitors' quarters.
- Five companies were required to pay administrative fees of PhP5,000 for duration of MOA.
- Average value of MOAs is PhP6,872 per firm per year.
- None of the companies have complied with all the requirements.

Computation of Rent Using CA 141 or Land Code as Basis

- CA 141 states that rent can be computed based on 3 percent of re-appraised value of land plus 1 percent value of improvements.
- Average value of improvements was PhP3,023,929 per firm.
- Based on 1 percent value of improvements, average annual rent that can be collected is PhP30,239 per firm.

Estimates of Excess Profit

- Except for one, companies could not provide data on revenues directly generated by the facility.
- To compute for excess profit, two scenarios were used:
  - Scenario 1: Shares of company A (company that provided complete set of data) were used to apportion nationwide revenues of other firms
  - Scenario 2: Manila technical personnel interviewed through the telephone provided rough estimates of MKRNP facility's share to nationwide revenues
- Estimates of net income were the following:
  - Scenario 1 = PhP1,832,375
  - Scenario 2 = PhP1,942,849
- Estimates of excess profit were the following:
  - Scenario 1 = PhP903,556
  - Scenario 2 = PhP1,036,124

d) **Recommendations**

- MOA contributions at PhP6,872 per firm are minimal.
- PAMB can charge at least PhP30,239 per firm per year based on CA 141, or PhP90,356 per firm per year based on 10 percent of excess profit.
- Foregone revenues amount to:
  - PhP23,367 to PhP83,483 per firm per year
  - PhP116,836 to PhP417,417 per firm for duration of MOA
  - PhP701,014 to PhP2,504,503 for all firms for duration of MOAs

5. *Statistical Procedures in Estimating Fees*

Statistics is the science of collecting, organizing, analyzing and interpreting information. The data collected from the surveys are analyzed using statistical tools. The steps in any statistical investigation include the following:

a) Determination and definition of the statistical problem
b) Definition of the universe or population
c) Devising questions and making a schedule or questionnaire
d) Determination of sampling design if enumeration is not to be a complete one
e) Preparation of manual of instructions
f) Organization and training of field personnel
g) Collecting and processing of data
h) Organizing and presenting the data in useful and concise forms
i) Measurement of relevant statistics, e.g., central tendencies and dispersions

5.1 Statistical Problem

a) delimit the scope of the study
b) identify the main source of the problem
c) objective or purpose of the study must be well understood
d) determine what data to gather and how

5.2 Definition of the Universe or Population

a) population should be in agreement with the objective
b) elements making up the population should be properly identified
c) extent of coverage and time of the study should be stated beforehand
d) the frame which is a list of all units included in the study should be complete, up-to-date, and without duplication
e) terms should be clearly defined

5.3 Questionnaire Construction

a) list of questions to be asked or items to be checked which are properly selected, phrased and arranged
b) a schedule is regarded as a much more extensive set of questions and instructions used in personal interview and is usually filled out by the interviewer
c) the questionnaire consists of pre-arranged questions accompanied by a cover letter and is usually mailed and accomplished by the respondent himself/herself

Suggestions in Questionnaire Construction

- State all questions briefly, clearly, and simply.
- Avoid asking leading questions.
- An objective reply is preferred to a subjective reply.
- Allowance should be made for approximate answers.
- Questions should be asked in correct sequence to permit a logical flow of thought
- Confidential, sensitive and emotionally-loaded questions should be avoided or should be carefully worded.

- Limit questions to essential information.
- Make sure that difficult questions are understood.
- Avoid double-barreled questions.

5.4 Sampling Design

a) depending on the nature of the problem, the size and extent of the population, the amount of money involved, and the time limit, collection of data may be conducted by census or by sample survey
b) the design of the sample is made after the decision to conduct a sample survey has been reached
c) the sample design must be such that the sample will yield maximum precision at a minimum cost or the desired precision at a given cost

5.4.1 Sample Survey

- requires that only a few representative elements, called a sample, of the population be carefully selected and studied.
- a method of gathering data from a small but representative cross section of the population with the objective of using the derived measurements from the sample to characterize the population.

5.4.2 Basic Concepts and Definitions in Survey Sampling

Population - totality of items or elements one is interested with

Target Population - population about which information is desired

Sampled or Sampling Population - population from which a sample is actually taken as determined by the sampling frame

Sample - a subset of population which is used as basis in making statements or inference about the sampling population

Sampling frame - list of units or members in a sampling population. This member or unit is called a sampling unit

5.5 Preparation of the Manual of Instructions

a) Manual of instructions should be concise and complete.

b) It should contain the instructions and directions that will be observed and followed out only by the field personnel in soliciting the desired statistical information but also by the respondents in answering the questions.

c) It should contain the definition of important terms used in the schedule and codes that are assigned to possible responses

d) It should serve as a reference to be consulted by both enumerators and supervisors as they come to grips with various problems in the field.

5.6 Organization and Training of Field Personnel

a) The field force consists of the data gatherers/enumerators and the supervisors.

b) The work of enumerators should be coordinated and closely supervised by the supervisor.

c) The survey workers should be made to undergo special training before they are sent out to the field.

d) The enumerators should be made proficient on how to conduct an interview and how to accomplish the interview schedules.

e) The supervisors should be taught how to edit the schedules and supervise the enumerators in the field.

5.7 Steps in Processing of Data

5.7.1 Editing the returns

a) checking for the accuracy and completeness of returns
b) the work consists mainly of the following activities:
   - Deciphering "unreadable" writing
   - Examining entries for completeness
   - Checking of entries for errors and inconsistencies

5.7.2 Preparing the Schedule for Tabulation

This step involves classification of data, defined as separating a large mass of individual attributes, observations, or computed figures into groups or classes on the basis of some similarity of data into any of the following:

a) qualitative – based on differences in kind,
b) quantitative – based on certain arbitrarily determined magnitude,
c) chronological – data arranged according to time interval, and
d) geographical – based on different geographical divisions

5.7.3 Coding

a) process of representing with symbols the observations or the information entered in the schedules so as to facilitate tabulation

b) for open-ended questions, codes are assigned after the data is acquired

5.7.4 Computing

5.7.5 Tabulation of Data

a) When all schedules have been properly edited, the next step is to tabulate the data.

b) Summarize important data in a way that can be easily understood and ready to be used as the need arises.

c) final stage of the work of collecting data

Two types of tabulations:
a) Hand Tabulation
b) Mechanical Tabulation.

5.8 *Presentation of Data*

5.8.1 *Textual Presentation* is summarizing the data in paragraph form giving emphasis on significant figures and comparisons

5.8.2 *Tabular Presentation* is a manner of arranging data in rows and columns so that the reader may easily see, compare and analyze them

5.8.3 *Graphical Presentation* is the most effective and most convincing way to present data results wherein numerical values or relationships are presented in pictorial form.

Types of statistical charts:

a) Line Diagram or Curve
b) Bar and Column Charts
c) Pie Chart/ Circle Graph
d) Pictogram/ Pictograph
e) Statistical Maps

5.9 *Organization of Data*

Raw Data is the set of data in its original form.

Array is an arrangement of the observations according to their magnitude either in ascending or descending order.

Frequency Distribution is the method of organizing and summarizing statistical data in tabular form. It is used to reveal the pattern of variation which characterizes a given data.

5.10 *Statistical Measurements*

Measures of Tendency are indices of the central location of a distribution.

Average is a value which is the most representative of the distribution, a typical value, or a point of concentration of the distribution

Median
- a value that divides the distribution into two equal parts
- one-half of the frequencies fall below and one-half fall above
- defined as the value of the middle item arranged according to magnitude

Mode
- the observation which occurs most
- may have several modes
- if there are two modes, it is called bimodal.

Measures of Dispersion

Measures of dispersion are descriptive measures that indicate the amount of variation or nature of clustering of a data set. They lend meaning to the measure of central tendency in the description of a given data set.

Measures of absolute dispersion, as distinguished from measures of relative dispersion, are in the same units as the data whose scatter they measure. Measures of absolute dispersion cannot be used to compare the scatter in one distribution with that in another distribution when the averages of the distribution differ in size or the units of measures differ in kind.

The Range is the difference between the largest and the smallest values of some variable.

The Standard Deviation measures the variation in a data set by determining how far the data values are from the mean, on the average.

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DENR ADMINISTRATIVE ORDER
No. 99 - ____

SUBJECT : **Guidelines and Principles in Determining Fees for Access to and Sustainable Use of Resources in Protected Areas.**

Pursuant to the provisions of Republic Act 7586 otherwise known as the National Integrated Protected Areas System (NIPAS) Act of 1992 and its Implementing Rules and Regulations, and in order to provide guidelines and principles in accessing and sustainably using resources in protected areas, this Order is hereby issued for the guidance of all concerned.

SECTION 1
TITLE

This Order shall be known as *"Guidelines and Principles in Determining Fees for Access to and Sustainable Use of Resources in Protected Areas"*.

SECTION 2
OVERRIDING PRINCIPLES IN THE UTILIZATION OF RESOURCES IN PROTECTED AREAS

2.1 Sustainability is the overriding consideration in determining all types and rates of use of all resources in protected areas. Sustainable use shall be operationalized as follows:

2.1.1 For the extraction of renewable resources such as forest flora and fauna and other forest products, surface and ground water, fisheries, geothermal energy and similar resources, sustainable use shall be the rate of extraction that is lower than either the rate of regeneration or the rate that shall endanger life forms inside the protected area. The rate of use shall be within the carrying capacity of the protected area and its immediate surroundings when taken individually or collectively or in relation to other uses of the area and that any form of use shall maintain the socio-economic and cultural aspect of the area.

2.1.2 Any development of land and other resources in a protected area shall not alter the landscape and shall not significantly disrupt normal ecological functions and processes.

2.1.3 The recreational use of resources for tourism, for filming or photography, shall preserve the natural landscape and not put significant stress on living resources by considering the carrying capacity of the area.

2.1.4 In the process of resource utilization, the introduction of substances or chemicals harmful to the environment shall not be allowed.

2.2 Subsistence use of resources by IPs and tenured migrants shall be exempt from the payment of user fees.

2.3 Pending the issuance of certification by the National Commission on Indigenous People (NCIP) in accordance with the Indigenous Peoples Rights Act (IPRA), IPs in protected areas shall be given preferential access to and be levied lower fees for the commercial extraction of allowable resources in protected areas.

2.4 Prior to the full implementation/operation of the IPRA Law, free and informed prior consent from indigenous people shall be sought in the gathering of biological and other resources within protected areas.

2.5 The collection and research of biological and genetic resources in protected areas for scientific and/or related purposes shall be governed by the provisions of Executive Order No. 247 (Prescribing Guidelines and Establishing a Regulatory Framework of Biological and Genetic Resources, their By-Products and Derivatives) and its implementing rules and regulations, if applicable.

SECTION 3
OBJECTIVES

It shall be the objective of this Order to set forth the procedure which DENR through the Protected Areas and Wildlife Bureau (PAWB) and the Protected Area Management Boards (PAMBs) shall follow in determining fees for access to and sustainable use of resources located in protected areas for subsistence, recreational, extractive, commercial, and all other purposes.

SECTION 4
SCOPE

This Order shall cover identified major uses of all resources and facilities in areas comprising the National Integrated Protected Areas system (NIPAS).

SECTION 5
DEFINITION OF TERMS

5.1 *Carrying capacity* - refers to the ability of the natural or environmental resource to absorb stress without experiencing unacceptable instability and degradation.

5.2 *Commercial Use* - is the use of resources in excess of subsistence use.

5.3 *Cottage-Scale Development* - any development that requires an investment of PhP 150,000 to 1.5 million.

5.4 *Development of Land and Other Resources* - involves all forms of improvement or enhancement of land and other resources within a protected area for any purpose.

5.5 *Extractive Use* - is the use of resources involving gathering, tapping, diverting, or any form of removal of resources within the designated multiple use zone, sustainable use zone and buffer zone.

5.6 *Final Consumption* - refers to use of resources where the resource is no longer used as input to production of other goods or services.

5.7 *Fishing* - is the taking of fishery species from their wild state or habitat, with or without the use of fishing vessels.

5.8 *Indigenous Cultural Communities/Indigenous People (ICCs/IPs)* - refer to a group of people or homogenous societies identified by self-ascription and ascription by others, who have continuously lived as organized community on communally bounded and defined territory, and who have, under claims of ownership since time immemorial, occupied, possessed and utilized such territories, sharing common bonds of language, customs, traditions and other distinctive cultural traits, or who have, through resistance to political, social and cultural inroads of colonization, non-indigenous religions and cultures, became historically differentiated from the majority of Filipinos. ICCs/IPs shall likewise include peoples who are regarded as indigenous on account of their descent from the populations which inhabited the country, at the time of conquest or colonization, or at the time of inroads of non-indigenous religions and cultures, or the establishment of present state boundaries, who retain some or all of their own social, economic, cultural and political institutions, but who may have been displaced from their traditional domains or who may have resettled outside their ancestral domains (Section 3(h), RA 8371).

5.9 *Medium-Scale Development* - any development that requires an investment of above PhP 1.5 million to 60 million.

5.10 *Marketed Resources* - are resources which use entails voluntary exchange involving monetary transaction or non-monetary transaction as in the case of barter.

5.11 *Micro-Scale Development* - any development that requires an investment of PhP 150,000 and below.

5.12 *Non-marketed Resources* - are resources which use does not entail market transaction.

5.13 *Recreational Use* - is the use of resources for the primary purpose of personal enjoyment but which does not entail any form of extraction, except, for example, in recreational or sports fishing where a regulated number of fish may be taken.

5.14 *Resources* - refer to all living and non-living, renewable or non-renewable, including but not limited to terrestrial, aquatic or both, surface or subsoil resources found within protected areas.

5.15 *Small-Scale Development* - any development that requires an investment of above PhP 1.5 million to15 million.

5.16 *Subsistence Use* - is the use of resources to satisfy the minimum basic requirements of households of indigenous cultural communities and tenured migrants including but not limited to food, dwelling, clothing, medical assistance and recreation.

5.17 *Sustainable Use* - is the use of components of biological diversity in a way and at a rate that does not lead to the decline in the species used, thus, maintaining its potential to meet the needs and aspirations of the present and future Filipino generations.

5.18 *Tenured Migrant* - or communities within protected areas are those who have actually and continuously occupied area five (5) years before the designation of such as protected area in accordance with the NIPAS Act and are solely dependent on the resource for subsistence (Sec. 4(1), RA 7586).

SECTION 6
TYPES OF USES

The following are the types of uses of resources in protected areas on which fees shall be assessed or may be applied.

6.1 Subsistence use shall include but not limited to hunting of wildlife for household consumption, gathering of forest products for house construction, agriculture or fish culture to raise crops or fish for household consumption. Subsistence use shall be for the benefit of indigenous cultural communities and tenured migrants only.

6.2 Recreational use shall include but not limited to land, water-based activities such as snorkeling, SCUBA diving, swimming, boating, mountain climbing, trekking, picnicking, and bird watching, filming and photography; and all other similar activities as may be determined and allowed by the Protected Area Management Board (PAMB).

6.3 Extractive use shall include but not limited to: a) extraction or diversion of water for irrigation or domestic uses; b) collection or gathering of forest products such as vines, rattan, bamboo, resin, ornamental plants, bird's nest, guano, honey; c) collection of wildlife such as monkeys, wild pigs, butterfly,; d) extraction of flora and fauna and its by-products, parts and derivatives, including, but not limited to leaves, blood and samples; e) fishing either in small or commercial scale.

6.4 Commercial use shall refer to the development of land and other resources such as construction of kiosks for vending food and souvenir items; construction of tourist and lodging facilities; shops for rental of recreational equipment such as boats, and such other activities as may be allowed by the Management Plan and in accordance with Department of Trade and Industry (DTI) guidelines.

Further, it shall also include existing activities relating to the use of geothermal energy, water resources for electric power generation, use of fishpens and fishcages, use of highways, relay stations and similar communication or transportation structure.

SECTION 7
TYPES OF FEES

7.1 *Protected Area Entrance Fee* - is a fee paid to enter a protected area.

7.2 *Facilities User Fee* - is a fee paid for the privilege of using man-made facilities inside a protected area.

7.3 *Resource User Fee* - is a fee paid for the sustainable commercial use of a specified quantity of resources within protected area over a specified period of time.

7.4 *Concession Fee* - is a fee paid for the use of land or other resources for the privilege of undertaking micro and cottage-scale development for a specified period of time and for a specified nature of development.

7.5 *Development Fee* - is a fee paid for the use of land or other resources for the privilege of undertaking small, medium and other bigger scale development in protected areas to the extent as may be allowed by PAMB and in accordance with the Management Plan for a specified period of time and for a specific nature of development.

7.6 *Royalty* may be defined as a fee paid based on the gross output value or gross sales from products out of resources derived from a protected area.

SECTION 8
SPECIFIC GUIDELINES AND PRINCIPLES IN DETERMINING FEES

One or more guidelines and/or principles may be employed in determining fees based on the following: a) capability to approximate closely the correct fee; b) availability of data as basis for computations; and c) costs to be incurred in estimating the fee.

8.1 Protected Area Entrance Fees and User Fees

Specific Principles

8.1.1 Cost-recovery principle - For Protected Area Entrance Fees, collected revenues shall cover, as much as possible, a reasonable proportion of all costs incurred in protecting, maintaining and enhancing the natural attractions of the protected area. For Facilities User Fees, collected revenues shall cover, as much as possible, a reasonable proportion of all costs incurred in providing and maintaining the man-made facilities in the protected area.

8.1.2 Willingness-to-pay principle - For Protected Area Entrance Fees, these shall be based on the willingness-to-pay estimates of the visitors based on appropriate surveys.

Guidelines

8.1.3 Protected Area Entrance Fees shall cover access to the protected area. If applicable, an additional Facilities User Fee shall cover access to and the use of man-made facilities in the protected area.

8.1.4 For Protected Area Entrance Fees, the willingness-to-pay principle shall be the primary basis for computing fees. However, if information is not available, the cost-recovery principle shall be the basis of computation.

8.1.5 For Facilities User Fees on man-made facilities managed by private entities, rates shall be determined by the private entity but shall be comparable to fees charged for the use of similar facilities in a comparable location. All Facilities User Fees shall be determined in consultation with the PAMB.

8.1.6 For Facilities User Fees on man-made facilities managed by the government, these shall be determined using the cost-recovery principle and shall be comparable to the fees for the use of privately-managed facilities with similar characteristics.

8.1.7 A three-tiered system of Protected Area Entrance Fees shall be developed: lower rates for Filipino students and senior citizens; normal rates for other Filipino visitors; lower rates for minors; higher rates for all foreign visitors.

8.2 Resource User Fees, Development Fees and Concession Charges

Guidelines and Principles

8.2.1 The PAMB shall, to the extent feasible, enter into co-production, joint venture or production-sharing agreements with interested parties in the commercial extraction and/or development of resources in protected areas.

8.2.2 The government share of the protected area through the Integrated Protected Areas Fund (IPAF) in these agreements shall be a reasonable proportion of the excess profits derived from the commercial extraction of resources.

8.2.3 All types of development are required to undergo EIA System as prescribed under PD 1586 and other pertinent laws and regulations.

8.3 Royalty

Guideline and Principle

For any use of resources that result in the sale of goods or services where the value of total sales can be easily monitored, the resource fee may be based on royalty.

SECTION 9
OTHER PROVISIONS

9.1 The computation of the excess profits shall be guided by the formula specified in *Annex A*. The corresponding government share from the excess profit shall be determined consistent with the appropriate instrument agreed upon by the contracting parties.

9.2 The rate of subsistence use shall be specified for each resource and where possible, for each household of indigenous people and tenured migrants. Such rate shall not exceed the rural annual capita threshold income by region as may be determined by the National Economic and Development Authority (NEDA).

9.3 The classification of development projects in protected areas in terms of investments shall be regularly updated in accordance with DTI guidelines.

9.4 The guidelines and principles enumerated herein shall be elaborated and operationalized in a handbook that shall be developed after pilot-testing in a sufficient number of protected areas.

SECTION 10
RESPONSIBILITIES OF PAWB AND PAMB

10.1 PAWB shall:

10.1.1 Take the lead in pilot-testing these guidelines and principles in key resources and uses in collaboration with the PAMBs and DENR Field Offices;

10.1.2 Develop a manual to be used by PAMBs in the implementation of the guidelines and principles after pilot testing in a sufficient number of areas;

10.1.3 Assist the PAMBs to operationalize the manual; and

10.1.4 Assist in providing experts required by the PAMBs in the implementation of the guidelines and principles.

10.2 PAMB shall:

10.2.1 Collaborate with PAWB in the pilot testing of the guidelines and principles;

10.2.2 Be guided by the manual developed by PAWB in implementing the guidelines and principles;

10.2.3 Approve all types of uses of resources in a protected area through a Memorandum of Agreement with the concerned entity;

10.2.4 Conduct public consultations/dialogues with interested parties on proposed fees;

10.2.5 Formulate and pass all resolutions required to enable and facilitate the collection of fees; and

10.2.6 Determine through consultations with indigenous people the traditional uses of resources within protected areas.

This Order shall take effect fifteen (15) days after publication and revokes, supersedes, and amends any order and/or instructions inconsistent herewith.

ANTONIO H. CERILLES
Secretary

version as of February 2, 1999

A. Computation of Excess Profit

The excess profit per year that arises from a natural resource-based activity shall be computed using the following formula.

Excess Profit = gross sales (GS) of natural resource-based product or service
Less cost of production
Less margin for profit
Less margin for risk

where: GS = (quantity of product or service) x (farm-gate price)
Cost of Production includes: payment for wages; material cost, e.g., gasoline; rentals for equipment, buildings, etc.; depreciation; and payments for taxes normally paid by any business enterprise (e.g., income taxes, permit fees, etc.)

Margin for Profit = normal return to entrepreneurial capital, usually determined through prevailing conditions in the financial market

Margin for Risk = a premium to cover losses from natural calamities and other causes

The margin for profit and risk shall be set at a maximum of 30 percent of the total cost of production.

Information to be used in computing for excess profits shall be based on a hypothetical company operating at an efficient level. Such information may be supplemented with data on the cost of the next-best-alternative. The cost of the next-best-alternative is the cost of providing equivalent goods and/ or services for the same market without using the resources of or derived from the protected area.

B. Computation of Willingness-To-Pay

The willingness-to-pay for a natural resource good or service shall be computed from appropriate surveys employing accepted economic tools such as travel cost method or the contingent valuation method. These surveys shall arrive at an estimate of the willingness-to-pay for a natural resource good or service taking into account factors such as income, occupation, and nationality, among others.

Appendix B.1

SURVEY OF TOURISTS AT HUNDRED ISLANDS NATIONAL PARK

Background

The National Integrated Protected Areas System, or NIPAS Act, was passed as a law by Congress on June 1, 1992. Hundred Islands National Park (HINP) is one of the identified initial components of NIPAS. HINP is currently managed by the Philippine Tourism Authority (PTA). Recently, the Protected Area Management Board (PAMB), composed of government and non-government representatives, was organized to make policies for managing the protected area.

Section 10 of the NIPAS Act states that the DENR Secretary can fix and prescribe NIPAS fees from people deriving benefits from protected areas. In turn, the funds will be used for the operational and monitoring activities in the protected area.

The Environmental and Natural Resources Accounting Project (ENRAP) is conducting a survey to determine the willingness of tourists to pay for accessing the beach and coral reefs of Hundred Islands National Park.

The objective of the survey is to include public opinions in decisions to manage the Hundred Islands National Park.

I. Please *check the activities* that you participate in and around every tourist spot in the Philippines:

ACTIVITY	Hundred Islands National Park	Substitute Site 1	Substitute Site 2	Substitute Site 3	Substitute Site 4	Substitute Site 5
Game Fishing						
Island Hopping						
Swimming/Sunbathing						
Beachcombing/Walking						
Picnicking						
Snorkeling/Scuba Diving						
Jetskiing						
Boating						
Other Activities, specify						

Why did you choose HINP over other sites for this visit?

_____

_____

II. RATING OF FACILITIES

A. Please indicate the degree of satisfaction with the services within the Park during the present trip.

Service	*Degree of Satisfaction*					*Comments/ Suggestions*
	Excellent	*Good*	*Fair*	*Poor*	*Not Used*	
Lodging						
Toilet Facilities						
Picnic Sheds/Tables						
Pavilion						
Water Supply						
Availability of litter bins						
Cleanliness						
Boat rides						
Personal safety						
Peace and quiet						
Others (specify)						

B. Please indicate the degree of satisfaction with the services at Lucap Point during the present trip.

Service	*Degree of Satisfaction*					*Comments/ Suggestions*
	Excellent	*Good*	*Fair*	*Poor*	*Not Used*	
Lodging						
Public Toilet Facilities						
Restaurants						
Water Supply						
Availability of litter bins						
Cleanliness						
Information Center • service • availability of information						
Personal safety						
Peace and quiet						
Others (specify)						

III. PROTECTION OF HUNDRED ISLANDS NATIONAL PARK

› The NIPAS Act mandates the collection of entrance fees for access to and use of facilities inside protected areas in the country. The fees will be used for the operation expenses, improvement of services and protection of the area.

1. a) Are you involved in any monitoring or protection activities for HINP or any other protected area in the country? ____ *Yes* _____ *No*

   b) If yes, how often do you participate in these activities?

   _____ *more than once a week* _____ *once a week*
   _____ *more than once a month* _____ *once a month*
   _____ *more than once a year* _____ *once a year*

2. How concerned are you about protecting the Hundred Islands National Park?

___ *no opinion* ___ *not concerned* ___ *a little concerned* ___ *very concerned*

3. The following actions would affect water quality in HINP. Please indicate how strongly you support or oppose each action, by ***circling a number for each one***.

   1 = strongly support 3 = neutral 5 = strongly oppose
   2 = support 4 = oppose NA = no opinion

Better enforcement of existing regulations	1	2	3	4	5	NA
Zoning to guide present use and future development	1	2	3	4	5	NA
Construct new amenities for tourists	1	2	3	4	5	NA
Require repair or upgrade of septic systems in the area	1	2	3	4	5	NA
Restrict fishing in the HINP area	1	2	3	4	5	NA
Dismantling of all fishpens in the HINP area	1	2	3	4	5	NA
Introduce entrance fees to support programs for protecting Hundred Islands National Park	1	2	3	4	5	NA
Public education to teach people how to reduce their impacts on the environment	1	2	3	4	5	NA

IV. MEASUREMENT OF WILLINGNESS-TO-PAY

1. *Current Level of Services and Facilities*

a) Assume that the Park services and facilities remain at their current level. If the PTA needs to increase the entrance fees paid by both local and foreign visitors, are you willing to pay the increased entrance fee per person per day?

_____ *YES,* I am willing to pay a maximum of PhP _____.
At this rate, how many times will you visit HINP in 1998? _____ *times*

_____ *NO,* the entrance fee should remain the same because
_____.

2. *Improvement of Facilities and Services*

a) Assume that the PTA and PAMB plan to make improvements in the following:

- Collection of litter and general cleanliness in the Park
- Maps and information
- Upgrading of facilities
- Enforcement of environmental rules and regulations

To make these improvements, the authorities need to increase the Park entrance fees. Would you be willing to pay the increased entrance fee, and if so, what is the maximum amount you would be willing to pay per person per day?

_____ *YES,* I am willing to pay a maximum of PhP _____.
At this rate, how many times will you visit HINP in 1998? _____ *times*

_____ *NO,* the entrance fee should remain the same because
_____.

3. Assume that the PTA and PAMB are planning to provide new facilities on the islands. To do this, they may have to implement user charges for these facilities. Please indicate which of the following facilities you intend to use and if you would be willing to pay user fees for them.

Facilities	Will Use	Maximum Amount You Are Willing to Pay	Not Willing to Pay
More lodging rooms			
Shower rooms			
Lockers			
Restaurants			
Convenience stores			
More picnic tables/ sheds			
Water Supply			
More camping sites			
More barbecue pits			
Diving/snorkeling equipment			
First Aid			
Lifeguard			

V. TRAVEL INFORMATION

1. What is the purpose of your visit to the Hundred Islands National Park?

___ *beach/diving/recreation* ___ *cultural visit* ___ *research/study*
___ *visit family & friends* ___ *business* ___ *others (specify)*
_____

2. How long are you staying? ___ *days*

3. a) Are you here on package tour? _____ *Yes* _____ *No*
   b) If yes, how much does the package cost per person? *PhP* _____

4. a) Did you come straight from your residence? _____ *Yes* _____ *No*
   b) If no, where did you come from? Please list down all places from the time you left your residence.

Location:	*No. of days:*
_____	_____
_____	_____

   c) Are you planning to go to another place aside from your residence right after here?
   _____ *yes* _____ *no*
   d) If yes, where and how long? Please list down all places until the time you go back to your residence.

Location:	*No. of days:*
_____	_____
_____	_____

5. a) What is the approximate distance from your place of residence to Hundred Islands National Park? _____ *kms.*
   b) How long will it take you to get here? _____ *hours* _____ *minutes*

6. What means of transportation did you use? **Please check all that apply**.

_____ *Own car* _____ *Airplane* _____ *Bus* _____ *Tricycle*
_____ *Boat* _____ *Jeep* _____ *Hired vehicle*

7. Are you with **(indicate no. of persons including yourself)**:

_____ *whole family* _____ *some family members* _____ *extended family*
_____ *friends* _____ *office peers*

8. How much did you spend for a one-way trip from your residence? **Please indicate amount per item.**

_____ *gasoline* _____ *vehicle rental*
_____ *toll fees* _____ *plane/bus fare*
_____ *accommodations* _____ *food*
_____ *others (please specify)*

9. Who paid for the trip expenses? **Please indicate either <u>amount or percentage</u> of total expenses in item 8.**

_____ *yourself* _____ *spouse* _____ *office* _____ *friend/s*
_____ *parents* _____ *children* _____ *relative/s* _____ *others (pls. specify)*

10. Which facilities do you intend to use and pay for? **Please indicate the <u>maximum amount you intend to spend</u> for each category.**

_____ *Park entrance fees* _____ *boat*
_____ *overnight accommodations* _____ *snorkeling equipment*
_____ *one-day picnic sheds* _____ *others (specify facility/ies)*

11. Who will pay for the use of the facilities? **Please indicate either <u>amount or percentage</u> of total expenses for use of the facilities.**

_____ *yourself* _____ *spouse* _____ *office* _____ *others* _____
parents _____ *friend/s* _____ *relative/s*

12. a) Did you bring your own food? _____ *yes* _____ *no*

b) If yes, how much did you spend for food? *PhP* _____

c) If no, how much do you intend to spend for food at the site? *PhP* _____

d) Who paid/ will pay for the food expenses? **Please indicate either <u>amount or percentage</u> of total expenses for use of the facilities.**

_____ *yourself* _____ *spouse* _____ *office* _____ *others*
_____ *parents* _____ *friend/s* _____ *relative/s*

13. a) How many times did you visit Hundred Islands from January 1997, including this trip? _____ *times*

b) How long did you stay for each trip? _____ *days*

14. a) Do you plan to come back to Hundred Islands? _____ *yes* _____ *no*

b) If yes, how many times within:

____ *next month* ____ *w/in 3 months* ____ *w/in 6 months*
____ *next year* ____ *later*

15. How often do you travel to beach resorts in the Phil. or abroad within a year?

____ *never* ____ *once* ____ *twice* ____ *three times* ____ *more than 3X*

VI. PROFILE OF THE RESPONDENT

- Do you: ___ *own your home?* ___ *rent?*
- Where is your home located? _____
- How long have you lived at your present residence? _____ *yrs.* _____ *mos.*
- Are you: ____ *male* *or* ____ *female?*
- What is your civil status?
____ *Single* _____ *Married* _____ *Widowed* _____ *Separated*
- Including yourself, how many people live in your household? ____
- How many people under age 18 live in your household? ____
- How old are you? _____ *Years*
- What is the highest level of education you have attained?_____
What is your field of discipline? _____
- Are you employed? ___ *Yes* ____ *No*
If yes: ___ *full, or* ____ *part-time?*
In what industry? _____
If no: are you currently enrolled in school? ___ *Yes* _____ *Level;* ____ *No*
- Do you own your business? ____ *Yes* ____ *No*
- What is your ***monthly income before taxes***? *PhP* _____

_____ Below 3,000	_____ 16,001 - 20,000
_____ 3,000 - 5,000	_____ 20,001 - 25,000
_____ 5,001 - 8,000	_____ 25,001 - 35,000
_____ 8,001 - 12,000	_____ 35,001 - 50,000
_____ 12,001 - 16,000	_____ Above 50,000

- Including yourself and all other income earners in the household, what is the ***total household monthly income before taxes***? *PhP* _____

_____ Below 3,000	_____ 16,001 - 20,000
_____ 3,000 - 5,000	_____ 20,001 - 25,000
_____ 5,001 - 8,000	_____ 25,001 - 35,000
_____ 8,001 - 12,000	_____ 35,001 - 50,000
_____ 12,001 - 16,000	_____ Above 50,000

- Are you a member of any organization? ____ *Yes* ____ *No*
- If yes, which one/s? _____

  _____
- Do you have any more suggestions for improvement of facilities and/or services at HINP?

_____

_____
- Do you have any other comments?

  _____

  _____

THANK YOU VERY MUCH FOR YOUR TIME.

To be answered by the Interviewer After the Interview:

Name of Interviewer: _____
Date of Interview: _____
Time of Interview: _____

1. Please indicate the degree of cooperation of the interviewee:

   _____ *Very Cooperative*
   _____ *Cooperative*
   _____ *Indifferent*
   _____ *Not Cooperative*

2. Were other people answering together with the interviewee?

   _____ *Yes* _____ *No*

3. Other comments/notes of the interviewer:

_____

_____

_____

APPENDIX B.2

PAMB Resolution: HINP

PAMB RESOLUTION 99-6

RESOLUTION ADOPTING THE RECOMMENDATIONS MADE ON THE STUDY IN THE DETERMINATION OF APPROPRIATE FEES FOR THE ENTRANCE TO AND USE OF FACILITIES WITHIN HUNDRED ISLANDS NATIONAL PARK.

Whereas Republic Act No. 7586 or NIPAS Act mandated the DENR to manage all protected areas in the country;

Whereas, HINP National Park is one of the identified initial components of NIPAS;

Whereas, under Section 16 of the NIPAS Act, an Integrated Protected Area Fund shall be established in each of the protected area to sustain the financing of the operations and maintenance activities of the protected areas;

Whereas, the PAMB is likewise authorized by the same law to impose appropriate fees for the use of resources of the protected areas;

Whereas, considering that Hundred Islands is one of the famous tourist destination in the country, it is necessary that there would be enough funding to support the effective management of the park;

Whereas, at present the PTA is collecting minimal amount of entrance fees for entry to the protected area;

Whereas, the PAMB opines that there is a need to generate more revenues for the sustained management of the protected area, considering that the government subsidize for the operation of the area is minimal;

Whereas, the team from DENRF, PAWD and PPSO conducted a study on the determination of appropriate fees for entrance to and use of facilities within the protected area;

Whereas, on January 25, 1999; the Study Team presented to this body the result of their study in the said area;

Whereas, during the said PAMB meeting, the Board hereby agreed that the recommendations made by the study team will be adopted and that the corresponding fees shall be fixed as recommended as Annex;

NOW THEREFORE, for and in consideration of the foregoing premises and of the initial covenants thereinafter set forth, the existence of the Board hereby agrees, as we hereby agreed to adopt the above cited recommendation by the study team.

c/o Ms Nina Rosales
FAX # 439-3916

Certified Correct:

ERLINDA P. NICOL
Secretariat

Approved By:

RUDY R. VILLANUEVA
Presiding Officer

PAMB Members:

ALFREDO CORPUZ

ROEL ANONUEVO

NICOLAS C. [illegible]

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APPENDIX C

SURVEY OF VISITORS AT MT. PULAG NATIONAL PARK

BACKGROUND:

On June 1, 1992, Republic Act No. 7586, "An Act Providing for the Establishment and Management of National Integrated Protected Areas System, defining its scope and coverage, and for other Purposes" better known as the NIPAS ACT of 1992, was passed as a law by Congress. Mt. Pulag National Park (MPNP) is one of the identified initial components of NIPAS. Recently, the Protected Area Management Board (PAMB), composed of government and non-government representatives, was organized to make policies for managing the protected area.

Section 10 of the NIPAS Act states that the DENR Secretary can fix and prescribe fees from people deriving benefits from protected areas. In turn, the funds will be used for the operational and monitoring activities in the protected area.

The Environmental and Natural Resources Accounting Project (ENRAP) is conducting a survey to determine the willingness of tourists to pay for access to Mt. Pulag for hiking expeditions. The objective of the survey is to include public opinions in decisions to manage Mt. Pulag.

PART I. RECREATION BEHAVIOR OF VISITORS

For official use:
I.1.a
I.1.b
I.1.c
I.1.d
I.1.e
I.1.f
I.1.g.1
I.1.g.2
I.2.a
I.2.b
I.2.c
I.2.d
I.2.e
I.2.f
I.2.g
I.2.h
I.2.i
I.2.j
I.2.k
I.2.l
I.2.m
I.2.n
I.2.o
I.2.p
I.2.q.1
I.2.q.2
I.2.q.3
I.2.q.4
I.2.q.5
I.2.q.6
I.3.a
I.3.b
I.3.c
I.3.d
I.3.e
I.3.f
I.3.g.1
I.3.g.2
I.3.g.3
I.3.g.4
I.3.g.5
I.3.g.6

1. How did you first learn about Mt. Pulag? Check all that apply.

a. _____ Television
b. _____ Print Media
c. _____ Radio
d. _____ Friends/Relatives
e. _____ School
f. _____ Travel Agency
g. _____ Others, *specify:*
g.1 _____
g.2 _____

2. Aside from Mt. Pulag, have you visited any other mountain climbing site in the Philippines?

	No. of visits:
a. Mt. Makulot	_____
b. Mt. Makiling	_____
c. Mt. Data	_____
d. Mt. Banahaw	_____
e. Mt. Cristobal	_____
f. Mt. Guiting-Guiting	_____
g. Mt. Fami	_____
h. Mt. Isarog	_____
i. Mt. Canlaon	_____
j. Mt. Apo	_____
k. Mt. Hibok-Hibok	_____
l. Mt. Halcon	_____
m. Mt. Arayat	_____
n. Mt. Batulao	_____
o. Mt. Lukban de Banahaw	_____
p. Mainland Palawan	_____
q. Others, *specify:* _____	_____
_____	_____

3. Please use the following scale to indicate the importance of the following activities on your decision to take this trip.

5=Extremely Important *3=Important* *1=Does Not Matter*
4=Very Important *2=Less Important*

Reason:	*Importance:*				
a. Mountain climbing/ hiking/ trekking	5	4	3	2	1
b. Sightseeing/ Wildlife watching	5	4	3	2	1
c. Photography	5	4	3	2	1
d. Picnicking	5	4	3	2	1
e. Camping	5	4	3	2	1
f. Research/ Study	5	4	3	2	1
g. Others, *specify:* g.1)	5	4	3	2	1
g.2)	5	4	3	2	1

4. **Why did you choose Mt. Pulag for this visit? Use the following scale to rate the level of importance.**

5=Extremely Important *3=Important* *1=Not applicable*
4=Very Important *2=Less Important*

Reason:	***Importance:***				
a. Challenge of climb	5	4	3	2	1
b. Scenery/ View	5	4	3	2	1
c. Climate	5	4	3	2	1
d. Flora in area	5	4	3	2	1
e. Fauna in area	5	4	3	2	1
f. Recommended by Friends/ Family	5	4	3	2	1
g. Media Ads	5	4	3	2	1
h. Proximity to Residence	5	4	3	2	1
i. Price/ Affordability	5	4	3	2	1
j. Uniqueness of species/ biodiversity	5	4	3	2	1
k. Historical/ cultural reasons	5	4	3	2	1
l. Others, *specify*: i.1)	5	4	3	2	1
i.2)	5	4	3	2	1
i.3)	5	4	3	2	1

5. **Please indicate the degree of your satisfaction with the Park services during your present visit. Use the following scale to rate the services:**
5=Excellent *4=Good* *3=Fair* *2=Poor* *1=Not used*

Park Service:	***Satisfaction:***				
a. Access to the Park	5	4	3	2	1
b. Road/trail conditions	5	4	3	2	1
c. Availability of litter bins/ Cleanliness	5	4	3	2	1
d. Comfort rooms	5	4	3	2	1
e. Camping facilities	5	4	3	2	1
f. Water for drinking/ refill	5	4	3	2	1
g. Park amenities, e.g. lights, signs	5	4	3	2	1
h. Personal Safety	5	4	3	2	1
i. Peace and Quiet	5	4	3	2	1
j. Others, *specify*: h.1)	5	4	3	2	1
h.2)	5	4	3	2	1
h.3)	5	4	3	2	1

6. **Did your experience at Mt. Pulag meet your expectations?**

_____ *YES*
_____ *HIGHER THAN EXPECTED*
_____ *LOWER THAN EXPECTED*

For official use:
I.4.a
I.4.b
I.4.c
I.4.d
I.4.e
I.4.f
I.4.g
I.4.h
I.4.i
I.4.j
I.4.k
I.4.l.1
I.4.l.2
I.4.l.3
I.4.l.4
I.4.l.5
I.4.l.6
I.5.a
I.5.b
I.5.c
I.5.d
I.5.e
I.5.f
I.5.g
I.5.h
I.5.i
I.5.j.1
I.5.j.2
I.5.j.3
I.5.j.4
I.5.j.5
I.5.j.6
I.6.a
I.6.b
I.6.c

PART II. WILLINGNESS TO PAY FOR SERVICES

1. You now pay PhP 50.00 as entrance fee to Mt. Pulag National Park. However, the Park has not covered all of its costs and the Protected Area Management Board (PAMB) will need to increase entrance fees. How many *ADDITIONAL PESOS* (for local visitors) or *ADDITIONAL DOLLARS* (for foreign visitors) are you willing to pay to access the Park?

LOCAL VISITOR:
+ PhP 0 : _____
+ PhP 10 : _____
+ PhP 25 : _____
+ PhP 50 : _____
+ PhP100: _____
Other Amount: _____

FOREIGN VISITOR:
+ US$ 0 : _____
+ US$ 5 : _____
+ US$ 10: _____
+ US$ 15: _____
+ US$ 20: _____
Other Amount: _____

2. Assume that the PAMB plans to make improvements in its services. To do this, the entrance fee has to be increased. How many *ADDITIONAL PESOS* (for local visitors) or *ADDITIONAL DOLLARS* (for foreign visitors) are you willing to pay for each improvement:

SERVICE:	*+0*	*+5*	*+10*	*+15*	*+20*	*Other Amount*
a. Road/trail conditions (e.g., varying levels of difficulty)						
b. Maps and information						
c. Collection of litter and cleanliness in the Park						
d. Park protection and personal safety (e.g., signal lights, railings)						
e. Enforcement of environmental rules and regulations						

3. Assume that the PAMB is planning to provide new facilities to the Park. They may have to implement user charges for these facilities. **Please indicate which you intend to use, and HOW MUCH are you willing to pay to use them.**

FACILITIES	WILL USE (1)	AMOUNT WILLING TO PAY
a. More lodging facilities		
b. Comfort rooms		
c. Parking areas		
d. Outdoor cooking areas		
e. Camp sites		
f. Meditation sites		
g. First aid stations		
h. Orienteering sites		
i. Photo opportunity sites		
j. View decks and towers		
k. Hikers' rest areas		
l. Tour guides/wardens		
m. Signal stations		

_____ *No*, I do not want any further development in the area because
_____.

For official use:
II.1.a
II.1.b
II.2.a
II.2.b

PART III. TRAVEL INFORMATION

1. **How long are you staying?** _____ Days _____ Hours

2. **Are you here on package**

II.2.c
II.2.d
II.2.e
II.3.a.1
II.3.a.2
II.3.b.1
II.3.b.2
II.3.c.1
II.3.c.2
II.3.d.1
II.3.d.2
II.3.e.1
II.3.e.2
II.3.f.1
II.3.f.2
II.3.g.1
II.3.g.2
II.3.h.1
II.3.h.2
II.3.i.1
II.3.i.2
II.3.j.1
II.3.j.2
II.3.k.1
II.3.k.2
II.3.l.1
II.3.l.2
II.3.m.1
II.3.m.2
II.3.n

tour? ___ Yes ___ No

If yes, how much is the package tour? PhP _____

3. **Did you come straight from your residence?** ___ Yes ___ No

If no, where did you come from?

Location	**No. of days**
_____	_____
_____	_____

4. **Are you going back to your residence right after here?**

___ Yes ___ No

If no, where else are you going?

Location	**No. of days**
_____	_____
_____	_____

5. **How far is Mt. Pulag from your residence?** _____ Kms.

6. **How long did it take you to get here?** ____ Days _____ Hours

7. **What means of transportation did you use to get to Mt. Pulag from your residence? Check all that apply.**

_____ Airplane
_____ Own vehicle
_____ Bus
_____ Hired vehicle
_____ Others, *specify*: _____

8. **How many people are you with? Please check all that apply and indicate the number of people, including yourself.**

___ None
___ With family/relatives, total _____ people
___ With friends, total _____ people
___ With office peers, total _____ people
___ With schoolmates, total _____ people
___ Others, *specify:* _____ total _____ people

TOTAL NO. OF PEOPLE IN YOUR GROUP: _____

III.1
III.2.a
III.2.b
III.3.a
III.3.b
III.3.c
III.3.d
III.3.e
III.4.a
III.4.b
III.4.c
III.4.d
III.4.e
III.5
III.6
III.7.a
III.7.b
III.7.c
III.7.d
III.7.e
III.8.a
III.8.b
III.8.c
III.8.d
III.8.e
III.8.f.1
III.8.f.2

For official use:

9. **How much did you spend for *A ONE-WAY TRIP FROM YOUR RESIDENCE TO MT. PULAG*?**

_____ Gasoline
_____ Bus/Plane fare
_____ Vehicle rental
_____ Lodging to get to Mt. Pulag
_____ Food/ drinks during the trip up to Mt. Pulag
_____ Others, *specify*: _____
═══
_____ *GRAND TOTAL*

10. **Who paid for the *TRIP EXPENSES TO THE SITE*? Indicate amount or percentage for each. If amount is indicated, note that the GRAND TOTAL should equal the total of no. 9.**

	Percentage	*OR*	*Amount*
Yourself:	_____		_____
Others, *specify*: _____	_____		_____
	═══		═══
GRAND TOTAL:	**100%**		_____

11. **How much did you spend for facilities and food *USED AT MT. PULAG*?**

_____ Park Entrance Fees
_____ Lodging at the site
_____ Equipment rental
_____ Tent rental
_____ Food/drinks consumed at the site
_____ Souvenirs
_____ Photo film
_____ Others, *specify*: _____
═══
_____ *GRAND TOTAL*

12. **Who paid for the *EXPENSES AT THE SITE*? Indicate amount or percentage for each. . If amount is indicated, note that the GRAND TOTAL should equal the total of no. 11.**

	Percentage	*OR*	*Amount*
Yourself:	_____		_____
Others, *specify*: _____	_____		_____
	═══		═══
GRAND TOTAL:	**100%**		_____

13. **How many times have you visited Mt. Pulag, including this trip?**
_____ times

14. **How many times do you intend to visit Mt. Pulag within the next two years?** _____ times

PART IV. RESPONDENT'S PROFILE

For official use:
III.9.a
III.9.b
III.9.c
III.9.d
III.9.e
III.9.f.1
III.9.f.2
III.10.a
III.10.b
III.10.c
III.11.a
III.11.b
III.11.c
III.11.d
III.11.e
III.11.f
III.11.g
III.11.h.1
III.11.h.2
III.12.a
III.12.b
III.12.c
III.13
III.14

1. **Where is your current home located?** _____
2. **How long have you lived there?** _____ Years _____ Months
3. **Do you:** _____ own your home? _____ rent your home?
4. **Gender:** _____ Male _____ Female
5. **Civil status:** ___ Single ___ Married ___ Widowed ___Separated
7. **Including yourself, how many people live in your household?** _____ people
8. **How many *below 18 years old* live in your household?** _____ people
9. **How many people earn incomes in your household?** _____ people
10. **Age:** _____ Years
11. **Occupation:**_____ **Industry:** _____
12. **If student, indicate current year level:** _____
13. **Educational attainment:**

___ Elementary ___ College, course: _____ ___ Vocational
___ High school ___ Post-graduate, course: _____

13. **Approximate *MONTHLY INCOME OF RESPONDENT* before taxes:**

___ Below 4,000
___ 4,000 – 7,000
___ 7,001 – 10,000
___ 10,001 – 14,000
___ 14,001 – 18,000
___ 18,001 – 23,000
___ 23,001 – 28,000
___ 28,001 – 35,000
___ 35,001 – 45,000
___ 45,001 – 60,000
___ 60,001 – 80,000
___ 80,001 – 100,000
___ Above 100,000

14. **Approximate *HOUSEHOLD MONTHLY INCOME* before taxes:**

___ Below 4,000
___ 4,000 – 7,000
___ 7,001 – 10,000
___ 10,001 – 14,000
___ 14,001 – 18,000
___ 18,001 – 23,000
___ 23,001 – 28,000
___ 28,001 – 35,000
___ 35,001 – 45,000
___ 45,001 – 60,000
___ 60,001 – 80,000
___ 80,001 – 100,000
___ Above 100,000

15. **Are you a member of any of the following types of organizations?**

___ Religious
___ Environmental
___ Regional grouping
___ Sports-related
___ Civic, e.g. Rotary
___ Others, *specify*: _____
___ School, e.g. Fraternity
___ Government
___ Non-government/People's
___ Business, e.g. Chamber of Commerce
___ Professional

16. **Do you have any suggestions for improving facilities and/or services at Mt. Pulag?**

_____
_____
_____

17. **Do you have any other comments?**

_____
_____

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION.

APPENDIX D.1

SURVEY OF FISH CAGE OPERATORS AT PAOAY LAKE

In June 1992, Congress passed the NIPAS Act as a law, designating certain areas in the country as protected areas. Paoay Lake National Park is included in the list of protected areas in the country. The NIPAS Act further states that appropriate fees can be charged to finance the operation and maintenance activities for protecting the area. In accordance with this, the PAMB, composed of government and non-government representatives, is considering to impose appropriate fees that will be charged against the users of the resources of the Lake.

The operation of fish cages has been identified as one of the major economic activities in the area. In this connection, a survey is being conducted among fish cage operators to determine the economic rents derived therefrom, which will be used as basis for determining the appropriate resource user fees.

I. Profile of Respondent

1. Position : _____

2. Age : _____

3. Fish Cage Experience (yrs.) : _____

4. Educational Attainment : _____

5. Sex : _____

6. Ethnicity : _____

7. Civil Status : _____

8. Other sources of livelihood : _____

9. Resident's gross monthly income before taxes : _____

10. Household gross monthly income before taxes : _____

11. Location of residence : _____

II. Location of Fish cage

(1) _____
(2) _____
(3) _____

III. Total Area of Fish Cage (meters)

Length _____ Width _____ Depth _____
Length _____ Width _____ Depth _____
Length _____ Width _____ Depth _____

IV. Date Established (month, year) : _____

V. Expenses (Pesos/year)

A. Taxes : _____
B. Permits : _____
C. Others : _____

Table 1
1997 Crop Production Data (Fishcage # ___)

Crop Number	1	2	3	4	5
1. Culture Period (days)					
2. a. Species Cultured (for monoculture)					
b. Species 1 (for polyculture)					
c. Species 2 (for polyculture)					
3. Grow-out Area (has.)					
4. Total no. of Pieces Harvested					
5. Ave. no. of Pcs./kg.					
6. Marketed Output					
a. Adult (no. of kg.)					
b. Others (wild)					
i.					
ii.					
iii.					
7. Price (PhP)					
a. Adult (per kg.)					
b. Others (wild)					
i.					
ii.					
iii.					

Table 2: 1997 Material Input Data

Crop Number	1		2		3		4		5	
Inputs	**Qty**	**Unit Cost**	**Qty**	**Unit Cost**	**Qty**	**Unit Cost**	**Qty**	**Unit Cost**	**Qty**	**Unit Cost**
1. Stocking Material										
Species 1										
a. Fry										
b. Fingerling										
Species 2										
a. Fry										
b. Fingerling										
2. Feeds (kg.)										
a. Commercial Feeds										
b. Trash Fish										
c. Bread Crumbs										
d. Others, specify[1]										
i.										
ii.										
iii.										

[1] Others such as feed additives (e.g., vitamins, minerals, enzymes, hormones, etc.)

Table 3: 1997 Labor Input Data for Daily/Weekly Laborers

Crop Number	1		2		3		4		5	
Inputs	Total Man-days	Total Cost	Total Man-days	Total Cost	Total Man-days	Total Cost	Total Man-days	Total Cost	Total Man-days	Total Cost
1. Stocking										
2. Growing										
3. Harvesting										
4. Other Activities[2]										
a.										
b.										
c.										
d.										
e.										

Table 4: 1997 Labor Input Data for Monthly/Yearly Laborers

Position	Duration of Employment	Monthly Salary	Bonuses/ Incentives	Percent Time Spent Per Crop				
				1	2	3	4	5
1								
2								
3								
4								
5								
6								

[2] Others such as feed additives (e.g., vitamins, minerals, enzymes, hormones, etc.)

Table 5: Fish Cage Structure and Equipment/Machinery (Since Start of Operations)

Item	Acquisition/ Construction Costs (Initial)	Average Yearly Maintenance Cost	Economic Life (Yrs.)
1. Farm House			
2. Cage Structure			
3. Net Structure			
4. Other Structures (i.e., sinkers, etc.)			
a.			
b.			
c.			
d.			
5. Equipment/ Machinery			
a. Harvesting Nets			
b. Bancas			
c. Others, specify			
i.			
ii.			
iii.			
iv.			

Table 6: Credit Information (Only for Fishcage Operation – For Loans Still Outstanding)

Year	Source	Amount (PhP)	Collateral	Yearly Interest Rate (%)	Purpose

Code:
1 - Fish Cage Development
2 - Purchase of Equipment
3 - Purchase of Inputs
4 - Others, specify

GENERAL QUESTIONS

1. Have you attained maximum production potential of your fishcage?
   _____ *Yes* _____ *No*

   If not, what constraints have you encountered?

   Crop 1: _____
   Crop 2: _____
   Crop 3: _____
   Crop 4: _____
   Crop 5: _____

2. In addition to the above, what other problems have you encountered in fishcage operations?

   _____
   _____

3. Has the productivity of your fishcage decreased over the years?
   _____ *Yes* _____ *No*

   a. If yes, to what factors would you attribute this?

   _____
   _____

   b. What measures have you taken to increase productivity?

   _____
   _____

4. Can you think of any negative impact of fishcage aquaculture?

   _____
   _____

5. Suppose the municipal government requires bidding of rights to construct and operate fishcages, how much are you willing to bid for your facility per year?

   _____

THANK YOU VERY MUCH FOR YOUR COOPERATION

To be filled up by the interviewer:

NAME OF INTERVIEWER : _____
DATE OF INTERVIEW : _____
TIME OF INTERVIEW : _____
LOCATION OF INTERVIEW: _____

COMMENTS OF INTERVIEWER:

_____
_____
_____

APPENDIX D.2

PAMB Resolution:
Paoay Lake National Park

Republic of the Philippines
Department of Environment and Natural Resources
PROTECTED AREA MANAGEMENT BOARD
Paoay Lake National Park
Paoay, Ilocos Norte

EXCERPTS FROM THE MINUTES OF THE REGULAR PAMB MEETING OF THE PAOAY LAKE NATIONAL PARK, PAOAY, ILOCOS NORTE HELD AT THE PARK'S PAVILION ON MARCH 24, 1999 AT 9:00 A.M.

PRESENT:

Isidro Naluna, Jr.	Presiding Officer, Division Chief, PAWD, DENR, Region I
Basilio Valdez	Brgy. Chairman, Sungadan
Ruben Gonzales	Brgy. Chairman, Nanguyudan
Jose Cabel	Brgy. Chairman, Suba
Rogelio Gallardo	Brgy. Chairman, Pasil
Roy Gonzales	DA, Ilocos Norte
Alberto Cabanos	NIA
Pedro Agcaoili, Jr.	PPDO
Gilbert Buduan	Sangguniang Bayan Member Paoay, Ilocos Norte
Anselmo Dulduluao	President, Baay Irrigators Association
Dolores Yadao	MAO, Paoay, Ilocos Norte
Charito Cariaga	President, Nagbacalan Laoan Weavers Cooperative
Nestor Hurtado	MPDO, Paoay, Ilocos Norte

ALSO PRESENT:

Benjamin S. Abucay	CENR Officer, Laoag City
Jose Q. Quigao	PASU, PLNP

PAMB RESOLUTION NO. 01-8-1999

A RESOLUTION ADOPTING THE RECOMMENDATIONS OF THE ENVIRONMENT AND NATURAL RESOURCES ACCOUNTING PROJECT (ENRAP) ON THE IMPOSITION OF APPROPRIATE FEES FOR FISH CULTURE WITHIN THE PAOAY LAKE.

WHEREAS, the ENRAP in its terminal report as presented to the PAMB on their regular meeting held on January 13, 1999, came-up with sets of recommendations on appropriate fees that could be imposed on Fish Culture Operation within the Paoay Lake;

WHEREAS, the PAMB recognizes the need to generate more revenues for sustained management considering that the government subsidy is very minimal and insufficient to support the overall operations of established protected areas;

WHEREAS, the adoption of said recommendations is in consonance with section 16 of the NIPAS Act, establishing the Integrated Protected Area Fund (IPAF) in each established protected area to sustain operation and maintenance activities;

WHEREFORE, on motion of Board Member DOLORES YADAO, duly seconded

RESOLVED, as it is hereby resolved, to adopt the schedule of fees recommended by the ENRAP consisting as follows:

CY 2000	-	P 250.00 per cage
CY 2001	-	P 300.00 per cage

RESOLVED FURTHER, that the PAMB will again convene to review and move for the adoption of appropriate fees that will be imposed by year 2002.

Unanimously approved this 24th day of March 1999.

I HEREBY CERTIFY to the correctness of the foregoing resolution.

Prepared by:

JOSE Q. QUIGAO
Park Superintendent

BASILIO VALDEZ
Member

RUBEN GONZALES
Member

JOSE CABEL
Member

ROGELIO GALLARDO
Member

ROY GONZALES
Member

ALBERTO CABANOS
Member

PEDRO AGCAOILI, JR.
Member

GILBERT BUDUAN
Member

ANSELMO DULDULAO
Member

DOLORES YADAO
Member

CHARITO CARIAGA
Member

NESTOR HURTADO
Member

Approved by:

[illegible] ALIPIA, [illegible]
Presiding Officer

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Appendix E

LECTURE NOTES ON STATISTICS[3]

1. INTRODUCTION

1.1 DEFINITION OF STATISTICS

Statistics - a set of numerical figures

Statistics - The science of collecting, organizing, analyzing and interpreting information.

1.2 USES OF STATISTICS

1. provides information
2. provides comparison
3. helps discern relationships
4. aids in decision making
5. explains action that have taken place
6. estimates unknown quantities
7. justifies a claim or assertion
8. predicts future outcomes

1.3 FIELDS OF STATISTICS

1. **Descriptive Statistics**

   - methods concerned with describing and summarizing sets of numerical data
   - construction and interpretation of graphs and tables
   - calculation of various descriptive measures such as averages, dispersion, percentiles

2. **Inferential Statistics**

   - methods which allow an inference or generalizations about the population based on the information provided by the sample

1.4 DEFINITION OF SOME TERMS

1. **Population**

   - collection of all individuals or items included in the scope of the study

[3] Prepared for the training by Josefina Almeda, Asst. Professor, University of the Philippines School of Statistics, Diliman, Quezon City.

2. **Sample**

- part of the population from where information is actually taken

3. **Parameter**

- a value that summarizes the characteristics of a population

4. **Statistics**

- a value that summarizes the characteristics of the sample

Example of a Statistic and Parameter:

A barrio has 94 households and the average expenditure per year is ₱ 22,000.00. Ten households are selected for investigation and the average expenditure per year of the households is ₱ 19,500.00. Determine the statistic and the parameter.

2. PRELIMINARY STEPS IN STATISTICAL INVESTIGATION:

1. Determine and define the statistical problem
2. Define the universe or population
3. Devise questions and make a schedule or questionnaire
4. Determine sampling design if enumeration is not to be a complete one
5. Prepare manual of instructions
6. Organize and train field personnel

2.1 THE STATISTICAL PROBLEM

- delimit the scope of the study
- identify the main source of the problem
- objective or purpose of the study must be well understood
- determine what data to gather and how

<u>3 Types of Statistical Problem</u>

1. ***Estimation***
2. ***Determining Relationships***
3. ***Prediction***

2.1.1 Variables

<u>*Variables*</u> - characteristics or attributes of persons or objects that can assume different values for different persons or objects.

2 Categories of Variable:

1. *Quantitative*

   - result from counting or measuring
   - "how much" or "how many"

   a)Discrete Variable

   - result of count or enumeration

   b) Continuous Variable

   - result of measurements

2. *Qualitative*

   - result from information that has been sorted into categories

2.1.2 Measurement Scales

Measurement -the process of determining the value or level, either qualitative or quantitative of a particular variable.

4 Levels of Measurement

1. *Nominal or Classificatory Level*

   - qualitative measurement
   - at least 2 categories
   - categories should be distinct, mutually exclusive and exhaustive

2. *Ordinal*

   - has the properties of nominal measurement but categories are ranked in order of their value on the property
   - refers to measurements where only the comparisons "greater" or "less" or "equal" between measurements are relevant
   - difference or distance between values measured cannot be determined

3. *Interval*

   - has the properties of nominal and ordinal measurements but can determine how many units' difference in the value of variable from one rank to the next
   - zero point is arbitrary

2. **Sample**

- part of the population from where information is actually taken

3. **Parameter**

- a value that summarizes the characteristics of a population

4. **Statistics**

- a value that summarizes the characteristics of the sample

Example of a Statistic and Parameter:

A barrio has 94 households and the average expenditure per year is ₱ 22,000.00. Ten households are selected for investigation and the average expenditure per year of the households is ₱ 19,500.00. Determine the statistic and the parameter.

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- determine what data to gather and how

<u>3 Types of Statistical Problem</u>

1. ***Estimation***
2. ***Determining Relationships***
3. ***Prediction***

2.1.1 Variables

<u>*Variables*</u> - characteristics or attributes of persons or objects that can assume different values for different persons or objects.

3. *Free-answer question/open-ended question*

- used to elicit the answers in the respondent 's own words

Example: How do you spend your salary?

Suggestions in Questionnaire Construction

a. State all questions briefly, clearly, and simply

b. Avoid asking leading questions

c. An objective reply is preferred to a subjective reply

d. Allowance should be made for approximate answers

e. Questions should be asked in correct sequence to permit a logical flow of thought

f. Confidential, sensitive and emotionally-loaded questions should be avoided or should be carefully worded

g. Limit questions to essential information

h. Make sure that difficult questions are understood

i. Avoid double-barreled questions

Some of the Problems and Their Possible Remedies

1. Respondents feels the interview is not legitimate but is a subterfuge either to sell him/her something or for some other commercial purpose such as conducting a credit check.

   Remedy : A well-written cover letter or introductory statement legitimizing the study.

2. Respondents feels that the information will be used against him or her or is an invasion of privacy.

   Remedy : Omit unnecessarily sensitive questions, assure respondents of anonymity

3. Respondents refuse to cooperate.

4. Respondent is an ethnic-minority member who says he or she is tried of "being a guinea pig" and refused to be interviewed suggesting that the investigator study rich people for a while.
5. Respondent is "sophisticated", gets many questionnaire and knows what the investigator wants to hear and where the reliability checks are located in the questionnaire.

Remedy for 3, 4 and 5 :

Survey situation has become a problem of major proportions with the proliferation of sampling. It helps to ensure that the same person will not be interviewed over and over again. However, if the respondent must be interviewed, the researcher must make a special appeal, assuring him or her that the interview is necessary and that no one else can be substituted.

6. Respondents answers "normatively" the way he or she thinks, he or she should answer, whether it is an honest answer or not.

   Remedy : Omit unnecessarily sensitive questions, assure respondents of anonymity.

7. Respondent is afraid that his/her responses will reveal lack of education or that he/she will appear stupid.

   Remedy : Emphasize that there are no right and wrong answers, assure anonymity.

8. Respondents says that his/her time is too valuable to waste on the study, that the study is not applicable to him/her. Her or she argues that it is not important that he/she be studied and that a relative or neighbor who has more free time should be substituted.

   Remedy : If the respondent must be interviewed, the researcher must make a special appeal, assuring him or her that the interview is necessary and that no one else can be substituted.

9. Respondent says he/she cannot answer because the question is too general or vague, or because he/she has never thought about the topic.

   Remedy : Use more specific probing questions to guide the answer

<u>3 Main Ways to Make Sure That A Respondent Is Not Asked a Question that does Not Apply To Him/Her</u>

1. Use 2 or more separate questionnaires for the respective populations

   Example : Male and Female questionnaire

2. Use of multiple wording, so that the respondent on interviewer can pick the appropriate phrase

   Example : Is your (husband, boyfriend) involved in illegal logging?

3. Skips to a question or contingency questions

   Example : If your answer is Yes, skip to question 5.

- A contingency question is a question whose relevance to the respondent is determined by his/her response to an earlier filter or screening question

Example : Have you ever used government funds for personal use? How long ago?

Question Order

1. Put sensitive questions and open-ended questions late in the questionnaire
2. Ask easy-to-answer questions first
3. Ask information needed for subsequent question first
4. Place questions in logical order
5. Avoid establishing a response set
6. Separate reliability check question pairs
7. Place scale items according to response required
8. Vary questions by length and type
9. Determine whether funnel technique is applicable

Cover Letter or Introductory Statement

- Introductory statement justifies the study to the respondent and often determines whether he/she cooperates or not

-cover letter is usually written on the letterhead of the organization conducting or sponsoring the survey in order to help legitimize the survey to the respondent

Pretesting

- final stage in questionnaire construction
- this is done to identify and correct flaws in the questionnaire
- should be conducted in the same manner as the final study

2.4 SAMPLING DESIGN

- depending on the nature of the problem, the size and extent of the population, the amount of money involved, and the time limit, collection of data may be conducted by **census** or by **sample survey**

- the design of the sample is made after the decision to conduct a sample survey has been reached

- the sample design must be such that the sample will yield maximum precision at a minimum cost or the desired precision at a given cost

2.4.1 Census vs. Sample Survey

Census
- requires complete enumeration
- a method of gathering the facts of interest on every unit of the population

Example: Census on population and housing

Sample Survey

- requires that only a few representative elements, called a sample, of the population be carefully selected and studied.

- a method of gathering data from a small but representative cross section of the population with the objective of using the derived measurements from the sample to characterize the population.

Advantages of Sampling over Census

1. More economical
2. Accomplished Faster
3. Wider Scope
4. More Accurate
5. Sometimes the only feasible Method

Basic Concepts and Definitions in Survey Sampling

Population - totality of items or elements one is interested with

Target Population - population about which information is desired

Sampled or Sampling Population - population from which a sample is actually taken as determined by the sampling frame

Sample - a subset of population which is used as basis in making statements or inference about the sampling population

Sampling frame - list of units or members in a sampling population. This member or unit is called a sampling unit

Remarks:

1. Ideally the target and the sampled populations should be the same, however, in practice it is rarely so.

2. Sampled population is determined by the sampling frame

3. Statements or inferences based on sample should only be applied to the sampled population.

Criteria in Selecting A Sample

1. The sample must be representative of the population
2. The estimates of the population characteristics obtained from the sample must be precise and their reliability measurable.

3. The cost of selecting the sample is small.

2.4.2 Probability versus Nonprobability Sampling Techniques

1. *Probability Sampling*

- is a method of selecting a sample wherein each unit in the population (for example each person) has a known non-zero probability of being included in the sample
- this probability is used in computing estimates of population characteristics
- specifies rules and procedures for both sample selection and estimation
- this is used if the main objective of the sample survey is making inferences about the characteristics of the population under study

2. *Nonprobability Sampling*

- probabilities of selection are not specified for the individual units of the population
- some units in the population may not be given a chance to be included in the sample
- no objective way of assessing the reliability of sample results

Methods Of Nonprobability Sampling

A. *Accidental/Convenience Sampling*

- whatever items or units that come to hand are used as the sample

B. *Judgement/Purposive Sampling*

- Sample is selected in accordance with an experts subjective judgment

C. *Quota Sampling*

- is a method in which the interviewer is required to interview a specified number of persons with a given set of characteristics

Cases Where Nonprobability Sampling is Useful

1. Only few are willing to be interviewed
2. Extreme difficulties in locating/identifying the subjects
3. Frame construction is infeasible.

How To Use The Table of Random Numbers: (For Methods of Probability Sampling)

1. Determine how many digits there are in the population size N. Assume that there are M digits in N.

2. Using any m columns of the table, read the random numbers down the column.

3. Choose the elements whose serial numbers are the same as those of the random number read.

4. Ignore the random numbers greater than N, ignore also those that have already been selected.

5. If the random number of the first m columns have been exhausted, continue reading the next m columns. Stop when n elements have been chosen.

TABLE OF RANDOM NUMBERS

	00-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49
00	54463	22662	65905	70639	79365	67382	29085	69831	47058	08186
01	15389	85205	18850	39226	42249	30669	96325	23248	60933	26927
02	85941	40756	82414	02015	13858	70030	16269	65978	01385	15349
03	61149	69440	11286	88218	58925	03638	52862	82733	38451	77455
04	05219	01619	10651	67079	92511	59888	04502	72095	83463	75577
05	41417	98326	87719	92294	46624	50948	64686	20002	97365	30976
06	28357	94070	20652	35774	16249	75019	21145	05217	47286	76305
07	17703	00015	10806	83091	91530	36466	39981	62481	49177	75779
08	40950	84820	29881	85966	62800	70326	84740	62660	77379	90279
09	02995	64157	68164	41180	10089	41757	78258	96488	88629	37231
10	96754	17676	55659	44105	47361	34833	08879	23930	53249	27083
11	34357	83040	53364	71726	45090	66334	60332	22554	90600	71113
12	06318	37403	49927	57215	50423	67372	63116	48888	21505	80182
13	62111	52820	07243	79931	89292	84767	85693	73947	22278	11551
14	47534	09243	87869	00544	23410	12740	02540	54440	32949	13491
15	98614	75993	84460	62846	59844	14922	48730	73443	48167	34770
16	24856	03648	44898	09351	98795	18644	39765	71058	90368	44104
17	96887	12479	80621	66223	86085	78285	02432	53342	42848	94770
18	90801	21472	42815	77408	37390	76786	52615	32141	30868	18106
19	55165	77312	83666	36020	28320	70219	81389	41943	47368	41067
20	75884	12952	84318	95108	72305	64620	91318	89672	45375	85436
21	16777	37116	58550	42958	21460	43910	01175	87894	81376	10620
22	46230	43877	80207	86877	89380	32992	91380	93164	98656	59337
23	49202	86892	46134	01432	94710	23474	20423	60137	60609	13119
24	81007	00333	39693	28039	10154	95425	39220	19774	31782	49037
25	68089	01122	51111	72373	06902	74373	96199	97017	42173	21546
26	20411	67081	89950	16944	95054	87687	98693	87236	77054	33848
27	58212	13160	06468	15718	52627	76999	05999	58680	96739	63700
28	70577	42866	24969	61210	76046	67699	42054	12696	93758	03283
29	94522	74359	71659	62038	79543	79169	44741	05497	39038	13163
30	47626	86819	85651	98678	17401	03252	99547	32404	17018	62830
31	16051	33783	57194	16752	54450	19031	58530	47629	54132	60631
32	08244	27647	33851	44705	94211	46716	11738	95374	72655	02445
33	49597	04392	09419	89964	51211	04894	72882	17805	21806	83864
34	97155	13428	40293	09985	58434	01412	69124	82771	59059	82859
35	98409	66162	95763	47420	20792	61527	20441	39435	11859	41567
36	45476	84882	65109	96957	25930	66790	65706	61203	53634	22557
37	89300	69700	50731	30329	11658	23166	05400	66669	48708	03887
38	50051	95137	91631	63318	91428	12274	28816	68091	71710	33258
39	31753	85178	31310	89642	98364	02306	24617	09609	83942	22716
40	79152	55829	77250	80180	59593	18760	69942	77448	30078	48805
41	44560	38750	83635	56540	64900	42912	13953	79149	10710	68618
42	68329	83378	63369	71381	39584	05615	42451	64559	97501	65747
43	46939	38689	58625	08342	38459	85863	20781	09284	26333	91777
44	83544	06141	15707	96256	23068	13782	08467	89469	93842	55349

Methods Of Probability Sampling

A. Random Sampling

A.1 *Description of the Design*

Random sampling is the process of selecting a sample, giving each sampling unit an equal chance of being included in the sample. A random sample of n observations is a sample that is chosen in such a way that each subset of n observations of the population has the same chance of being selected.

Random sampling may be with replacement or without replacement. The former is also referred to as unrestricted random sampling and the latter as restricted random sampling, or merely simple random sampling. In random sampling with replacement, a chosen element is always replaced before the next selection is made, so that an element may be chosen more than once.

A.2 *Sample Selection Procedure*

Step 1 : Make a list of the sampling units and number them from 1 to N (N = population size).

Step 2 : Select n (distinct) random numbers (n = sample size) ranging from 1 to N, using the table of randomly assorted digits. The sample consists of the units corresponding to the selected numbers.

A.3 *Advantages and Disadvantages*

Advantages

1. The theory involved is much easier to understand than the theory behind other sampling designs; estimation methods are simple and easy.

Disadvantages

1. The sample chosen may be widely spread, thus entailing high transportation costs.
2. A population frame, or list, is needed.
3. The sample chosen may not be truly typical of the population if the population is heterogeneous with respect to the characteristic under study.

B. Stratified Sampling

B.1 *Description of the Design*

There are cases wherein the population is made up of groups of items which are heterogeneous with respect to the characteristic under study. In such a situation the population should be divided, or stratified, into more or less homogenous sub-populations or strata before sampling is done.

Stratified random sampling then consists of selecting simple random sample from each of the sub-population into which the population has been divided.

B.2 *Sample Selection Procedure*

Step 1 : Stratify the population into strata so that each stratum will consist of more or less homogenous units.

Step 2 : After the population has been stratified, a (random) sample can be selected from each stratum.

B.3 *Advantages and Disadvantages*

Advantages

1. Stratification may bring about a gain in precision of the estimates of characteristics of the population.
2. It allows for more comprehensive data analysis since information is provided for each stratum.
3. It is administratively convenient.

Disadvantages

1. A listing of the population from stratum to stratum is needed.
2. The stratification of the population may mean the need for additional prior information about the population and its sub-populations.

C. Systematic Sampling

C.1 *Description of the Design*

Systematic sampling with a "random start" is a method of selecting a sample by taking every kth unit from an ordered population, the first unit being selected at random. Here k is called the sampling interval: the reciprocal 1/k is the sampling fraction.

C.2 *Sample Selection Procedure*

Method A

Step 1 : number the units of the population consecutively from 1 to N.

Step 2 : Determine k, the sampling interval, by the formula:

$$K = \frac{N}{n} \left(\frac{\text{population size}}{\text{sample size}} \right)$$

Step 3 : Use a table of random numbers to choose r; where $1 \leq r \leq k$. The unit corresponding to r is the first unit of the sample.

Step 4 : The other units of the sample are r+k, r + 2k, r + 3k,...

Method B

Step 1 and 2 are the same as those in Method A.

Step 3 : Use a table of random numbers to choose r, where $1 \leq r \leq N$. The unit corresponding to r is the first unit of the sample.

Step 4 : Consider the list of units of the population as a circular list, i.e., the last unit in the list is followed by the first. The other units chosen are r + k, r + 2k, r + 3k . . .

C.3 *Advantages and Disadvantages*

Advantages

1. Drawing of the sample is administratively easy.
2. It is possible to select a sample in the field without a sampling frame.
3. The sample is spread evenly over the population.
4. It is likely to give more precise estimates than simple random sampling.

Disadvantages

1. If periodic regularities are found in the list, a systematic sample may consist only of similar types.

D. Cluster Sampling

D.1 *Description of the Design*

Cluster sampling is a method of selecting a sample of distinct groups, or clusters, of smaller units called **elements.** The sample clusters may be chosen by random sampling or by systematic sampling with a random start. Similar to strata in stratified samplings, clusters are mutually exclusive sub-populations which together compromise the entire population. Unlike strata, however, clusters are preferably formed with heterogeneous, rather than homogeneous elements so that each cluster will be typical of the population.

The number of elements M in a cluster is called the size of the cluster, and the number of clusters N in the population is called the size of the population of clusters. Clusters may be of equal or unequal size.

D.2 *Sample Selection Procedure*

Step 1 : List the clusters and number them from 1 to N.

Step 2 : Using a table of random numbers, obtain n numbers. The clusters corresponding to the selected number form the sample of clusters.

Step 3 : Observe all the elements in each sample cluster.

D.3 *Advantaqes and Disadvantages*

Advantages

1. A population list of elements is not needed; only a population list of clusters is required. Listing cost is reduced.
2. Transportation cost is reduced.

Disadvantages

1. The costs and problems of statistical analysis are greater.
2. Estimation procedures are difficult.

E. Multistage Sampling

E.1 *Description of the Design*

In multistage sampling the selection of the sample is accomplished in two or more steps. The population is first divided into a number of first stage primary units from which a sample is drawn. Within the sampled first-stage units, a sample of second stage or secondary units is drawn. If desired, one might add further stages,

dividing the population into a hierarchy of sampling units corresponding to the different sampling stages.

E.2 *Sample-Selection Procedure (for two stage sampling)*

Step 1 : Number the first-stage units consecutively from 1 to N in the frame.

Step 2 : Using a table of random numbers, selecting numbers, then choose the first-stage units outnumbered correspondingly.

Step 3 : Number the second-stage units consecutively from 1 to M in the frame for each of the n selected first-stage units.

Step 4 : Using a table of random numbers, obtain n sets of m random numbers each (n & m).

Step 5 : In each of the n first-stage units, select the m second-stage units corresponding to the selected numbers.

E.3 *Advantages and Disadvantages*

Advantages

1. Listing cost is reduced.
2. Transportation cost is reduced.

Disadvantages

1. Estimation procedures are difficult, especially when the first-stage units are not of the same size.

2. The sampling procedure entails much planning before selection is done.

2.5 PREPARATION OF THE MANUAL OF INSTRUCTIONS

- manual of instructions should be concise and complete

- it contains the instructions and directions that will be observed and followed out only by the field personnel in soliciting the desired statistical information but also by the respondents in answering the questions

- contains the definition of important terms used in the schedule and codes that are assigned to possible responses

- serves as a reference to be consulted by both enumerators and supervisors as they come to grip with various problems in the field

2.6 ORGANIZATION AND TRAINING OF FIELD PERSONNEL

- The field force consists of the data gatherers/enumerators and the supervisors
- The work of enumerators should be coordinated and closely supervised by the supervisor
- The survey workers should be made to undergo special training before they are sent out to the field
- The enumerators should be made proficient on how to conduct an interview and how to accomplish the interview schedules
- The supervisors should be taught how to edit the schedules and supervise the enumerators in the field

3. MAIN STEPS IN STATISTICAL INVESTIGATION

1. Collection of Data
2. Presentation of Data
3. Analysis of Data
4. Interpretation of Data

3.1 COLLECTION OF DATA

3.1.1 Kinds of Statistical Data

1. **<u>Primary and Secondary Source of Data</u>**

Primary Source of Data

- are those which are obtained and/or published by the data collector themselves
- include business firms or organizations, government and private agencies, and individuals or family groups from whom numerical information not otherwise available can be taken
- data originating from primary sources are classified as primary data.

Secondary Source of Data

- are those obtained from published or unpublished reports by people/organization other than the original collectors
- data coming from the secondary sources are classified as secondary data

Advantages of Primary over Secondary Data

a. The primary data frequently gives detailed definitions of terms and statistical units used in the survey.

b. The primary data usually includes a copy of the schedule and a description of the sampling procedure.

c. The primary data are usually broken down into finer classifications.

2. **Internal and External Data**

Internal Data

- data which are by-products of the firm's administrative and management functions

External Data

- data supplied from outside or those that are not produced by the company's own operation

- such data originate from government agencies, private entities or individuals

3.1.2 Methods of Collecting Data

1. **Survey Method**

- information is obtained by asking people questions either by personal interviews or by mailed questionnaires

QUESTIONNAIRE	*PERSONAL INTERVIEW*
a.Obtained information is limited to subjects' written answers to the pre-arranged questions	a. Obtained information is ample since the inter-viewer and the interviewee are both present
b.It is often mailed or handed to the informant with minimum explanation	b. It is adapted in person-to person or person-to-group situations wherein questions can be clarified and therefore better understood
c.It can be administered to a large group simultaneously	c. It is administered to a person or group one at a time
d. Informers feel freer to express views and are less pressured to answer immediately	d. Informers are more cautious for fear of disapproval or unfavorable consequences

e .It is more appropriate for obtaining objective information	e. It is more appropriate for revealing information about complex, emotionally ladden topics of for probing sentiments underlying an expressed opinion
f .It usually has high proportion of non-response	f. A relatively high proportion of usable returns is expected
g. It is relatively simple and inexpensive method of gathering facts	g. It is a relatively expensive method of gathering facts

Remarks for Questionnaire Method

The prepared questionnaire is usually accompanied by the following:

1. Clear and concise directions and if necessary, by pictures or sketches to illustrate the investigator's points;
2. Courteous letter of explanation;
3. Self-addressed, stamped envelop

2. **Registration Method**

- informant supplies the information often in compliance with certain laws, ordinances, or standard practices
- practical and inexpensive method of getting the facts

3. **Observation Method**

- makes possible the recording of behavior but only at the time of occurrence

4. **Use of Existing Records**

Sources of Data:

a. ***Documentary Sources***

- published or written reports, periodicals, unpublished documents, etc.

b. ***Field Sources***

- experts whom we can ask, personal or direct

5. **Experimental Method**

- a method designed for collecting data under controlled conditions
- an experiment is in operation when there is actual human interference with the conditions that determine the phenomenon under study

3.2 PROCESSING OF DATA

- should be done in a manner that will ensure utmost accuracy

Steps in Processing the Data

3.2.1 Editing the returns

- checking for the accuracy and completeness of returns
- the work consists mainly of the following activities:
  - *(i) Deciphering "unreadable" writing*
  - *(ii) Examining entries for completeness*
  - *(iii) Checking of entries for errors and inconsistencies*

3.2.2 Preparing The Schedule for Tabulation

- steps preceding the actual tabulation of data:

Classification

- separating a large mass of inidividual attirbutes, observations, or computed figures into groups or classes on the basis of some similarity

4 Types of Classification

1. **Qualitative**

- classification systems based on differences in kind

2. **Quantitative**

- classifications based on certain arbitrary determined magnitude

3. **Chronological**

- data arranged according to time interval
- time intervals may be in terms of hours, days, months, years and so on.

4. <u>Geographical</u>

- separation of numerical data into groups according to different geographical divisions

- geographical divisions may be by continent, by country, by province, by city or town, etc.

<u>Requirements of Classification</u>

a. Classes should not overlap
b. Classes should account for every case
c. Classes should be appropriate for study

3.2.3 Coding

- process of representing with symbols the observations or the information entered in the schedules so as to facilitate tabulation

- for open-ended questions, codes are assigned after the data is acquired

1. **Precoding**

   - refers to coding of responses when the questionnaire is being written

   - limited chiefly to questions whose answer categories are known in advance

2. **Postcoding**

   - refers to coding of responses after the questionnaires have been answered by the respondents

   - allows the coder to ascertain which answers are actually given by respondents before beginning coding

3. **Code-Book Construction**

   - defines the meaning of the numerical code and gives the location of the variable on the computer

   - consists of establishing classifications for the responses made on the schedule, recording the entries on a tally sheet, sorting and counting.

4. Coding Non-response

- assigns a numerical code for nonresponse
- codes may also need to be assigned for "don't know" responses and for "not applicable" responses

Remarks : The standard procedure for coding is to split the task of constructing the datafile into 2 separate operations:

1. reading the questionnaire and codebook and transferring the correct numerical code for each question into a sheet of computer paper and
2. entering the data into the computer

3.2.4 Computing

3.2.5 Tabulation of Data

- when all schedules have been properly edited, the next step is to tabulate
- to summarize important data in a way that can be easily understood and ready to be used as the need arises
- final stage of the work of collecting data

<u>2 Types of Tabulation</u>

1. *Hand Tabulation*

- used in investigation of limited size
- facts on a schedule are tallied on a tally sheet
- totals shown on tally sheets are transcribed on a table

2. *Mechanical Tabulation*

- machine tabulation can be used economically if

(a) a large number of schedules are to be tabulated

(b) different table forms are to be prepared

(c) there are several entries on the schedule

4. PRESENTATION OF DATA

4.1 PRESENTATION OF DATA

4.1.1 Textual Presentation

- Summarizing the data in paragraph form giving emphasis on significant figures and comparisons

- directs the readers attention to some data which need particular emphasis as well as to some important comparisons and to supplement with narrative account a table or a chart

4.1.2 Tabular Presentation

- is a means of arranging and presenting data in rows and columns so that the reader may easily see, compare and analyze them

A. ***Characteristics of a Good Table***

1. Simple in design
2. Logical in arrangement
3. Easy to read

B. ***Forms of Tabular Presentation***

1. *Leader Work*

- a single listing without title, boxhead or rules
- presents only one or two columns of figures or indicates relationship between two sets of facts or categories
- cannot stand alone
- used largely for illustrative purposes within a text
- introduced by a text statement ending in a colon

2. *Text Tabulation*

- its form is different from the leader work in that, it has the form of a table except that the table number and title are omitted

- cannot stand alone, must be introduced by an explanatory statement ending in a colon

3. *Formal Statistical Table*

- most finished form of tabular presentation

- distinguished by the presence of a table and number, a formal boxhead, and by the use of tabular rules

- use of headnotes, phrasing and tabular arrangement make the table independent of text explanation and discussion

- designed to be as self-sufficient as possible

C. *Structural Parts of a For mal Table*

1. *Heading*

- the portion of the table appearing above the body; comprises the table number, title, and headnote

a. *Table Number*

- an indicator of the relative position of the table within a series

b. *Title*

- a brief statement indicating the nature, classification, and the time reference of the data presented, and the political division or physical area or plant to which the data refer

- serves as a catalog of content and a guide for ready reference

Guidelines in writing the title:

1. it should be brief, clear and in topic rather than in sentence form (should immediately answer the questions what? when? how? where?)

2. give in the title (1) the subject followed by a colon, (2) the data in the order in which they appear in the table (3) classification of the data (by kinds, markets, etc.) and (4) time period.

3. capitalize only the beginning word and proper nouns. Do not underline the title or end it in a period. Abbreviate months if followed by day, but not months alone.

4. center a title of only one line; likewise center a title of two lines, but make the first line much longer, dividing it at a logical place.

5. begin with the word "Table"; the proper arabic number, a period, and a dash.

6. leave one space between the title and the top cross rule of the table, or if there is a headnote, between the title and the headnote, the headnote itself rests directly on the top cross rule of the table.

7. all cardinal numbers in the title, as elsewhere in the table, should be expressed in figures.

8. if a table covers more than one page, add "...continued" at the end of the title on all succeeding pages. Use the abbreviation "con". to avoid an overrun.

c. *Headnotes*

- headnotes express the unit of quantity if the unit is the same for all the figures in the table or if the unit is the same for a large, easily identified group of figures

- enclosed in parenthesis immediately on the top cross rule of the table, and space below the title

2. <u>*Box Heads*</u>

- the portion of the table in which are located the individual column heads or captions describing the data in each vertical row or column; the stubhead is physically a part of it

a. *Column head or Caption*

- the basic unit of the boxhead; the descriptive title for all the data appearing in the given column at the top of which the head appear

b. *Spanner head*

- a classifying, a descriptive, or qualifying caption spreading across one or more column heads, or across one or more lower spanners

c. *Panel*

- a distinctive segment of the boxhead consisting of a group or related column heads with their attendant spanners; a self-contained unit

3. *Stub*

- portion at the left devoted to a listing of line or row captions or descriptions, together with needed classifying and qualifying centered heads and subheads

a. *Stubhead*

- it describes the stub listing as a whole

b. *Center head or Subhead*

- classifying, descriptive, or qualifying statement applying to all subheads and line captions below it until the next center head of coordinate or superior classification is reached

c. *Line Caption*

- basic unit of the stub; the descriptive title of the data appearing on the given line

d. *Block*

- a distinctive segment of the stub consisting of a group of related line captions with their attendant heads and subheads; usually a self-contained unit

4. *Field*

- the portion of the table extending from the bottom rule of the boxhead to the bottom rule of the table, and to the right of the stub

a. *Cell*

- basic unit of tabular presentation, intersection of any line caption with any column head

b. *Line*

- a horizontal row of cells with a common classification, extending across from a descriptive entry or line caption in the stub

c. *Column*

- a vertical row of cells with a common classification extending down from a column head

5. *Footnote*

- a statement explaining the information presented in, or omitted from, a specific cell, column, line or group of columns or lines
- inserted at the foot or bottom of the table; brief and always end with a period
- usually indented while succeeding lines are flush with the left margin of the table
- never attached to a heading

6. *Source Note*

- an exact citation of the source of data presented in the table
- presented by the word "source" followed by a colon

(headnote)

panel

Stubhead	*Spanner head*			*Spanner Head*			*The Column*
	Column Head	*Column Head*	*Column Head*	*Column Head*	*Column Head*	*Column Head*	*Both Sexes*
CENTER HEAD							
Total line caption				Cell			100.0
Line caption				Cell			51.0
Line caption				Cell			48.8
Line caption				Cell			2.2
Line caption	Cell	Cell	Cell	Cell	Cell	Cell	49.0
CENTER HEAD							
Total line caption				Cell			100.0
Line caption				Cell			47.4
Line caption				Cell			43.7
Line caption				Cell			3.7
Line caption				Cell			52.6

block

line

[1]Footnote
Source note

Figure 1. – The Formal and its Major Parts Table
No. – TITLE OF TABLE

Example:

heading

TABLE 1. - Household Population 10 Years Old And Over By Employment Status, By Sex, Urban And Rural For The Philippines: August 1975

(In Thousands)

Employment status and area	*Total*			*Percent of total persons 10 years old and over*		
	Both sexes	*Male*	*Female*	*Both sexes*	*Male*	*Female*
PHILIPPINES						
Total population, 10 years old and over				100.0		
In the labor force				51.0		
Employed				48.8		
Totally employed				2.2		
Not in the labor force[1]	14,591	4,697	9,894	49.0	32.0	65.7
URBAN						
Total population, 10 years old and over				100.0		
In the labor force				47.4		
Employed				43.7		
Totally employed				3.7		
Not in the labor force[1]				52.6		
RURAL						
Total population, 10 years old and over				100.0		
In the labor force				52.8		
Employed				51.4		
Totally employed				1.4		
Not in the labor force[1]				47.2		

boxhead

stub

field

[1] Includes labor force status and reported.
Source: National Census and Statistics Office.

Remarks:

1. All totals shown on a table should be carefully checked, for any inaccuracy is likely to discredit the table.

2. Totals are generally indicated at the foot of the column and at the right of the rows but can be reversed.

3. For separate classification, sub-totals may be used and a general total for all cases combined.

4. Average are usually placed at the bottom or to the right of the numbers averaged.

5. When both totals and averages appear in the same table, it is customary to place the averages after the totals from which they were computed.

4.1.3 Graphical Presentation

- presenting numerical values or relationships in pictorial form
- most effective and most convincing way to present data results

Characteristics of a GOOD chart

1. Accurate
2. Simple
3. Clear
4. Good Appearance
5. Well-designed structure

Types of statistical charts

A. *Line Diagram or Curve*

- oldest, simplest, most familiar and most widely used

- the points are usually plotted with reference to arithmetic scale

- the horizontal and vertical dimensions should bear a reasonable proportion to each other

When to Use

- When the emphasis is on the movement rather than the actual amount

- When several series are compared on the same chart

- When data cover a long period of time

- When a frequency distribution is presented by two or more curves

- When data estimates or forecasts are to be shown

B. *Bar and Column Charts*

- most commonly used to show comparison of categories as chronological comparisons

- use horizontal arrangement of the individual bars (Bar Charts) when comparison of categories is being made

- use vertical arrangement of the individual bars (Column Charts) when chronological comparisons is being made

C. *Pie Chart/Circle Graph*

- diagram of circular shape cut into subdivisions; each size of every section is indicative of the proportion of each component

- generally for a categorical or nominal data particularly proportions or percentage

- aims to show percent distribution of a whole into its component parts

- a maximum of 5 or 6 sectors would be acceptable but 5 or less would be preferable

D. *Pictogram/Pictograph*

- horizontal bar chart using pictorial symbols to indicate the quantity

- chief purpose is to catch the readers attention and to convey in a vivid manner basic numerical facts

- it does not attempt to show details; it simply tries to facilitate comparison of approximate quantities

E. *Statistical Maps*

- when statistical data need to be related to geographical areas

1. *Shaded Map*

   - shading patterns should run progressively from dark to light

   - darkest shade usually denotes the highest magnitude with the shade progressively becoming lighter with decreasing magnitude

2. *Dot Map*

   - can either be a dot location or dot density

     a. *dot location*
     e.g. location of Red Cross units in M. M.

     b. *dot density*
     e.g. no. of elem. schools in Region IV

Points to Observe in Graph Making

a. The general arrangement of the graph must be from left to right, and from bottom to top.

b. The zero-base line should be indicated on the chart whenever practicable.

c. If for some reasons part of the scale has to be omitted, show this omission by a scale break.

d. Chart labels should be horizontal and large enough to be easily read. When labels cannot be written horizontally, they should be written vertically from bottom to top, never from top to bottom.

e. Horizontal scales should be read from left to right; vertical scales from bottom to top.

f. The title should be clear and complete. It should show at least what the graph is about, the time period covered, and the geographical area involved.

g. The footnote, if any, should be placed below and to the left of the graph.

h. The source of the data should be given. This fact is indicated just below the chart at the lower left, immediately below the footnote of any.

5. ORGANIZATION OF DATA

5.1 VARIABLES AND RAW DATA

Variable - a quantity which varies form one observation to another within a given domain and under a given set of conditions

- usually devoted by the last letter of the alphabet like X, Y and Z.

Constant - a quantity which does not vary under a given situation

Raw Data - the set of data in its original form.

Example : Number of Tourist Arrivals at Hundred Islands National Park for 40 days (hypothetical)

70	64	99	55	64	89	87	65
62	38	67	70	60	69	78	39
75	36	71	51	99	68	95	86
57	53	47	50	55	81	80	89
51	36	63	66	85	79	83	70

5.2 ARRAY

Definition : an arrangement of the observations according to their magnitude either in ascending or descending order.

Example:

36	51	56	64	68	71	81	89
38	51	57	64	69	75	83	95
39	53	64	65	70	78	85	98
47	55	62	66	70	79	86	99
50	55	63	67	70	80	87	99

Advantages of the Array

a. easier to detect the smallest and largest values
b. easy to infer the concentration of the data values

Disadvantages of the Array

a. becomes inconvenient as the data becomes voluminous
b. does not picture clearly the distribution of the observations for large masses of data

5.3 FREQUENCY DISTRIBUTION TABLE

Frequency Distribution
- is the method of organizing and summarizing statistical data in tabular form.
- used to reveal the pattern of variation which characterized a given data.

Definitions

1. **Class Frequency**
   - the number of observations falling under a class
2. **Class Interval**
   - the numbers defining a class
3. **Class Limits**
   - the end number which define a class or lowest and highest values which can belong to a class
   - should be a set of easy to read nos. that do not overlap so that each variate can be classified in one and only one class
   - Class interval without an upper class limit (UCL) or a lower class limit (LCL) is an Open Class Interval.
4. **Class Boundaries**
   - true class limits
   - boundaries of adjacent classes overlap
   - halfway between the upper limit of a class and the lower limit of the next higher class
   - are artificial points and no recorded value is expected to fall exactly on these points.
5. **Class Size**
   - also called the size of Class Interval
   - difference between two successive upper/lower class boundaries of difference between two successive UCL or LCL
6. **Class Mark or Class Midpoint**
   - midpoint of a class interval
   - point halfway between the class limit or class boundaries

7. **Modal Class**

- class wherein most of the observations are found

Steps in Constructing a Frequency Distribution

1. Determine the adequate number of classes.

   - no standard rule; not too many so as to avoid many empty classes and not too few to avoid lumping observations and losing too much information

   - the number of classes should not be smaller than 6 but not greater than 16

   Sturges' rule : guide in the determination of the no. of classes

   $$K = 1 + 3.32 \log n$$

   where K = number of classes suggested for use
   n = number of observation
   log is the ordinary Briggsien logarithian (base 16)

   - observations should fall into one and only one class interval (mutually exclusive)

2. Determine the range R = highest value - lowest value.

3. Divide the range R by the number of classes (K) to estimate the approximate class size C = R/K.

4. Determine C = class size by rounding-off C to the nearest odd number depending upon the number of digits of the observation.

5. List the classes starting from the lowest class limit. Start with a class whose lower limit is either equal to or little less than the lowest observed value.

6. Determine the class marks of each interval by averaging the class limits or the class boundaries.

7. Tally all the observed values in each class.

8. Sum the frequency column and check against the total number of observations

Table 5.3.a. The Frequency Distribution Table of Number of Tourist Arrivals at Hundred Islands National Park for 40 days

Class Limits	Class Boundaries	Class Marks	Frequency
30 - 39	29.5 - 39.5	34.5	3
40 - 49	39.5 - 49.5	44.5	1
50 - 59	49.5 - 59.5	54.5	8
60 - 69	59.5 - 69.5	64.5	10
70 - 79	69.5 - 79.5	74.5	7
80 - 89	79.5 - 89.5	84.5	7
90 - 99	89.5 - 99.5	94.5	4
			40

Example of Too Few Classes:

Table 5.3b - Classification of Data in Table 4.1

Class Limits	Frequency
30 - 69	22
70 - 109	18
	40

Example of Too Many Classes:

Table 5.3c - Classification of Data in Table 4.1 into 14 classes

Class Limits	Frequency
30 - 34	1
35 - 39	2
40 - 49	0
45 - 49	1
50 - 54	4
55 - 59	4
60 - 64	5
65 - 69	5
70 - 74	4
75 - 79	3
80 - 84	3
85 - 89	4
90 - 94	0
95 - 99	4
	40

5.3.1 Relative Frequency Distribution

In addition to the frequency of a class, we are often interested in the relative frequency of a class expressed as a decimal.

Definition

$$\textit{Relative Frequency} = \frac{\text{frequency of the class}}{\text{total number of observation}}$$

5.3.2 Relative Frequency Percentage Distribution

In addition to the frequency of a class, we are often interested in the percentage of a class.

Definition

$$\textit{Relative Frequency Percentage} = \frac{\text{frequency of the class}}{\text{total number of observation}} \times 100\%$$

Example: Relative frequency distribution and Relative frequency Percentage for the Number of Tourist Arrivals at Hundred Islands National Park for 40 days

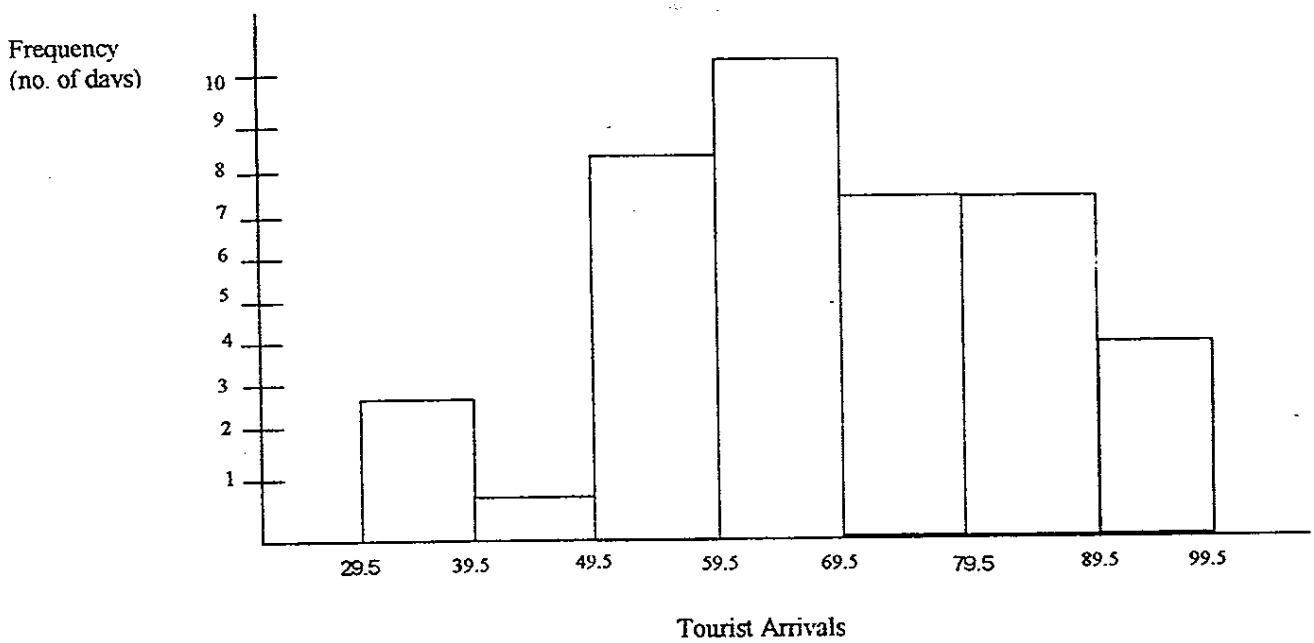
Days to Maturity	Relative Frequency	Percentage Frequency
30 - 39	3/40 = 0.075	7.5
40 - 48	1/40 = 0.025	2.5
50 – 59	8/ 40 = 0.200	20.0
60 – 69	10/40 = 0.250	25.0
70 – 79	7/40 = 0.175	17.5
80 – 89	7/40 = 0.175	17.5
90 – 99	4/40 = 0.100	10.0
	1.000	100.0

5.3.3 Graphical Presentation of the Frequency Distribution Table

1. *FREQUENCY HISTOGRAM*

   - a graph that display the classes on the horizontal axis and the frequencies of the classes on the vertical axis. The frequency of each class is represented by a vertical bar whose height is equal to the frequency of the class and whose width represent those intervals

Figure 5.3.a *Frequency Histogram For Tourist Arrivals Data*

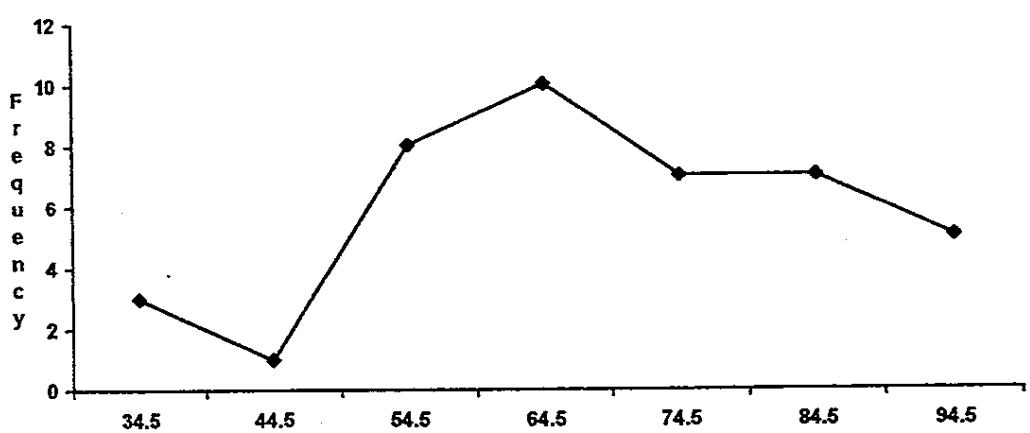


2. *FREQUENCY POLYGON*

- constructed by plotting the frequencies at the midpoint of the classes and connecting the plotted points by means of straight lines.
- to close the polygon, an additional class is added at both ends and the ends of the line are brought down to the horizontal axis at the midpoints of the additional classes.

Example:

Figure 5.3.b Frequency Polygon for Tourist Arrivals Data



Advantages of the Frequency Histogram:

1. Area under the histogram represents exact number of observations.
2. Represents distribution at one glance
3. Easier to see individual classes.

Advantages of the Frequency Polygon:

1. Lends itself easily to comparison of data.
2. Lends itself easily to smoothing techniques.

6. MEASURES OF CENTRAL TENDENCY

Measure of Tendency - an index of the central location of a distribution

Average - a value which is the most representative of the distribution

- a typical value
- point of concentration of the distribution

Uses of the Average:

1. provides a summary of the data
2. provides a common denominator in comparing two groups of data

6.1 MEAN

For Ungrouped Data:

- most common average
- sum of all values divided by the number of observations or

$$\text{mean} = \frac{\sum_{i=1}^{n} X_i}{n}$$

where X is the variable of interest
n is the no. of observations

Example: 1. Five foresters reported the number of illegal loggers they have apprehended as follows:

1, 2, 5, 5, 7

The mean number of illegal loggers apprehended is 4.2

2. The change in fixed assets of 10 companies are as follows (in percent)

+1.2, -1.5, +3.4, +2.1, -2.7
+4.1, -3.3, +3.8, +1.9, -3.6

The mean percent change in fixed assets of the companies is 0.54

For Grouped Data: multiply the class marks and the frequencies, then get the sum and divide it by the number of observations

Example: The following distribution represents the age of the respondents (in years)

Class Boundary	Class Mark	Number of Respondents(f)	Product
20-30	25	10	250
30-40	35	12	420
40-50	45	23	1035
50-60	55	17	935
60-70	65	15	975
	total	77	3615

Mean Age = 3615 / 77 = 46.94805 years

Characteristics of the Mean:

1. It is widely understood
2. It always exists
3. It is always unique
4. It is greatly influenced by extreme values
5. The value of the arithmetic mean from sample to sample is relatively more stable than that of the other measure of central location.

Use the Mean:

1. when the distribution is not badly skewed
2. when the effect of all values are given equal importance
3. when other statistics will be computed later

Weighted Average

- used if weights are given to the observation

$$\text{Weighted Average} = \frac{\sum_{i=1}^{n} X_i W_i}{\square_{I=1}^{n} W_i}$$

where X is the variable of interest
w is the weight
n is the number of observations

6.2 MEDIAN - a value that divides the distribution into two equal parts
- one-half of the frequencies fall below and one-half fall above
- defined as the value of the middle item arranged according to magnitude

For Ungrouped Data:

1. If the number of observations is odd, the median is the middle value in an array

2. If the number of observations is even, the median is the average of the two middle values in an array

Examples: 1. The following are the total receipts of 7 mining companies (in million pesos)

1.2, 4.5, 6.5, 7.2, 10.4, 12.5, 50.6

The median is 7.2

2. The following are the number of years of operation of 8 mining companies:

8, 10, 10, 11, 16, 17, 17, 18

The median is (11+16) / 2 = 13.5

For Grouped Data: Median = $L_{Md} + c \left(\frac{n/2 - F_{Md-1}}{f_{Md}} \right)$

where L_{Md} is the lower class boundary of the median class
c is the class size
n is the number of observations

F_{Md-1} is the less than cumulative frequency preceding the median class
f_{Md} is the frequency of the median class

How to Get the Median Class

1. Construct the less than cumulative frequency column.
2. Get $\frac{n}{2}$
3. The class interval whose value in the less than cumulative frequency column is greater than or equal $\frac{n}{2}$ the first time is the Median class.

Example: Age distribution of respondent in years

Class Boundary	No. of Respondents (f)	<CF	
20 - 30	10	10	
30 - 40	12	22	
40 - 50	23	45	Median Class
50 - 60	17	62	
60 - 70	15	77	
	77		

$$\text{Median Age} = 40 + 10\left(\frac{\frac{77}{2} - 22}{23}\right)$$

$$= 47.17 \text{ years}$$

Characteristics of the Median:

1. a positional measure
2. not influenced by extreme values

Use the median:

1. when the exact midpoint of the distribution is desired
2. when there are extreme observations
3. when the frequency distribution has open-ended class intervals

6.3 MODE- the observation which occurs most
- may have several modes
- if there are two modes, we call it bimodal

For Ungrouped data : Mode is the most frequent observation in a set of data

Examples: 1. The following are waistlines of 10 males:

25, 26, 29, 29, 30, 30, 30, 31, 34, 36

The modal waistline is 30

2. The following are the shoe sizes of 15 women:

5, 5, 5.5, 6, 6, 6.5, 7, 7, 7, 7, 7.5, 7.5, 7.5, 8, 8.5

The modal size is 7

For Grouped Data:

$$\text{Mode} = L_{Mo} + c \left(\frac{f_{Mo} - f_1}{2 f_1 - f_2 - f_{mo}} \right)$$

where L_{Mo} is the lower class boundary of modal class
c is the class size
f_{Mo} is the frequency of the modal class
f_1 is the frequency proceding the modal class
f_2 is the frequency of the class succeeding the modal class

Modal Class - the class interval having the most number of observations

Example: Age distribution of respondent in years

Class Boundaries	No. of respondents (f)	
20-30	10	
30-40	12	
40-50	23	Modal Class
50-60	17	
60-70	15	
	77	

$$\textbf{Modal age} = 40 + 10 \left(\frac{23 - 12}{2(23) - 12 - 17)} \right)$$

$$= 43.47$$

Characteristics of the Mode:

1. Most easily determined
2. Not always unique
3. Not affected by extreme values

Use the Mode:

1. when the "typical" value is desired
2. when the data is measured on a nominal scale
3. when most common value is desired

7. MEASURES OF DISPERSION

Absolute Measures:

1. Range
2. Standard Deviation

Relative Measure:

1. Coefficient of Variation

Definition:

Measures of dispersion are descriptive measures that indicates the amount of variation or nature of clustering of a data set. It leads meaning to the measure of central tendency in the description of a given data set.

Measures of absolute dispersion, as distinguished from measures of relative dispersion, are in the same units as the data whose scatter they measure. Measures of absolute dispersion cannot be used to compare the scatter in one distribution with that in another distribution when the averages of the distribution differ in size or the units of measures differ in kind.

MEASURES OF ABSOLUTE DISPERSION

The Range:

Range is the difference between the largest and the smallest values of some variable.

Computation form ungrouped data:

Example: Raw data: 64, 59, 67, 69, 65, 70, 68

Range = R = 70 - 59 = cms

***Computation from grouped data*:**

R = Difference between the upper limit of the highest class interval and the lowerd limit of the lowest class interval.

Example:

lowest class interval 5 - 9 ←	7		
	10 - 14	10	R = 39 - 5 = 34
	15 - 19	13	
	20 - 24	18	
	25 - 29	8	
	30 - 34	5	
highest class interval ←	35 - 39	3	
		64	

The Standard Deviation

- measures the variation in a data set by determining how far the data values are from the mean, on the average.

Computation from ungrouped data:

Definitional formula:

$$\square = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu)^2}{N}} \quad \text{(from a population)}$$

$$s = \sqrt{\frac{\sum_{i=1}^{n} (X_i - \bar{X})^2}{n - 1}} \quad \text{(from a sample)}$$

Computational formula:

$$s = \sqrt{\frac{n\sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2}{n(n - 1)}}$$

Example:

x_i	x_i^2
64	4096
59	3481
67	4489
69	4761
65	4225
70	4900
68	4624
462	30576

$$s = \sqrt{\frac{7(30576) - (462)^2}{7(6)}}$$

$$= \sqrt{\frac{588}{42}}$$

$$= \sqrt{14}$$

$$= 3.74 \text{ cms.}$$

Computation from grouped data:

Let X_i = midpoint of ith class interval
f_i = frequency of ith class interval
k = number of classes
c = class size
d_i = deviation
x_0 = assumed mean
n = number of observations

Definitional formula: $$s = \sqrt{\frac{\sum_{i=1}^{k} (X_i - \bar{X})^2 f_i}{n-1}}$$

Computational formula: $$s = \sqrt{\frac{n \sum_{i=1}^{k} X_i^2 f_i - (\sum_{i=1}^{k} f_i d_i)^2}{n(n-1)}}$$

Example:

Using computational formula

Class Limits	X_i	f_i	$x_i f_i$	$x_i^2 f_i$
5- 9	7	7	49	343
10-14	12	10	120	1440
15-19	17	13	221	3757
20-24	22	18	396	8712
25-29	27	8	216	5832
30-34	32	5	160	5120
35-39	37	3	111	4107
	64		1273	29311

$$S = \sqrt{\frac{64(29311) - (1273)2}{64(63)}}$$

$$= \sqrt{\frac{255375}{4035}}$$

$$= \sqrt{63.3371} = 7.96$$

Characteristics of the Measures of Absolute Dispersion

Range

1. Simple, easy to compute and easy-to-understand measure.

2. Gives a comprehensive value for the data since it includes the limits within which all of the items occured.

3. Fails to communicate any information about the clustering or lack of clustering of the values in the distribution located between the two extremes.
4. Depends on the value of the extreme items, and a single abnormal item would change it materially.

5. Sensitive to sampling variation.

6. Tends to be smaller in smaller samples than in large samples.

7. Cannot be computed from open-end frequency distributions.

8. Unreliable when computed from frequency distributions with gaps or zero frequencies.

9. Not tractable mathematically.

10. Used chiefly in control of production, expressing the stock prices and interest rates, etc.

Standard Deviation

1. Takes into account the values of all the items.

2. Amenable to algebraic treatment.

3. Less influenced by sampling variation.

4. Most suitable measure of dispersion.

5. Difficult to understand and compute.

6. Squaring of large deviations gives more weights to large items which may be undesirable.

7. Used in interpretation of normal curves, skewed curves and coefficient of variation.

8. Useful in testing the reliability of certain statistical measures, and used in connection with business cycle analysis.