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Japan International Cooperation Agency (JICA)
Guatemala Tourist Commission (INGUAT)

Study of National Tourism Development
for the Republic of Guatemala

Final Report
Volume 3: Project Evalution

May 2002

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Pacific Consultants International

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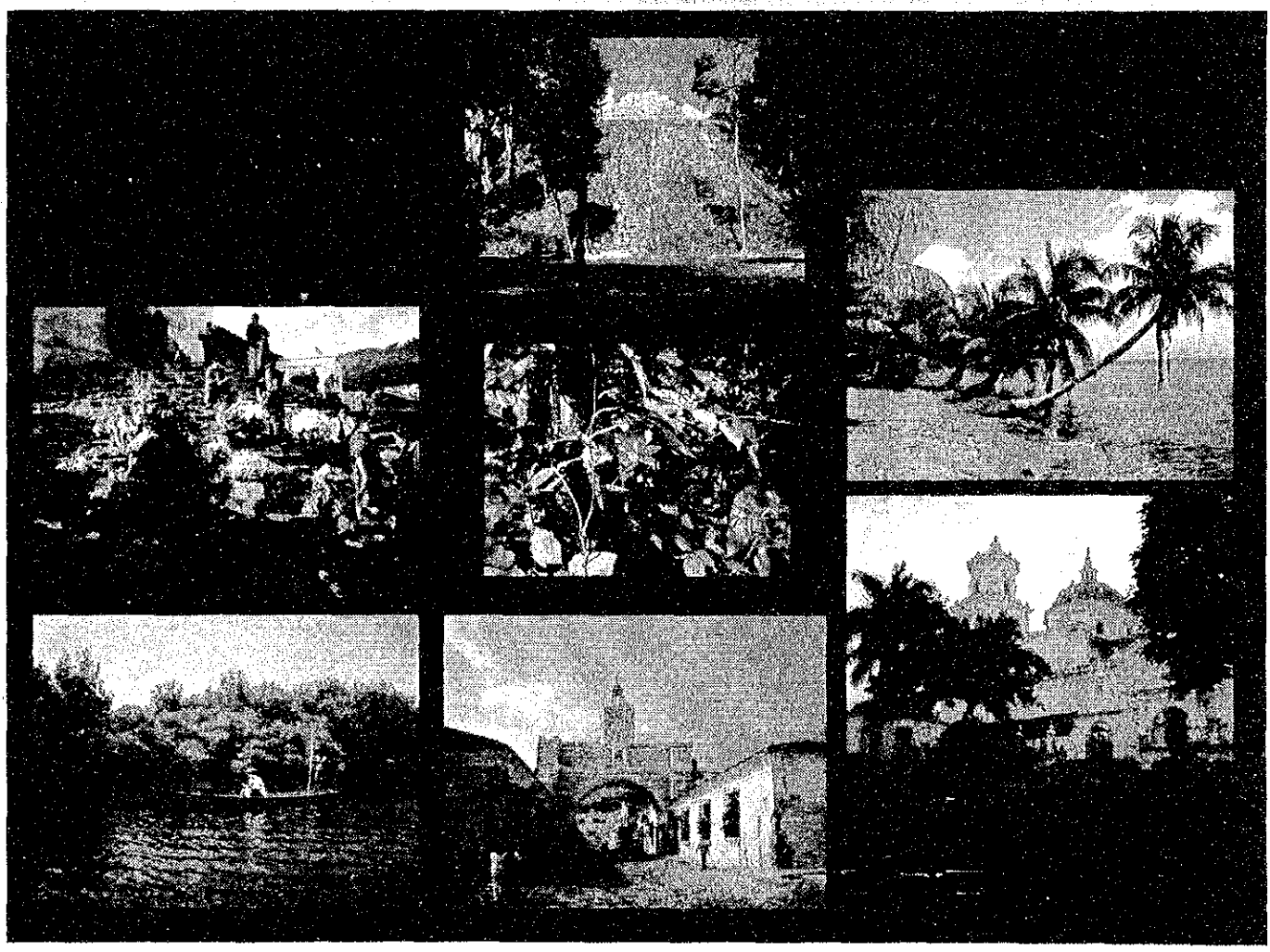

May 2002

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The following exchange rate is applied in the Study:
US$1 = Quetzal 8 = Yen 121

Preface

In response to the request from the Government of the Republic of Guatemala, the Government of Japan decided to conduct the Study of National Tourism Development for the Republic of Guatemala, and entrusted the Study to the Japan International Cooperation Agency (JICA).

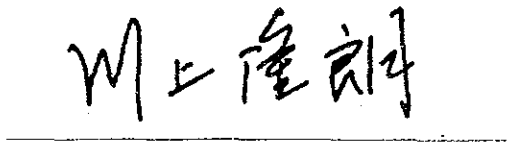
JICA selected and dispatched a study team headed by Mr. Yoshiki Hirabayashi of Pacific Consultants International to Guatemala from January 2001 to March 2002. In addition, JICA set up an advisory committee headed by Dr. Nobumaru Shindo, Professor of Toyo University, between January 2001 to March 2002, which examined the study from specialist and technical points of view.

The study team held discussions with the officials concerned of the Government of Guatemala, and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Guatemala for their close cooperation extended to the Study.

May 2002



Takao Kawakami
President
Japan International Cooperation Agency

May 2002

Mr. Takao Kawakami
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

Dear Sir,

We are pleased to formally submit herewith the Final Report of the "Study of National Tourism Development for the Republic of Guatemala."

This report compiles the results of the Study, which was undertaken in the Republic of Guatemala from January 2000 through March 2002 by the Study Team represented by Pacific Consultants International.

We had been assisted by many people for the accomplishment of the Study, and we would like to express our sincere gratitude and appreciation to all those who extended their kind assistance and cooperation to the Study Team, in particular, Guatemala Tourist Commission who acted as the counterpart agency.

Also, we acknowledge the effective assistance by all the officials of your Agency and the Embassy of Japan in the Republic of Guatemala.

We hope that the report will be able to contribute to formulate appropriate polices and measures for the future development of Guatemala.

Very truly yours,

平林喜記

Yoshiki Hirabayashi
Team Leader,
Study of National Tourism Development
for the Republic of Guatemala

Table of Contents

Abbreviations

Abbreviation English(Spanish)	Original name in English	Original name in Spanish
ADESCA	Agency for Cultural Decentralization	*Agencia para la Descentralización Cultural*
BOD	Board of Directors	Junta Directiva
CA	Central America	Central America
CAMTUR	Chamber of Tourism of Guatemala	Camara de Turismo
CONAMA	National Commission of Environment	Consejo Nacional de Medio Ambiente
CONAP	National Council of Protected Areas	Consejo Nacional de Áreas Protegidos
EIA	Environmental Impact Assessment	Evaluación del Impacto Ambiental
EIRR(TIRE)	Economic Internal Rate of Return	Tasa Interna de Retorno Económica
ENT	National Tourism Strategy	Strategia Nacional de Turismo
FEGUA	Railway of Guatemala	Ferrovias de Guatemala
FIRR (TIRF)	Financial Internal Rate of Return	Tasa Interna de Retorno Financierra
FIS	Social Investment Fund	Fondo de Inversión Social
FIT	Foreign Independent Tourist	Turistas de Comodidad
FODIGUA	National Fund for Indigenous Development in Guatemala	Fondo Nacional para el Desarrollo Indígena en Guatemala
FONACON	National Fund for Conservation	Fondo Nacional para Conservación
FONAPAZ	National Fund for Peace	Fondo Nacional para la Paz
FONTIERRA	National Fund for Land	Fondo Nacional para las Tierras
FSDC	Solidarity and Community Development Fund	Fondo de Solidaridad y Desarrollo Comunitario
FTN	Northern Transverse Belt	Franja Transversal del Norte
GOG	Government of Guatemala	Gobierno de Guatemala
IDAEH	Institute of Anthropology and History	Instituto de Antropología e Historia
IDB (BID)	Inter American Bank	Banco Interamericano de Dessarrollo
IEE (EAI)	Initial Environmental Examination	Examen Ambiental Inicial
IGSS	Guatemalan Institute of Social Security	Instituto Guatemalteco de Segridad Social
INAB	National Institute of Forestry	Instituto Nacional de Bosques
INDE	*National Institute of Electrification*	Instituto Nacional de Electrificación
INE	National Statistics Institution	Instituto Nacional de Estadistica
INFOM	National Institute of Municipal Strengthening	Instituto de Fomento Municipal
INGUAT	Guatemala Tourist Commission	Instituto Guatemalteco de Turismo
INSIVUMEH	National Institute of Seismology, Volcanology, Meteorology and Hidrology	Instituto Nacional de Sismologia, Vulcanologia, Meteologia e Hidrogia
INTECAP	Technical Institute of Training and Productivity	Instituto Técnico de Capacitación y Productividad
IT (TI)	Information Technology	Tecnología de Información
JICA	Japan International Cooperation Agency	Agencia de Cooperación Internacional del Japón
LTC (CLT)	Local Tourism Committee	Comité Local de Turismo
MAGA	Ministry of Agriculture, Livestock and Food	Ministerio de Agricultura, Ganadería y Alimentación
MARN	Ministry of Environment and Natural Resources	Ministerio de Ambiente y Recursos Naturales
MICE (RICCE)	Meeting, Incentive, Convention and Event	Reuniones, Incentives, Congresos, Convenciones y Eventos
MICIVI	Ministry of Communication, Infrastructure and Housing	Ministerio de Comunicación, Infraestructura y Vivianda
MICUDE	Ministry of Culture and Sports	Ministerio de Cultura y Deportes
NGO (ONG)	Non-Governmental Organization	Organización No Gubernamentales
NPV (VPN)	Net Present Value	Valor Presente Neto
OMM	Mundo Maya Organization	Organización del Mundo Maya
PDI	Integrated Development Plan	Plan de Desarrollo Integrado
PDS	Sustainable Development Program	Programa de Desarrollo Sostenible
PINFOR	Forestry Incentive Program	El Programa de Incentivos Forestales
PLV	Las Verapaces Program	Programa Las Verapaces
PTDA (ADTP)	Priority Tourism Development Area	Área de Desarrollo Turistico Prioritario
SEGEPLAN	General Secretariat of Planning and Programming	Secretaría General de Planificación y Programación
SICA	System of Integration of Central America	Sistema de Integracion de Centroamerica
SIGAP	Guatemalan System of Protected Areas	Sistema Guatemalteco de Áreas Protegidas
SIT (TIE)	Special Interests Tourist (or Tourism)	Turistas de Interes Especial
SME (PyME)	Small and Micro Enterprise	Pequeña y Microempresa
SWOT (FODA)	Strengths, Weaknesses, Opportunities and Threats	Fortaleza, Debelidad, Oportunidad y Amaneza
UNDP (PNUD)	United Nations Development Program	Programa de las Naciones Unidas para el Desarrollo
URNG	Guatemala National Revolutionary Unit	Unidad Revolucionaria Nacional Gutemalteca
VFR (VdAyP)	Visit Friends and Relatives	Visita de Amigos y Parientes
WTO (OMT)	World Tourism Organization	Organización Mundial de Turismo

1. FEASIBILITY ASSESSMENT OF THE PROJECTS

Table 1.1 Country profile

A. Geographic & Climatic Fundamentals	B. Land boundaries
1. Total area: 108,890 sq km; land: 108,430 sq km; water: 460 sq km	1. Total land boundaries: 1,687 km of which: with Belize 266 km; with El Salvador 203 km; Honduras 256 km; Mexico 962 km
2. Total coast line: about 400 km	
3. Terrain: Mountainous with fertile coastal plain	
4. Climate: Temperate in highlands; tropical on coasts	
C. Maritime claims	
Continental shelf: 200m depth or to the depth of exploitation; EEZ: 200 nm; territorial sea: 12 nm	
D. Land use (1993 estim.): arable land: 12%; permanent crops: 5%; permanent pastures: 24%; forests & wood- land 54%; irrigated land 1,250 sq km	
E. Political & Administrative Fundamentals	
1. Independence: September 15, 1821	6. Judicial: 13-member Supreme Court of Justice with 5-year term
2. Type: Constitutional Democratic Republic	
3. Constitution: May 1985, amended 1994	7. Administrative division: The country is divided into 22 departments with appointed Governors and 331 municipalities with elected Majors & City Councils
4. Executive: President with 4-year term	
5. Legislative: unicameral; 113 member Congress, 4-year term	
F. Basic Demographic Data	
1. Absolute Population Size (1981 census): 6,054,227 people	7. More Urbanized Departments (1994 census): Guatemala (70.9%); Sacatepequez (70.5%); Chimaltenango (41.6%); Quetzaltenango (39.8%) and Escuintla (37.1%)
2. Absolute Population Size (1994 census): 8,331,874 people	
3. Estimated 2000 Population Size: 11,385,338 people	
4. Implied Population Growth Rate 1981 - 1994: 2.49 per cent	8. Major Rural Departments: The other 17 Departments are below or well below the average national urbanization rate
5. Implied Population Growth Rate 1981 - 2000: 3.38 per cent	
6. Urban/rural split (1994 census): 35% - 65%	9. Ethnic Groups: There are 22 ethnic groups and some 42% of the population are considered indigenous Mayas ('94)

[Note: 1994 population census data, 2000 population size estimation and the implied growth rates are indicative only, in view of the limited reliability of the 1994 population census data.]

G. Population Structure:	1985	1990	1995	1998
0 to 4 years		18.1	17.4	17.0	16.6
0 to 14 years		46.3	45.9	45.1	44.8
15 to 24 years		19.3	19.6	20.3	20.5
15 to 64 years		50.7	50.9	51.6	51.8
Over 65 years		3.0	3.2	3.4	3.5

H. Simple Poverty Indicator

It is estimated that around 57% of the population are poor, that is they live from around US $ 2/day; and that about 30% of the population is "extremely poor" living from less than US $ 1 per day.

I. Gross Domestic Product Structure	1985	1995	2000 (e)
Primary Sector (%)	25.9	25.9	22.9
Secondary Sector (%)	19.7	19.8	20.4
Tertiary Sector (%)	54.4	54.3	56.7
GDP (million Q)	2,936.1	3,389.5	5,059.8

[Note: in 1958 constant prices; (e) = estimate.]

J. GDP Growth Performance	1985 to 2001	K. Per Capita Income	
Primary Sector (%)	2.86	In constant 1958 Quetzales (2000):	444
Secondary Sector (%)	3.97	In constant 1990 US dollar (2000):	998
Tertiary Sector (%)	3.98	In current 1998 Quetzales:	9,642
GDP (%)	3.71	In current 1998 US dollar:	1,523

Source: JICA Study Team

1.1. Introduction

Volume 3 of the "Study of National Tourism Development for the Republic of Guatemala" is a basically technical-oriented volume that supports the recommendations for tourism sector development in the three PTDAs by reporting the conclusions and recommendations that have resulted from the integrated economic and financial viability assessment of the proposed pilot projects and their Environmental Impact Assessment.

It is a commonly accepted requirement for feasibility investigations that, based on a clearly defined project structure, the subject projects must be assessed based on their "own merits". Hence, the structure of Volume 3 presents and discusses the assessment results on a "pilot project by pilot project basis". The structure of Volume 3 follows the standard sequence of a logical framework, i.e. after discussing the overall approach and methodology that has been applied to all three feasibility investigations, the general directions of the socio-economic, regional and tourism development frameworks 2000 to 2020 are introduced briefly. This is followed by the pilot project definition and structure, tourism demand considerations and projections, the economic and financial project analyses, a suggested project implementation plan and an assessment of project related risks. The EIAs for the pilot projects are bundled and presented after the above "case-by-case" considerations. Such report-structure enables the general reader in a sponsoring and or financing institution, who is interested say in only one particular project, to come to conclusions by reading only that part of the Study in isolation. Selected background and summary information is provided for in 18 attachments, the information value of which is self-explanatory.

However, in order to reduce the volume of paper, but at the same time maintain the rationale of the assessment and maintain readability, information presented in some Sections is highly compressed and not each and every step of the analysis is identified. General worksheets are omitted. Primary data used as inputs into the economic and financial viability assessment were primary surveys conducted with hotels, the results of the two visitor surveys and interviews with relevant private and public sector institutions. Box 1.1 identifies the major secondary input data sources and general data limitations are discussed briefly.

Box 1.1 Feasibility assessment secondary data sources & general data limitations

A) In general, reports, documents and data provided by the following organization and institutions were consulted and used in the preparation of this report: "Banco De Guatemala" (the Central Bank); the World Bank Office in Guatemala City; The "National Institute of Statistics (INE)"; the "Secretariat for Economic Integration of Central America (S.I.E.C.A.)"; the "National Center for Economic Investigations (CIEN)"; the "United Nations Development Programme (UNDP)"; UNICEF; UNFPA, and the "Inter-American Institute for Cooperation in Agriculture (IICA)", and the Office of Planning of the President (SEGEPLAN).

B) Secondary data sources - Macro-economy & Fiscal. Data draw to a large extent on the following sources: (1) The World Bank, Guatemala - Building Peace With Rapid en Equitable Growth, Report No. 15352-GU; August 22, 1996. (2) The World Bank, Guatemala - Investing for Peace: A Public Investment Review, Report No. 16392-GU, July 15, 1997. (3) The World Bank, Guatemala - Expenditure Reform in a Post-Conflict Country, Report No. 19617-GU, February 4, 2000. (5) Centro De Investigaciones Economicas Nacionales, Perspectivas Economicas 2001, Guatemala City, no year given. (6) Secretaria De Integracion Economica Centroamericana, Boletin Estidistico 9.1, Guatemala City, January 2001.

C) Secondary data sources - Agricultural sector. Instituto Interamericano De Cooperacion Para La Agricultura, Guatemala - Marco Cuatitativo De La Agricultura Guatemalteca 1950 - 1999, Guatemala City, November 1999.

D) Secondary data sources - Social sectors. United Nations, Guatemala - la fuerza incluyente del desarrollo humano 2000, Guatemala, 2000.

E) Human rights record. United States State Department, Human Rights Guatemala 2000. UNICEF, Adoption And The Rights of The Child In Guatemala, Guatemala, 2000.

F) The Peace Agreements. MINUGUA, Acuerdo Sobre Aspectos Socioeconomicos Y Situacion Agraria, signed Mexico on 6 May 1996. (2) MINUGUA, Acuerdos De Paz, Guatemala City, 1997. (3) MINUGUA, Acuerdo Sobre Bases Para La Incorporacion de La Unidad Revolucionaria Nacional Guatemalteca A La Legalidad, signed in Madrid on 12 December 1996, (4) MINUGUA, Informe De Verificacion - Situacion de la ninez y la adolescencia en el marco del proceso de paz de Guatemala, Guatemala City, December 2000. (5) Comision De Acompanamiento Del Cumplimiento De Los Acuerdos De Paz, Cronograma de Implementacion y Verificacion de los Acuerdos de Paz 2000 - 2004, Guatemala City, 12 December 2000.

G) General data limitations. In general, macro and sector economic data (for example for the agricultural sector) are considered to be quite reliable and most reports base their statistical information on data available from the central bank "Banco de Guatemala". However, there are statistical and methodological data constraints in terms of "classification system in use" (for example, the GDP structure does at present not follow United Nation standard classification) and the verification and therefore measurement of specific peace targets. The World Bank's expenditure reform study of 2000 identifies the following areas, in which difficulties are faced: (a) measurement of the tax ratio, b) achievement of public spending targets, c) measurement of preventive/curative health targets, d) prioritization criteria for rural infrastructure and rural development investments, e) measurement of literacy rates and primary education coverage, f) measurement of health indicators, g) measurement of infant and maternal mortality, and h) monitoring and measurement of epidemic illnesses (for example polio and measles cases). Please consult the World Bank report, Box III.3, page 45, for a more detailed discussion of these data constraints.

Source: Compiled by JICA Study Team

1.2. Common Definitions, Fundamental Assumptions and Methodologies

The following fundamental assumptions common to all three feasibility investigations are made:

- It is assumed that total number of visitors, visitor patterns and flows can be, to a certain degree, influenced by adjustments on the supply side, i.e. the physical, hotel and tourism facilities' infrastructure,
- Hence, tourism demand patterns and flows in the "without" case means a "do nothing" scenario for GOG and INGUAT, and the "with" case means that the measures and pilot projects recommended in this Study are implemented timely and that such public sector investments are followed-up and complimented in due course by private sector investment activities, in particular in accommodation facilities,
- It is obvious that certain, in particular, commercial activities will only materialize when demand has reached a point that generates sufficient return for private sector capital,

- Such profitability criteria are not applied for public sector investments following the classical definition of public sector investments, and
- There are, in principle, only three ways to increase direct & indirect benefits accruing from tourism, namely i) to increase the absolute number of tourists in a given market (and therefore market value) segmentation, ii) to shift, under a given number of absolute tourist numbers, the visitors to a higher value market segmentation, and iii) to increase the absolute number of visitors while, at the same time, an increasing number of tourists is redirected into higher value market segments. Obviously, the third option would results in the highest net-benefit achievable under any market diversification approach.

All three economic cost-benefit-analyses (CBA) are based on the following basic definitions and assumptions:

- The conventional discount method is employed and World Bank guidelines for calculating financial and economic rates of return for development finance cooperation projects were employed[1],
- All financial cost are converted into economic prices taking into account the prevailing fee and levy structure as well as the structural features of individual cost streams. The conversion factors are identified in Table 1.2,
- Economic cost are defined as the total pilot project implementation cost and the "operation & maintenance (O&M)" cost of the facilities as identified in the following Sections,
- The economic benefits are defined as the difference in direct economic benefits measured as total direct tourist expenditures and the related revenues that can be achieved in the "with" against the "without" scenarios. Hotel/accommodation related revenues for both scenarios are estimated based on underlying visitor numbers, average lengths-of-stay, estimated distribution over level of accommodation and average bed-nights,
- The net economic benefits are defined as the economic cost plus the economic benefits,
- A holistic and lifecycle approach is adopted for the economic evaluation. The lifecycle adopted for different types of assets is in line with depreciation rules as prescribed by the Ministry of Finance. The depreciation rules are identified in Table 1.3, and
- All computations are undertaken in constant 2001 price base.

[1] As, for example, illustrated in: J.Christian Duvigneau and Ranga N.Prasad, "Guidelines for Calculating Financial and Economic Rates of Return for DFC Projects, World Bank Technical Paper Number 33, Washington, D.C. various years.

Table 1.2 Conversion factors to adjust financial to economic prices

	Parameter	Conversion Factor
[1]	Real estate transactions/land acquisition	0.90
[2]	Domestic salaries	
	(a) Up to 65,000 Q/year	0.85
	(b) 65,000-180,000 Q/year	0.75
	(c) Over 180,000 Q/year	0.52
[3]	Gross profit	0.75
[4]	Domestic materials, components & equipment	0.71
[5]	Imported materials & components	0.74
[6]	Imported capitol goods*)	0.79
[7]	Salaries of expert staff	1.00

Note: *) Imported capital goods from outside Central America are exempted from tariff.
**) Goods and services subject to VAT are excluded from the three percent stamp tax.
Source: JICA Study Team

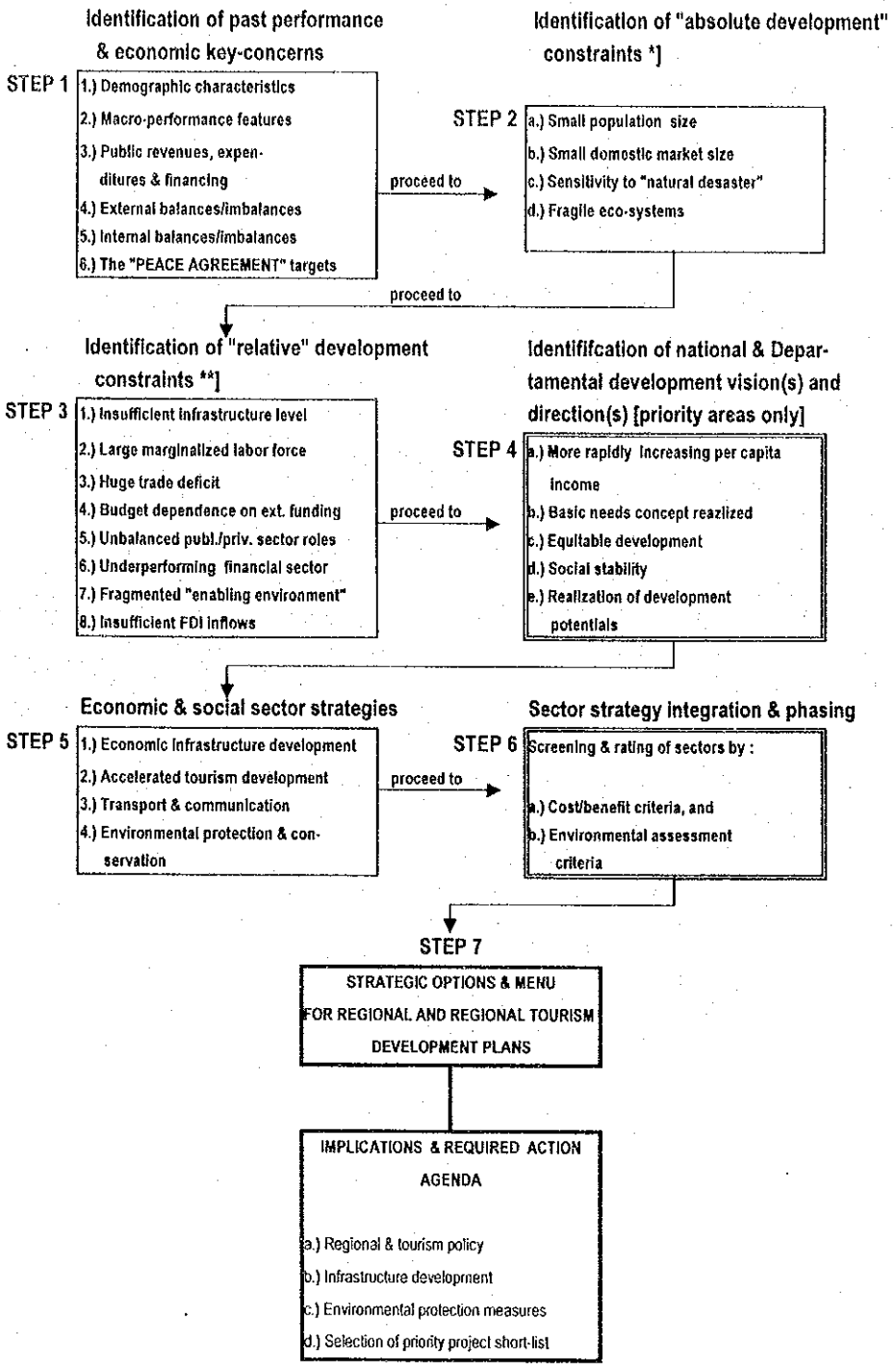
Table 1.3 Ministry of public finance asset depreciation rules

	Parameter	Depreciation Rate
[1]	Buildings & improvements	5%
[2]	Forestry, fruits & vegetable plants	15%
[3]	Furniture & fixtures	20%
[4]	Machinery, equipment & vehicles	71%
[5]	Tools & computer equipment	33%
[6]	Any other depreciable assets	10%

Note: Depreciation in Guatemala is determined on a straight-line-basis.
Source: JICA Study Team

The forecast of the socio-economic development directions for all three PTDAs up to the planning horizon of 2020 is based on the seven steps analysis chart as presented in Figure 1.1. The six-steps approach for screening, selecting and assessing the pilot projects selected for implementation is summarized in Figure 1.2.

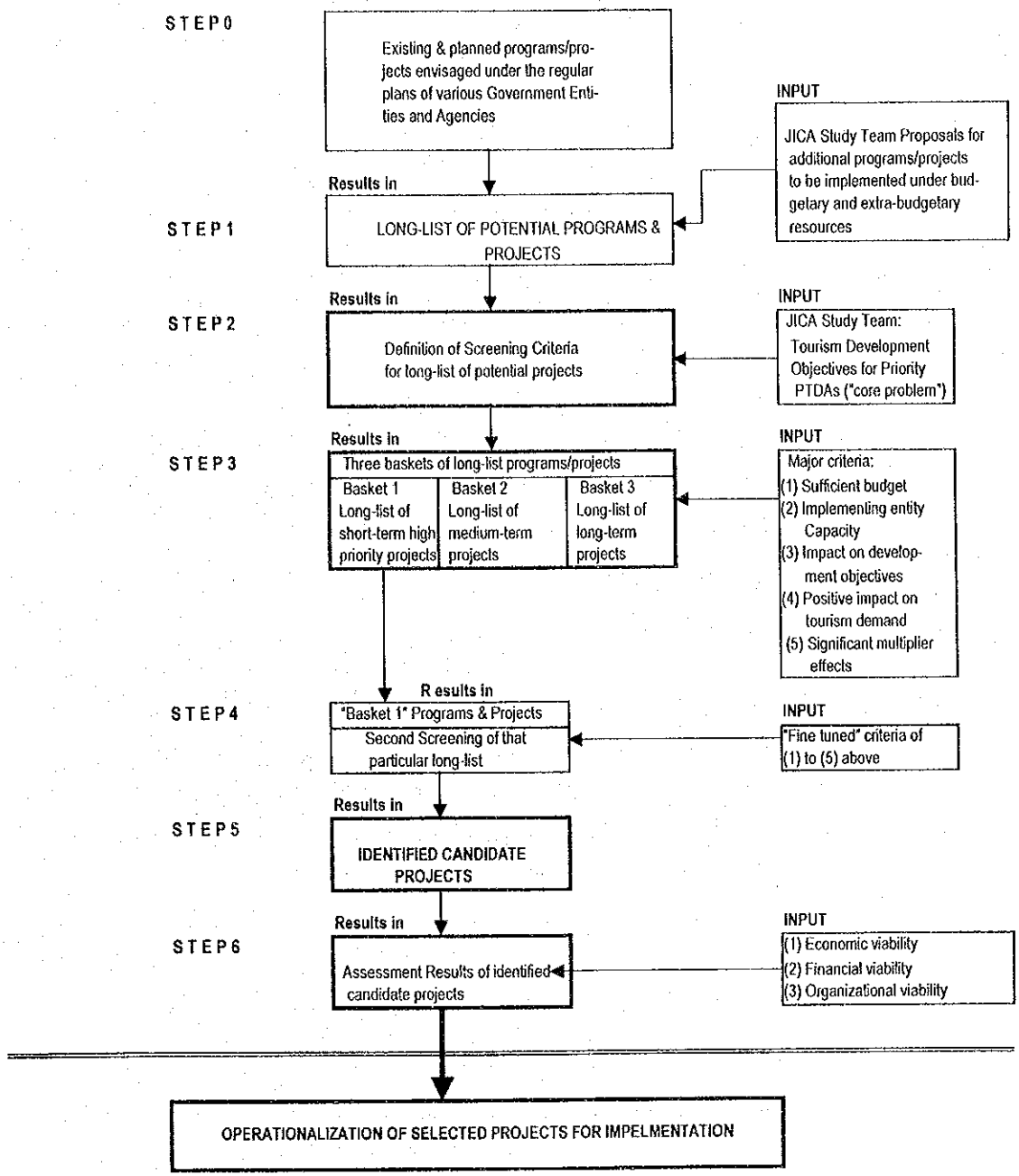
Figure 1.1 Schematic appraisal approach for socio-economic development scenarios



Notes : *] Absolute development constraints are those, on which policy measures have little or no influence.
**] Relative development constraints are those, on which policy measures have direct or indirect influence.

Source: JICA Study Team.

Figure 1.2 Approach for screening, selecting & assessing pilot projects



(1) Implementing Entity
(2) Project Structure
(3) Financing Plan
(4) Implementation Schedule
(5) Pre-F/S or F/S "Project Document" along Standard Format
(6) Supporting project documentation

Source: JICA Study Team

1.3. Feasibility Assessment of the Pilot Project in El Petén PTDA

1.3.1. Existing and Projected Socio-economic & Regional Development Frameworks

The Department of El Petén ranks with an estimated population size of some 333,390 people[2] (year 2000, about 2.9 percent of Guatemala's total population size in that very year) as number 13 among Guatemala's 22 Departments, but it ranks first in terms of area size, which is estimated at some 35, 854 km^2, equivalent to about 33 percent of Guatemala's total land area size. Petén's population density is, therefore, with around 9 persons per km^2 the lowest in all of Guatemala[3].

Petén's absolute population size according to the 1981 and 1994 population census data was 131,927 and 224,884 people, respectively[4]. Hence, the gross population growth rate is 4.2 percent over the period 1981 to 1994, and 6.8 percent over the six-year period 1994 to 2000. The implied long-term 1981 to 2000 population growth rate is with 5.0 percent well above the national average of 3.4 percent, indicating that the Department Petén is clearly a net in-migration area. According to the enumerated year 2000 population size data, Petén has an overhang in males over females of about 21,444 persons, equivalent to 6.4 percent of the total population size.

1994 population census results allow for the identification of the then prevailing urban/rural split, as well as the ethnic composition of the population base. These data suggest that Petén was a predominantly rural Department (about 73.3 percent of total department population) mainly comprising a non-indigenous population (71.2 percent non-indigenous; 26.2 percent indigenous, and 2.6 percent "didn't know")[5].

Petén had in the year 2000 some twelve municipalities, the largest of which is La Libertad with some 79,416 urban dwellers. The urban structure is characterized and dominated by eight municipalities[6] in the "10,000 to 50,000" population size category[7]. Three municipalities[8] fall into the "below 10,000" inhabitants category. An urbanization rate cannot, at this point in time, be indicated, due to a lack of time-series on the Department's rural/urban split. However, it appears that an urban agglomeration of roughly 65,000 people is evolving around Lake Petén Itza, comprising Flores, Santa

[2] Estimated and enumerated by the national statistical institute, INE. Please consult with Appendix 1 for more details.

[3] This part deals only with the numerical frameworks needed to undertake the feasibility study. All other aspects, such as physical environment and so on, have been presented and discussed in Interim Report 1. They do not need to be repeated here.

[4] Please consult with Appendix 8 for details.

[5] Please consult with Appendices 9 and 10 for details.

[6] They are: Sayaxché; San Luis, Poptún; Dolores; Melchor de Mencos; San Benito; Flores, and San Andres.

[7] Please consult with Appendix 2 for details.

[8] They are: San Francisco, Santa Ana, and San Jose.

Elena and San Benito Townships. Sayaxché Township with an estimated year 2000 Population size of 47,693 people is a gateway to several archeological sites.

The Department Petén is identical with Guatemala's "Development Region VIII". Detailed reliable past performance gross regional domestic product (GRDP) data have not been made available. However, using a "cross-referencing" approach and common sense allow for tentative, but not conclusive general observations on most likely past trends in GRDP structure and development. The population size in the "work-age" bracket of 15 to 64 years is estimated by the national statistical institute INE at some 241,041 people, equivalent to 72.3 percent of the absolute population size in the year 2000[9]. Formal sector employment is derived at by using a 35 percent participation rate, resulting in some 116,220 formal sector employees in the year 2000, or about 48.2 percent of the working-age population size.

The distribution of formal sector employment over major economic sectors is estimated at 80.1 percent for agriculture (equivalent to 93,116 people); 7.7 percent in industry (equivalent to around 9,002 people) 7.7 percent in the construction sub-sector (equivalent to about 9,002 people); 1.4 percent in the trade sub-sector (equivalent to about 1,600 people); 2.0 percent in the services sub-sector (equivalent to about 2,300 people); 0.7 percent in public administration (about 800 people), and 0.3 percent (about 400 people) for which the formal economic sector cannot be identified.

Implied "open unemployment" is estimated at 6,267 people (around 2.6 percent of the working age population); implied "open under-employment" is estimated at 42,182 people (around 17.5 percent of the working age population), and the implied "informal sector labor force" is therefore estimated at around 76,372 persons, or around 31.7 percent of the working age population size.

It is possible to roughly calculate from such data a static picture for the Department Petén year 2000 GRDP, including the implied GRDP's structural composition. The values are derived at by applying national average labor productivity data to the estimated formal sector employment data. Table 1.4 presents the results of that approach for the GRDP estimation in 1958 constant Quetzales and Table 1.5 for a likely structural composition of Petén's GRDP in the year 2000.

[9] Please consult with Appendix 12 for details.

Table 1.4 Rough estimation for Petén GRDP size in 2000

Parameter	Based on Sub- sector Labor Productivity (2)	Based on National Average Labor Productivity (3)
Absolute GRDP Size	95.7	164.2
Share in GDP	1.96%	3.40%

Note: Unit: Million Quetzales/Percent
1) All values are in constant 1958 constant Quetzales
2) Not all sub-sectors are covered and/or clearly identified.
3) All sub-sectors are covered by average used.

Source: JICA Study Team

Hence, the Department Petén, which accounts for roughly 3 percent of the total labor force in the formal sector accounted in the year 2000 for between 2 percent to 3.5 percent of total national level GDP (measured in constant 1958 Quetzales prices) and covering the formal sector of the department economy only.

Table 1.5 Rough estimation for Petén GRDP structure in 2000

At National Level			At Department Peten Level		
Parameter	% of Labor Force	% of GDP	Parameter	% of Labor Force	% of GRDP
Primary Sector	58.1	23.1	Primary Sector	80.1	54.9
Secondary Sector	17.7	20.3	Secondary Sector	15.6	21.0
Tertiary Sector	24.2	56.6	Tertiary Sector	4.3	24.1
Total	100.0	100.0		100.0	100.0

Note: Unit: percent of total
1) The sector definition is according to United Nations standard classification.
2) Public Administration is included under the tertiary sector.

Source: JICA Study Team

Though the above data have to be interpreted with caution, due to the approach employed in estimating the department level data, the following three features appear to be quite characteristic:

- The relationship between labor employed and share of output produced in the secondary sector is almost the same at national and Department Peten levels, most likely due to similar manufacturing processes (both, in terms of process, equipment and technology level employed)
- The relationship between labor force employed and share of output produced in the primary sectors hints at the quite low level in terms of efficiency, size and technology employed in Petén's primary sector. Some 80 percent of the Department's labor force produces only about 55 percent of GRDP, where some 58 percent of total national level labor force produce some 23 percent of GDP, and
- The tertiary sector, which comprises all services including tourism and tourism related activities, produces with only 4.3 percent of the labor force some 24 percent of GRDP. In other words, one percent of the Department Petén labor force could produce around 5.6 percent of GRDP. This is more than double of national average, in case of which one percent of the labor force in the tertiary sector produces only 2.3 percent of GRDP. It is therefore fair to state that the tertiary sector, including tourism and tourism related service activities, are quite important for Petén in terms of overall gross output.

It is not recommendable for projecting Petén's socio-economic framework to use a "one point-in-time" related projection approach, given the high uncertainty level in past regional & local level empirical socio-economic data. As a consequence, a scenario approach is adopted to project trend corridors for the socio-economic fundamentals of absolute population size; formal sector employment, GRDP and per capita income in current Quetzales.

Three scenarios are defined, namely a "linear past trend scenario"; a "low-end" as well as a "high-end" scenario. The fundamental underlying assumptions for the three scenarios are summarized in Table 1.6.

Table 1.6 Assumptions for scenario formulation to project socio-economic fundamentals of El Petén Department 2000 to 2020

"Low-end" Scenario	Linear Past Trend Scenario	"High-end" Scenario
Qualitative assumptions	Qualitative assumptions	Qualitative assumptions
1) Political & economic instability	1) Past trends & interrelationships continue over the coming 20 years	1) Growth in the national, regional and global economy accelerates
2) Private sector investment stagnates	2) Socio-economic fundamentals remain at similar levels	2) Domestic and foreign direct investment picks up & consumer confidence is restored
3) No focused development efforts at national & regional levels	3) The tourism sector remains at the same level in terms of "scope" & "depth"	3) Tourism development is guided by coordinated and targeted resource allocation (public & private)
4) Tourism sector remains fragmented and negatively effected by downturn in visitor arrivals		
Basic numerical assumptions	Basic numerical assumptions	Basic numerical assumptions
1) Population size growth: 3.38%	1) Population size growth: 5.00%	1) Population size growth: 5.00%
2) Real GRDP Growth: 1.7%	2) Real GRDP Growth: 3.7%	2) Real GRDP Growth: 6.5%
3) Inflation rate: 6.0%	3) Inflation rate: 7.0%	3) Inflation rate: 5.0%

Note: Unit: as indicated
Source: JICA Study Team

Table 1.7 provides the numerical results of the major socio-economic parameter projected up to the planning horizon of 2020.

It should be kept generally in mind that, though clearly an in-migration and predominantly rural area over the past 20 years, the economic base of the Department Petén is at a relatively early stage of development in terms of labor force availability and its skill level composition, economic structure, scope and depth of such structure, and modern sector enterprise-base.

As has been observed above, there are no major urban agglomerations and/or consumption centers in Petén. The Department Petén had, according to the year 2000 directory of industrial establishments[10] only 23 modern sector industrial establishments, i.e. 0.8 percent of the country's total number of modern sector industrial establishments.

[10] Published in electronic format by the national statistical institute INE.

The distribution of these establishments in the given year was: Flores 6 establishments; San Benito 8 establishments; San Andres 2 establishments; La Libertad two; Melchor de Mencos one, and Poptún 4 industrial establishments.

The number of informal sector and formal sector SME's could not be established with certainty. However, it is estimated for the year 2000 that Petén had in the order of magnitude some 42,000 people "openly under-employed" and around 76,000 people in the "informal labor force" sector.

Table 1.7 Projection of major socio-economic parameter for the Petén Department 2000 to 2020

Main Socio-economic Parameter	Year	"Low-end" Scenario	Linear Past Trend	"High-end" Scenario
Absolute Population Size (Number of people)	2000	333,390	333,390	333,390
	2010	464,855	543,057	543,057
	2020	648,161	884,583	884,583
Formal Sector Employment (Number of people)	2000	116,220	116,220	116,220
	2010	162,048	189,310	244,376
	2020	225,949	308,366	398,062
GRDP (current prices) (Million Quetzales)	2000	4,395	4,395	4,395
	2010	9,228	12,157	13,053
	2020	19,376	33,628	38,766
Current price per capita income (Quetzales)	2000	13,182	13,182	13,182
	2010	19,851	22,386	24,036
	2020	29,894	38,016	43,824

Note: 1) Real GRDP growth for the pessimistic scenario is assumed at 1.7%, average inflation rate of 6%.
2) Real growth for the trend scenario is assumed at 3.71%, average inflation rate of 7%.
3) Real growth performance for the optimistic scenario is assumed at 6.5%, average inflation rate at 5%.

Source: JICA Study Team

1.3.2. El Petén PTDA Development Strategy & Projected Tourism Development Direction

As has been observed in previous section, the Government of Guatemala (GOG) has overall principally guiding macro-economic development objectives. In addition, there are the various and broad objectives and tasks that need to be realized under the Peace Agreement.

Generally, Guatemala so far does not adopt a regionally-based development approach. However, as regards the Department Petén, an integrated regional development plan (Plan de Desarollo Integrado de Petén - PDI) was formulated under the jurisdiction of SEGEPLAN in the early 1990s. The major development direction identified in the PDI is:

- To protect forests as a foundation for sustainable economic development by involving the rural population into forest resource management and integrating their agricultural activities with forestry
- To promote agricultural intensification and diversification in suitable areas identified in the PDI

- To prepare the necessary conditions for tourism development so that tourism activities could contribute to the conservation of natural and cultural resources, and
- To promote industrial development within the areas delineated by the PDI's land-use plan and by promoting human resources development.

The PDI includes a project long-list of potential development projects for which the total investment amount was estimated at roughly US$ 1,300 million. Few projects have been implemented since the formulation and promulgation of the PDI, though the GOG considers the plan still a valid document.

Some of the projects recommended in the PDI have been succeeded by a "Sustainable Development Program – PDS" (Programa de Desarollo Sostenible). Implementation of the PDS started some two years ago with funding being provided from the Inter-American Development Bank (IADB). The PDS, which is to continue for another seven years, comprises the following major components:

- Legalization of land for the existing population in the buffer zones of the Maya Biosphere Reserve, the territory of which accounts for some 21,130 km^2 (core zones account for 36%, multiple use zones for 40%, and buffer zones for 24% of the total area)
- Restoration of cultural heritage sites and improvement of tourism services, covering the restoration of archaeological sites and the provision of tourism infrastructure in Yaxhá and Aguateca
- Management of natural resources by encouraging small-scale farmers to improve the traditional system of their agriculture, and
- Strengthening of local institutions, such as municipalities and regional government offices, and the coordination mechanism among them.

The discussion of the future tourism development direction for the Department Petén contained in Volume 2 reflects, inter alias, directions for the spatial tourism sector development structure of Petén, as well as numerous tourism-related measures, the implementation of which would support the realization of said proposed spatial tourism development structure.

The Department Petén has some 41 important tourism resources, the major number of which is related to archeological sites and the remainder being nature-based. The analyses of their strength and weaknesses revealed that tourism resources, besides archeological sites, are very limited, and that most of the archeological sites are isolated with poor accessibility and that they are not well know as Guatemalan tourism attractions. The major tourism development issues and the basic tourism development strategy as

identified in the tourism development plan are summarized in Table 1.8 and the general tourism structure is identified in Table 1.9.

Table 1.8 Major tourism development issues and development strategy for El Petén PTDA

Tourism Development Issues	Tourism Development Strategy
1) Concentration of visitors in Tikal	1) Strengthening of archeological tourism
2) Short length of stay, due to lack of tourism products	2) Development of nature tourism
3) Insufficient management of archeological sites	3) Development of Peten Itza as a lakeside resort
4) Potential to develop nature tourism	4) Strengthening of tourism net work to establish linkage with neighboring tourism destinations
5) Poor linkage with neighboring tourism destinations	
6) Poor access to important archeological sites and nature areas	

Note: The numbering does not imply a ranking of importance.
Source: JICA Study Team

Table 1.9 Directions for spatial tourism structure development

Tourism Structure	Existing Structural Features	Additional/Future Structural Features
Tourism Center	Flores / Santa Elena	Peten Itza Resort
Tourism Sub-center	None	Sayaxche Melchor de Mencos Poptún
Major Tourism Area	Tikal Ceibal / Aguateca	Tikal / Uaxactún Peten Itzá Lake Ceibal/ Aguateca Yaxha/ Nakum/ Naranjo triangle
Major Tour Route	Flores - Tikal Flores - Sayaxche - Ceibal / Aguateca	Flores - Tikal - Uaxactun Peten Itza Lake Flores – Sayaxché - Pasion River - archeological sites Flores - Yaxha - Nakum - El Naranjo Flores - Poptun
Mundo Maya Linkage	Flores - Melchor de Mencos - Belize	Flores - Melchor de Mencos - Belize Flores - Sayaxche - Palenque
Domestic Linkage	None	Flores - Sayaxche - Coban Flores - Poptun - Puerto Barrios

Source: JICA Study Team

1.3.3. Existing Infrastructure and Proposed Supporting Infrastructure Development Plan

As has been discussed before, the air transport and road transport modes are the two most important transport modes for international visitors traveling to Guatemala. Table 1.10 identifies the major gateway function points together with the number of visitors using these gateway points.

Table 1.10 Transport mode gateway points & visitor numbers

Transport Mode	Gateway Point	International Visitors 2000	
		Number	Percent
Air transport	La Aurora Airport Guatemala City	354,111	41.0
Air transport	Santa Elena Airp. Peten	11,415	1.3
Sub-total air transport		365,526	42.3
Road transport	From Mexico:		
	La Mesilla	23,980	2.8
	El Carmen	28,869	3.3
	Tecun Uman	10,000	1.2
	El Naranjo	1,653	0.2
	Bethel	6,836	0.8
	From El Salvador:		
	Pedro de Alvarado	83,727	9.7
	San Cristobal	93,235	10.8
	Valle Nuevo	68,213	7.9
	Nueva Anguiatu	62,063	7.2
	From Honduras:		
	Agua Caliente	24,430	2.8
	El Florido	15,753	1.8
	El Cinchado	6,301	0.7
Sub-total road transport		425,060	49.2
Sea transport	From Caribbean:		
	Puerto S. Tomas	907	0.1
	Livingston	2,764	0.3
	Puerto Barrios	4,870	0.6
Sub-total sea transport		8,541	1.0
TOTAL		799,127	92.5

Note: Figures do not add up to 100 percent due to unexplained reasons.

Source: JICA Study Team

The data suggest that the road transport mode, which accounted in 2000 for about 49 percent of all international visitors arriving in Guatemala, is the most important, followed by the air transport mode, which accounted for about 42 percent in the same year. Though Guatemala has a Caribbean Sea Coast, sea transport accounted for a modest one percent of all international visitor arrivals. While there are no reliable data on the transport mode used by international visitors after they have entered Guatemala, it is safe to assume that road transport is the predominant transport mode used by international visitors within Guatemala, in particular along the east-west corridor El Salvador – Guatemala/Antigua – Sololá/ Panajachel – Quetzaltenango.

The total road network in the Department Petén[11] has a length of 1,033 km (year 2000), equivalent to about 7 percent of the national level road network (all classes) of some 14,270 km. Some 769 km are department level roads (74.4 percent of Petén's road network) and 264 km (25.6 percent) are Central American roads. Part of road CA-13 extends from Flores to Melchor de Mencos in the east at the border with Belize. The roads 11 and 12 extend to the west, connecting Flores via La Libertad with Bethel, a border crossing point with Mexico.

The Petén Department adjoins Alta Verapaz and Izabal Departments to the south. Road CA-13 connects Petén with Izabal. CA-13 from Flores through Poptún to San Luis was developed over the old road of the Mayan King. CA-14 connects the western part of

[11] Please consult with Appendices 15,16 and 17 for more details about the road network.

Petén with Alta Verapaz in the south. CA-9 and CA-13, at a distance of some 525 km, connect Flores with Guatemala City. The travel time from Guatemala City to Flores by road is currently approximately seven hours and, therefore, somewhat unattractive for tourists.

Several daily flights connect Guatemala City with Flores, the international airport of which receives also international flights from Cancun, Mexico.

The Ministry of Communications, Infrastructure and Housing (MICIVI) has a concrete work program up to the year 2003, which in turn is based on a master plan prepared in 1999 by a consulting firm from Honduras. However, that master plan covers road rehabilitation and widening/upgrading only, but no new road construction. The master plan identifies strengthening of the east-west corridor as the most important priority.

MICIVI has an annual budget of some 600 million Quetzales for a road network of 14,270 km, out of which around 4,977 km are asphalt road, 6,100 km are earth roads and 3,193 km are rural roads[12]. That leaves the ministry with around Quetzales 120,555 per annum per km asphalt road and/or Quetzales 54,166 per asphalt road and earth road network for road rehabilitation and upgrading.

It is difficult, in view of a lack of comprehensive recent O/D tables and other related empirical data, to establish a clear empirical link between the status of the road network and existing and future potential tourism flows among Guatemala's existing and planned primary tourism areas. However, common sense and experience in other countries/regions would suggest that in order to:

- Further accelerate the development of the Tourism Sub-Centers as identified in the above Table 1.9, road upgrading and/or development that considerably reduces travel time will be necessary, in order to divert and or attract additional tourism flows and support tourism corridor development
- Increase tourism corridor development and tourism flows along the Guatemala/Antigua – Cobán – Flores axis, considerable road travel time reduction will have to be materialized. A common sense argument may suffice in this context. The weighted average length of stay of international visitors, who came for "holiday" purposes is, according to the visitors survey, some 11.3 days. Travel time by road & car from Guatemala City to Flores is around 7 – 8 hours one way. In other words, almost two days, or about 18 percent of the total weighted average length of stay of an international visiting tourist would have to be allocated to make the trip (excluding stay at Flores/ Tikal and so on) to Petén

[12] Out of the 1,033 km roads in Petén some 378 km (about 37 percent) are asphalted and the remainder of 655 km are earth roads. No road in Petén is classified as rural road.

- Develop the corridors to Mexico and Belize, measures will have to be adopted to improve and upgrade road and air connections and to improve border crossings. In this connection, MICIVI indicated the need to construct on the Guatemalan side a missing part of the Flores – Cancun road of a length of approximately 600 km.

1.3.4. Public Investment Process, On-going 2001 Public Sector Projects

It is necessary in the context of this feasibility study to gain some fundamental understanding of Guatemala's public investment planning structure and process. As has been discussed in previous sections in detail, Guatemala does so far not adopt any medium and/or long-term planning approach[13], which in turn implies that the public investment program (PIP) is an annual budgetary exercise in line with Guatemala's fiscal year (FY), which lasts from January to December.

The planning and implementation process for public sector investments is, in principle, divided into two stages, namely the pre-investment or planning stage and the investment stage. Project identification and planning in the pre-investment stage is usually a "tripartite" exercise involving (a) the communities, (b) the municipalities, and (c) the regional urban and rural development councils. There are eight (8) urban and rural regional development councils[14] in line with the national level planning structure that *divides the country into eight development regions*[15]. *The tripartite exercise addresses* "social investments" only that is potable water supply, bridges, maintenance of roads, construction of new roads, construction of schools, health centers, and so on. Electricity supply and distribution is not covered any more after the privatization of this sector.

In principle, the process works such that communities identify projects based on the needs as they perceive them. The needs-based shopping list of the communities is then submitted to the major of the respective municipality at the level of which the tripartite nature of the process starts. *Prioritization of projects is done on social consensus basis* among the communities and the major. The prioritized or short-list of projects for which public investment is contemplated is then submitted to the Office of the President, which in turn submits all project lists to Congress. Congress then discusses real cost and real priorities. A project list screened and approved by Congress is then forwarded to the Ministry of Public Finance (the Budget Office). In the first days of each calendar year, the list of approved public investment projects is published and the projects proceed to the implementation stage.

[13] The existing socio-political matrix 2000 to 2004 is more an action agenda than a medium-term planning tool to guide public investment activities.

[14] *In Spanish: Consejo Regional de Desarollo Urbano y Rural.*

[15] The development regions are: development region I: Guatemala; development Region II: Alta Verapaz and Baja Verapaz; development region III: El Progreso, Izabal, Zacapa, Chiquimula, development region IV: Santa Rosa, Jalapa, Jutiapa, development region V: Sacatepequez, Chimaltenango, Escuintla; development region VI: Solola, Totonicapan,

The municipalities and the communities have to prepare for the investment stage a standardized "project document". A "tripartite agreement" has to be signed for the project's implementation. This agreement is signed by (a) the Governor of the Department; (b) the President of the regional development council, and (c) the President of the community, in which the project is located. Reflecting the "tripartite" nature of public investment projects, the parties can make contributions as follows:

- The community. It can make contributions either in cash or kind. If the contribution is in kind, it is either in the form of material and/or unskilled labor
- The municipality. It can make contributions only in cash,
- The development council: Can make contributions only in cash.

The councils receive their financial resources from the national budget, i.e. from the Ministry of Public Finances[16]. The major source for public investment financing is the value-added-tax (VAT). About 90 percent of national level revenues stay at national level. Municipalities receive some 10 percent of national revenues in accordance with the decentralization law. Other sources of revenue generation for the municipalities are:

- The main source is the tax on non-movable assets[17], and
- Levies on water supply, garbage collection and similar public activities.

It is obvious from the above that only large communities can raise significant revenues, given such limited resource generating base.

It is not possible, given the prevailing public sector investment project procedure and jurisdictions as described above, to provide an overview of tourism sector directly or indirectly related public sector investment projects that are earmarked for implementation over the coming ten or even twenty years. It is, therefore, also not possible to match needed public sector investment projects with those needed to support to proposed tourism sector development direction.

It is important in this context, however, to highlight the major concerns that should prevail in the interrelationship between general socio-economic and tourism sector planning and programming. These major concerns are:

- The short annual horizon of general socio-economic related public investment planning and implementation, which renders it for all practical purposes impossible to

Quetzaltenango, Suchitepequez, Retalhuleu, San Marcos; development region VII: Huehuetenango, Quiche; development region VIII: Peten.

[16] Please consult with Appendices for more details on the budget.

[17] Impuesto Unico Sobre Inmuebles – IUC.

assess the extent to which individual projects make sense in the context of longer-term development objectives of a locale, an area, a region and/or a department. Available data on FY 2001 public investment projects for Petén suggest that most envisaged public sector investment projects address urgent "basic needs" demands. In that sense, the approach adopted is justifiable. However, general socio-economic and sector-specific development is a long-term process requiring at least overall qualitative objectives, if not numerical targets

- The lack of proper integration among sub-sectors and sectors in the planning and implementation stages. Two examples may suffice to make the point. Flores is in dire need of a medium-to long-term integrated urban development plan in view of its unique location and development potential, inter alias, as a tourism center for the Department Petén[18]. However, the preparation of such a tool is not in sight. Also, development of tourism related roads seems to face difficulties. Tourism roads listed on a priority list provided by the Ministry of Communications, Infrastructure and Human Settlements do no, according to INGUAT, reflect INGUAT's priorities; though there is a coordination mechanism between the two entities
- Under such circumstances, investment project assessment and evaluation becomes somewhat fragmented and difficult, since it leads to taking projects out of their overall environment and assessing them as if they were operating in a vacuum.

Therefore, what can be gained, from a brief overall assessment of the public sector projects that are on-going in the Department Petén in the FY 2001, is:

- A perception of the general priorities that have been identified in the tripartite process
- The rough investment amounts that have been allocated for the implementation of these projects, and
- Very general unit cost by sub-sector.

Table 1.11 provides an overview of these projects, identifying the municipality, the overall sector and the number of public investment projects in that sector. Table 1.12 summarizes the overall and general unit cost by sub-sector.

[18] In fact the need and desire for such a plan was clearly expressed during interviews with the relevant authorities.

Table 1.11 Public sector FY 2001 investment projects in Petén PTDA

Sub-sector	Municipalities												
	Flores	San Jose	San Benito	San Andres	La Libertad	San Francisco	Santa Ana	Dolores	San Luis	Sayaxche	Melchor de Mencos	Poptún	TOTAL
Road construction	1	0	1	1	1	0	1	0	5	0	2	3	15
Road drainage	0	1	0	0	0	0	0	0	0	0	0	0	1
Bridge structures	1	0	0	0	0	0	0	0	0	0	0	0	1
Electricity distribution	3	0	1	0	2	0	1	6	5	4	0	1	23
Potable water	1	0	0	5	0	1	1	0	0	0	2	0	10
Drainage construction	0	0	0	0	1	0	1	0	0	0	0	0	2
Well drilling	0	1	0	0	3	4	0	0	1	0	0	0	9
Street rehabilitation	0	0	0	0	0	0	1	0	0	0	0	1	2
Water distribution tank	0	0	0	0	0	0	0	0	0	0	2	0	2
TOTAL	6	2	2	6	7	5	5	6	11	4	6	5	65

Note: The numbers indicate the number of public investment projects, regardless of investment amount

Source: JICA Study Team

Table 1.12 Average public sector unit investment amounts by sub-sector (FY 2001)

Sub-sector	Total Units	Range of Investment	Overall Average Investment Amount
Road construction	130 km	Range from Q 33,333/km to Q 108,333/km	Q 75,762 per km
Road drainage	8 km	n.a.	Q 100 per m^2
Bridge structures	384 m^2	n.a.	Q 1,302 per m^2
Electricity distribution	210 km	Range from Q 10,000/km to Q 150,000/km	Q 37,123 per km
Potable water	25,916 m	Range from Q 67/m to Q 274/m	Q 205 per meter
Drainage construction	24,000 m	Range from Q 35/m to Q 250/m	Q 71 per meter
Well drilling	19,100 m	Range from Q 164/m to Q 375/m	Q 229 per meter
Street rehabilitation	108,000 m^2	Range from Q 3/ m^2 to Q 67/ m^2	Q 10 per meter square
Water distribution tank	170 $m.^3$	n.a.	Q 3,529 per cubic meter

Note: Unit: as indicated

Source: Peten Investment Program for FY 2001

It needs also to be kept in mind here that that listing does not reflect other projects under implementation by line ministries, such in the field of archeological site conservation, and so on. The following general observations can be made from the FY 2001 priority investment project list:

- The Department of Petén in FY 2001 had a total of 65 investment projects under implementation representing a total investment amount of approximately US dollar 4.05 million (at an exchange rate of Quetzales 7.9 to one US dollar). This represents a per capita investment amount in FY 2001 into public facilities of about US dollar 12, equivalent to about Q 96

- The projects are mainly in the fields of electricity distribution (35 percent of all projects); road construction (23 percent of all projects); provision of potable water (15 percent of all projects); and water well drilling, including minor equipment (14 percent of all projects)
- Obviously, investment cost for individual projects depend on the scope and the technical level of the project, as well as the local conditions. In that sense, the average investment amounts per technical unit identified in Table 1.12 are of indicative nature only. However, they may be employed later in the feasibility assessment as a sort of "control data" and,
- It is difficult to deduct from the available data in a direct manner in what way and to what degree these public investment projects will be supportive of accelerated tourism development in El Petén PTDA.

1.3.5. Tourism Development Support Measures 2000 to 2020 and Short-term Projects

Tourism development support measures are divided in the tourism development plan into two rough groups, those recommended for implementation before 2010 (short-term), and those that should be implemented between 2010 and 2020. There are some 23 short-term and some nine long-term development measures[19] that are in line with the tourism development strategy for El Petén PTDA. The pilot project under consideration here has to be interpreted in the context of these support measures and other related short-term projects.

1.3.6. Pilot Project Definition and Structure

(1) Pilot Project Background & Justification

The analysis of the tourism resources and tourist flows within Guatemala has resulted in the following major conclusions:

- The existing market segment of Mayan archaeological sites is the highlight of tourism in Guatemala. For example, out of the total number of international visitors of some 826,240 in the year 2000, some 220,000 visited Tikal National Park, i.e. about 27 percent of the total number of international visitors. If one projects the park's visitor number on the number of people that arrived in Guatemala for pure "holiday" purposes, the share would be around 60 percent[20].

[19] *However, it is preferable in this feasibility study to term them as measures, since not all are to be implemented by the* public sector and not for all of them external financing will be required.

[20] This comparison is somewhat theoretical, since also people, who come to Guatemala for other than holiday reasons, go and visit Tikal. Notwithstanding this fact, the relationship gives an indication of the importance that Tikal plays in Guatemalan tourism.

- Flores as a gateway to Guatemala accounted in the year 2000 for only 1.3 percent of all international visitor arrivals, implying that the overwhelming majority of visitors to Tikal National Park arrived through other gateways and then traveled to Tikal either by road or air
- The visitor flow to Tikal needs to be mitigated, i.e. alternative sites in the vicinity need to be improved and/or developed toward that end
- The most important tourism resource assets are in the archaeological field, and
- That, therefore, tourism streams should be diverted into different major tourism areas as identified in the spatial tourism structure plan.

The tourism areas identified for priority development are all more or less within one-day trip distance to the tourism center of Flores/Santa Elena. The Uaxactún archaeological sites are some 20 km to the north of Tikal, or some 55 km from Flores. Sayaxché and El Ceibal are some 60 km to the southwest of Flores. It seems logical and reasonable, due to the limitations for the development potential of other tourism assets and the relatively close proximity to Tikal, to develop these sites as complimentary and/or alternative archaeological sites to Tikal.

Major effects that are to be expected from such development are:

- Alleviation of the visitor pressure on the Tikal site by diverting some visitors from Tikal to these sites
- A slow, but gradual increase in visitor numbers to the tourism center of Flores/Santa Elena
- An prolongation of length-of-stay in the whole area, and
- A slow, but gradual diversification into higher value market segments (higher value per unit of stay) that combine archaeological with nature tourism.

(2) Pilot Project Preliminary Design, Development and Direct Objectives

The project list for the PTDA of El Petén as introduced in Volume 2 reflects two broad categories of projects, namely short-term projects that should be implemented by the target year 2010 and long-term projects that are to be implemented by the planning horizon year of 2020.

The short-term project list comprises also two broad categories, namely the proposed pilot projects and required support short-term projects. Project implementing entities are overwhelmingly public sector entities with two accommodation facilities to be realized by the private sector[21]. The major development direction of the short-term projects are

[21] Please refer to Volume 2 for a detailed description.

archeological site development and a Community Tourism development scheme around San Jose. The pilot project's development and direct project objectives are:

a. Development objective

The development objective of the proposed pilot projects is to strengthen the tourism facilities' structure of the Department Petén, thereby contributing to an accelerated socio-economic development of the Department through direct and indirect economic effects.

b. Direct project objectives

Realization of the proposed pilot projects aims at a bundle of direct project objectives that are partly overlapping and partly complimentary[22]. It suffices in the context of this viability investigation to recall the ten (10) major direct project objectives as:

- To promote and encourage tourism activities
- To improve accessibility
- To improve and add tourist attractiveness and convenience
- To motivate researchers and academics to learn Mayan culture
- To obtain profit to reinvest into archaeological research and conservation
- To provide tourism information on the surrounding area
- To provide education programs on conservation
- To revitalize and activate Itza Maya culture
- To promote cultural exchange and interaction between local people and visitors
- To improve local economic conditions

(3) Expected Project Outputs & Results

a. Project outputs

Implementation of the pilot projects is expected to result in the following direct outputs:

- Five upgraded archaeological sites
- An established and operational "Development of Maya Research and Learning Center – MRLC"
- An established and operational "Archaeological Site Museum"
- An established and operational "Archaeology and Regional Cultural Center", and
- Realization of additional accommodation.

[22] For a detailed discussion, please refer to the relevant Sections in Volume 2.

b. Project results

Major project results will be higher visitor numbers in general and more visitors in higher market value segments, as well as a flow of scholars of various fields of expertise interested in studying Mayan history and culture.

(4) Project "Implementing/Management Entity" & Implementation Mechanism

The proposed project involves, due to its very nature, both public sector and private sector entities. Also, due to its cross-sectoral nature, three lines-of-argumentation along a stakeholders' approach should be kept and analyzed separately, namely:

- Functions and responsibilities of the pilot project "Implementing/Management Entity"
- The "Operating Entity" after completion of the pilot project realization
- Financial functions & responsibilities and the related cash flow, and
- Ownership title and direct and indirect beneficiaries.

There are, in principle, six entities that are considered direct stakeholders in the project, namely INGUAT, MICUDE/IDAEH, MICIVI, the Municipality concerned, the Tourism Committee concerned and the "private sector". Table 1.13 summarizes primary functions and responsibilities that should be attached to the three important principal stakeholders. The municipalities and tourism committees concerned should be co-management members without any secondary and/or cash flow functions. The private sector is expected to implement the sub-contracts.

The main features of the pilot project delivery mechanism and its related financial/cash flow responsibilities are:

- A co-management mechanism is recommended that involves all the primary stakeholders. However, the "project implementation/management entity" should be chaired by IDAEH
- Implementation of individual project components should be delegated to the authority/entity under the jurisdiction of which they would legally fall. Hence, roads to MCIHS, and so on. These entities would assume normal O&M expenditures after the project components have entered their useful life-cycle

Table 1.13 Primary functions of three primary project stakeholders

Primary Stakeholder	Primary Functions	Secondary Functions	Financial/Cash flow Functions
IDAEH	Chairman Implementing Entity	Coordination & General Supervision Tendering & Supervision of out-house contracts, if any	Budget Project Component Pay sub-contractor
INGUAT	Co-management Member	Tendering & Supervision of out-house contracts, if any	None
MICIVI	Implementation Road Components	Tendering & Supervision of Road Components	Project Budget Component Pay sub-contractor

Note: It is assumed here that the line Ministries will receive the funds for their respective project components as "budget support" from MOPF implying that there will be no repayment conditions.

Source: JICA Study Team.

- Most work under the individual project components (facility construction, road rehabilitation and/or construction, and so on) may actually be realized by the private sector following established tender procedures, and
- Financial and cash flow responsibility should rest with entities that have the capacity & capability for such functions.

The following principles should apply, since the pilot project comprises to a large extent the establishment and/or upgrading of physical facilities:

- Ownership title of the physical facilities to be established should be granted to the entities that are under the existing legal framework responsible for such or similar type of facilities/assets, and
- Hence, O&M cost responsibilities, but also beneficiary of potential revenue streams generated by the facilities should be the very same entities.

1.3.7. Future Tourism Demand Considerations and Projections

The recommendations put forward in the main report in Volume 2 for further developing the tourism facilities' infrastructure and related facilities imply that all short-term projects or, in other words, the related public and private sector investments materialize in a certain pattern and time related sequence. The implicit key assumption is that there is a parallel cycle between the supply and demand sides, i.e. in particular investment into additional accommodation facilites is realized[23] in parallel with increasing demand so that there is, at no point in time, any demand overhang and/or supply capacity constraint[24]. The future visitor numbers and/or tourism demand patterns and flow projections that are outlined in Volume 2 represent, therefore, the "with" pilot and other short-term project

[23] Whenever normal operating capacity is reached in the already existing facilities.

[24] A demand overhang and/or supply capacity constraint in accommodation facilities would automatically imply that visitor numbers, from that point in time, could not increase further and visitor numbers and benefits would have to be capped.

implementation scenario in the tourism development framework for El Petén PTDA. The main features of the "with" scenario are reproduced for comparative reasons in Table 1.14.

Table 1.14 El Petén PTDA "with case" tourism development framework

Parameter	Unit	2000	2010	2020
Peten PTDA				
A. Visitor arrivals				
International	"000"	161	285	472
Domestic	"000"	90	132	226
Total	"000"	251	417	699
B. Bed-nights				
International	"000"	559	986	1,603
Domestic	"000"	136	198	340
Total	"000"	695	1,184	1,943

Source: JICA Study Team.

However, it is necessary, in order to delineate the "with" against the "without" or "do nothing" case to determine, i) the number of international and domestic tourists as well as ii) the number of international and domestic bed-nights that would accrue under the "without" or "do nothing" scenario. The following approach is adopted:

- The total number of international and domestic tourists and bed-nights is estimated for the "without" scenario (the "do nothing" case). "Without" refers to two elements. First, tourism support measures and the pilot projects do not materialize and, secondly, the market segmentation measured in terms of average length-of-stay and average bed-nights remains at year 2000 constant values, and
- As indicated already above, the "with" scenario assumes that tourism promotion measures as well as the pilot project will be implemented timely and that they will be complimented by needed private sector investment.

Table 1.15 identifies the results of the three computations in terms of absolute number of tourists and bed-nights. The results are summarized briefly as:

- The accumulated differential up to the year 2020 in total visitor arrivals (international and domestic) is some 223,000 people, and
- The accumulated differential up to the year 2020 is some 611,000 bed-nights.

Table 1.15 With" and "without" project tourism flow and pattern for El Petén PTDA

Parameter	Unit	2000	2010	2020
"WITHOUT " SCENARIO				
1) International visitor arrivals	"000"	161	234	350
2) International bed-nights	"000"	559	812	1,215
3) Domestic tourists	"000"	90	80	125
4) Domestic bed-nights	"000"	136	120	188
5) Total visitor arrivals	"000"	251	314	475
6) Total bed-nights	"000"	695	932	1,403
"WITH" SCENARIO				
1) International visitor arrivals	"000"	161	286	472
2) International bed-nights	"000"	559	986	1,603
3) Domestic tourists	"000"	90	132	226
4) Domestic bed-nights	"000"	136	198	340
5) Total visitor arrivals	"000"	251	417	699
6) Total bed-nights	"000"	695	1,184	1,943
DIFFERENTIALS BETWEEN SCENARIOS				
1) International visitor arrivals	"000"	0	52	122
2) International bed-nights	"000"	0	174	388
3) Domestic tourists	"000"	0	52	101
4) Domestic bed-nights	"000"	0	78	152
5) Total visitor arrivals	"000"	0	104	223
6) Total bed-nights	"000"	0	252	611

Source: JICA Study Team

1.3.8. Project Base and Investment Cost

The following individual cost categories are taken into account in the project investment cost estimation and the economic project analysis:

- Land acquisition cost, including related compensation cost for existing fixed assets and utility relocation cost. The cost estimates are based on "best estimate" provided by private landowners and/or municipalities. However, there is a certain level of uncertainty in these data, since actually realized land cost depend on the results of individual negotiations and may, therefore differ, from "best estimates"
- Construction cost, including design cost. It is anticipated that construction contracts will be awarded on a "design-build-construct - DBC" basis and that tendering will be done on "QCSB" (quality-cost-selection-basis) criteria
- Administrative overhead cost of public entities involved in pilot project implementation are taken into account, since project cost have to be assessed on an "all resources & all cost component basis". They are assessed at 1.5 per cent of the related cost item
- Insurance cost during construction has not been taken into account separately
- Levies and value-added-tax are computed to derive at project investment cost. However, these cost items do not enter the CBA per definition of economic prices
- Working capital requirements are already covered by the cost category "administrative overhead". Hence, though the item is identified in the summary tables, it is set at "zero" value

- Interest-during-construction (IDC) is taken into account, again based on the principle of "all resources and all cost components"
- Contingency funds for civil works are set at a rate of ten per cent of the construction cost, and
- Contingency funds for equipment are set at five per cent of the estimated equipment cost.

In general, the economic cost-benefit-analysis (CBA) is based on the basic definitions and assumptions as reported in Section 2 of this Volume 3, and minor additional definitions, in particular as they refer to O&M cost items and responsibilities and the financing structure, are introduced and discussed under the individual headings.

(1) Land acquisition & compensation cost; land acquisition schedule

The proposed pilot project and its related supporting short-term projects have 14 components that may require the acquisition of land for the realization of the facilities. These components are:

1) Development of Maya Research and Learning Center – MRLC; about 2,500 sqm. In a rural setting. However, this land is currently located on a private finca. The "best estimate" provided per sqm is US $ 150, equivalent to about Quetzales 1,200 per sqm
2) Construction of 30 rooms middle class tourist hotel in a rural setting. Land requirement is estimated at 3,000 sqm and the "best estimate" per sqm is US $ 75, equivalent to Quetzales 600
3) Itzá Maya Culture Museum. Land requirement is estimated at 300 sqm, and the "best estimate" per sqm is US $ 50, equivalent to Quetzales 400
4) Itzá Maya Language Inheritor Museum. Land requirement is estimated at sqm 500 with the "best estimate" per sqm at US $ 50, equivalent to Quetzales 400
5) Botanical Pharmaceuticals and Herbs Museum. Land requirement are estimated at sqm 10,000 with the "best estimate" per sqm at US 50, equivalent to Quetzales 400
6) Horseback Riding Center. Land requirement are estimated at sqm 2,000 with the "best estimate" per sqm at US 50, equivalent to Quetzales 400
7) Handicraft Showcase. Land requirement are estimated at sqm 400 with the "best estimate" per sqm at US 50, equivalent to Quetzales 400
8) Local Cookery Restaurant. Land requirement are estimated at sqm 500 with the "best estimate" per sqm at US 50, equivalent to Quetzales 400
9) Hotel facilities with 50 middle class and 100 low class rooms. Land requirement are estimated at sqm 22,5000 with the "best estimate" per sqm at US 50, equivalent to Quetzales 400

10) Flores Tourist Paradise. Land requirement are estimated at sqm 150 with the "best estimate" per sqm at US 150, equivalent to Quetzales 1,200

11) Hotel facilities with 167 middle class and 132 low class rooms. Land requirement are estimated at sqm 29,900 with the "best estimate" per sqm at US 50, equivalent to Quetzales 400.

Actual land purchase cost, compensation cost, utility relocation cost and administrative overhead are assumed as summarized in Table 1.16.

Table 1.16 Estimated total land acquisition cost

Project Element	Land acquisition cost	Compensation	Utility relocation cost	Administrative overhead cost	Total
MRLC	3.000	0.000	0.000	0.045	3.045
Hotel Development in Sayaxche	1.800	0.000	0.000	0.027	1.827
Itza Maya Culture Museum	0.120	0.000	0.000	0.002	0.122
Maya Language Museum	0.200	0.000	0.000	0.003	0.203
Herbs Museum	*4.000*	*0.000*	*0.000*	*0.060*	*4.060*
Horseback Riding	0.800	0.000	0.000	0.012	0.812
Handicrafts Showcase	0.160	0.000	0.000	0.002	0.162
Restaurant	0.200	0.000	0.000	0.003	0.203
Accommodation around the Lake	9.000	0.000	0.000	0.135	9.135
Beautification of Noj Peten	0.180	0.000	0.000	0.003	0.183
Hotel Development in Peten	11.960	0.000	0.000	0.179	12.139
TOTAL	31.420	0.000	0.000	0.471	31.891

Note: Unit: Million Quetzales
Source: JICA Study Team.

Total land acquisition and related cost are estimated at Quetzales 31,891 million, equivalent to about US dollar 3.986 million or ¥ 482,351 million at the established exchange rates.

It is furthermore assumed that the land acquisition process will be finalized within fiscal year (FY) 2002.

(2) Estimated O&M costs for roads and facilities

Routine operation and maintenance expenditures (O&M expenditures) are estimated for the following project components:

- 35 km of access roads at Uaxactún and the Yaxhá and Nakúm archeological sites. Road routine O&M expenditures for the following five roads in Petén are used as a proxy to determine O&M expenditures for the road section referred to above: i) La Pólvora – La Blanca, about 18.75 km; ii) La Candelaria – San Andrés, 8.74 km; iii) San Andrés – El Remate, about 25.68 km; iv) La Libertad – El Subín, 19 km; v) El Subín – Sayaxché, 14 km. Sub-contracted O&M expenditures for these roads range from Q 3,947/km to Q 21,143/km. Obviously, O&M expenditures depend on many variables, such as technical road condition, volume and type of traffic, and so on. However, for calculation purposes it is assumed that the average annual O&M

expenditures for the pilot project road segments will be Q 16,386/km, equivalent to some Q 573,510 annually. The O&M cost for these access roads are not considered in the O&M portion of the CBA, since these roads fall under the jurisdiction of the respective line ministry and, hence, O&M expenditures are to be covered from regular budget resources

- Periodic road maintenance expenditures for resurfacing are not considered here
- O&M expenditures for the physical facilities are estimated at 7.5 percent annually of the original investment cost
- Maintenance expenditures, including spare parts, for the equipment component are estimated at annually 15 percent of the original investment cost, and
- The exchange rate applied throughout is one (1) US dollar equals eight (8) Quetzales equals Yen 121.

(3) Estimated construction engineering base cost and study cost

The following additional assumptions are made for the estimation of the project base cost (in constant 2001 price base) and, subsequently, later in this Section the total investment cost in current prices:

- Project cost components are "bundled" in such a way that cost items can be attached to the responsible implementing sub-entity
- It is assumed that MICIVI will implement the road element. Construction is to start in January 2003 with an implementation cycle of 24 months. The local cost component (LC) is assumed at 80 percent and the foreign cost (FC) component at 20 percent. This distribution is based on interview results with construction companies and the Ministry. The draw down schedule is in two equal annual portions
- All other civil works, such as physical building facilities, related utilities and so on, are to be implemented by the line ministry of whose jurisdiction the will eventually fall (ownership title). Realization is to start in January 2003 and to be completed within 36 months. The LC is assumed at 90 percent and the FC at 10 percent. The draw down schedule is in three equal portions
- It is assumed that the equipment component will be delivered in the last quarter of 2005. The LC and FC is assumed at 50 percent each
- The administrative overhead incurred by the "Implementing/Management Entity" and related line Ministries is assumed at 1.5 percent of total project base cost
- Duties and related levies are set at 7.5 percent of the FC component
- Value-added-tax of 12 percent is levied on all commercial transaction

- Constant 2001 prices are adjusted annually in the LC for 7 percent inflation and for the FC at 1.5 percent annually to convert constant 2001 into current prices. It is assumed that imports of material, components and equipment will be sourced from Japan
- Interest-during-construction (IDC) is calculated at 2 percent p.a., since it is assumed that the loan facilities will be forwarded to the relevant entities in form of budget support, i.e. there will be no repayment obligations to the Ministry of Finance
- No exchange rate risk is considered, i.e. it will be assumed by the GOG/Ministry of Public Finance
- It is assumed that the pilot project will be financed through a ¥en dominated sovereign guaranteed loan at an interest rate of i = 2.00 percent per annum; a grace period on the principal of ten (10) years, and a repayment period of thirty (30) years
- Total pilot project implementation time will be 36 months, i.e. the facilities are assumed to be opened to the public by January 2006.

Table 1.17 identifies the project base cost in constant 2001 price-base and Table 1.18 summarizes the project base cost in current prices.

The implicit meaning of both tables is summarized as:

- Total project base cost in current prices before financing, all cost components and all resources, is estimated at Quetzales 434,30 million, equivalent to about US dollar 54.29 million or ¥ 6,568.79 million
- The share of the engineering base cost, including the environmental and zoning planning studies, but excluding the Government of Guatemala contribution, is estimated at 80.14 percent of the above total
- The cost of the environmental improvement and zoning control studies is estimated at Quetzales 16.02 million, equivalent to about 3.7 per cent of total project cost. If these studies can be implemented through any ODA grant arrangement, the total project cost could be reduced by that amount
- The local cost component in the engineering base cost is around Quetzales 296.60 million (about US dollar 37.08 million or ¥ 4,486.08), equivalent to about 85 percent of project engineering base cost
- The foreign cost·component in the engineering base cost is about Quetzales 51.45 million (around US dollar 6.43 million or ¥ 778.18 million), equivalent to some 15 percent of project engineering base cost

- Total direct cost to the GOG in terms of land acquisition and compensation cost are estimated Quetzales 38.16 million, equivalent to about 8.8 percent of project base cost (all resources and all cost components)
- Administrative overhead represented by the salaries and other fringe benefits of line ministries and other relevant official salaries involved in the "Implementing/ Management Entity" of the pilot project is estimated at about Quetzales 5.48 million over the implementation cycle, about 1.26 percent of project base cost (all resources and all cost components)
- Direct government receipts resulting from duties, levies and value-added-tax are estimated at Quetzales 47.15 million or about 10.86 percent of project base cost (all resources and all cost components), and
- The above item represents a direct net benefit to the GOG, if for example no exemptions on duties, levies and VAT will be granted to private sub-contractors.

Table 1.17 Total engineering base cost & study estimation all resources all cost components (in 2001 constant prices)

Major cost category	2002			2003			2004			2005			2006			Total			Total [in percent]		
	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total
1) Civil Works Road Component/MTIHS	0.00	0.00	0.00	22.91	5.73	28.64	22.91	5.73	28.64	0.00	0.00	0.00	0.00	0.00	0.00	45.82	11.46	57.28	14.54	21.26	15.52
2) All other Civil Works*)	0.00	0.00	0.00	56.35	6.26	62.62	56.35	6.26	62.62	56.35	6.26	62.62	0.00	0.00	0.00	169.06	18.78	187.85	53.64	34.86	50.89
3) Equipment Component	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.80	3.80	7.60	0.00	0.00	0.00	3.80	3.80	7.60	1.21	7.05	2.06
4) Physical Contingency **)	0.00	0.00	0.00	7.93	1.20	9.13	7.93	1.20	9.13	5.83	0.82	6.64	0.00	0.00	0.00	21.68	3.21	24.89	6.88	5.96	6.74
5) Environmental Improvement Study	0.00	0.00	0.00	2.72	10.88	13.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.72	10.88	13.60	0.86	20.19	3.68
6) Zoning Control Study	0.00	0.00	0.00	0.21	0.85	1.07	0.11	0.43	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.32	1.28	1.60	0.10	2.38	0.43
7) Engineering Base Cost Sub-total	0.00	0.00	0.00	90.13	24.92	115.05	87.30	13.62	100.91	65.98	10.88	76.86	0.00	0.00	0.00	243.41	49.41	292.82	77.22	91.70	79.34
8) Land Acquisition, Compensation;	31.42	0.00	31.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.42	0.00	31.42	9.97	0.00	8.51
9) Related Administration OH ***)	0.47	0.00	0.47	1.51	0.00	1.51	1.51	0.00	1.51	1.15	0.00	1.15	0.00	0.00	0.00	4.64	0.00	4.64	0.46	0.00	1.26
10) Duty & Levies on Imports	0.00	0.00	0.00	0.99	0.00	0.99	0.99	0.00	0.99	0.82	0.00	0.82	0.00	0.00	0.00	2.79	0.00	2.79	0.89	0.00	0.76
11) Value -added-tax at 12 percent	3.77	0.00	3.77	10.58	1.58	12.16	10.58	1.58	12.16	8.02	1.31	9.32	0.00	0.00	0.00	32.95	4.47	37.42	10.45	8.30	10.14
12) GOG Contribution Sub-total	35.66	0.00	35.66	13.08	1.58	14.66	13.08	1.58	14.66	9.98	1.31	11.29	0.00	0.00	0.00	71.80	4.47	76.27	22.78	8.30	20.66
13) Project Base Cost (All resources)	35.66	0.00	35.66	103.20	26.50	129.71	100.38	15.20	115.57	75.96	12.18	88.15	0.00	0.00	0.00	315.21	53.89	369.09	100.00	100.00	100.00

Note: Unit: Million Current Quetzales
*) All other civil works includes all physical buildings, related utilities and landscaping., as well as the 2 km access road at El Ceibal/San Martin.
**) Physical contingency for civil works is assumed at 10 percent and for the equipment component at 5 percent.
***) Related administrative overhead covers the salaries and related expenditures incurred by the "Implementing/Management Entity" and other related technical Ministries. It is assessed at 1.5 percent of engineering base cost.

Source: JICA Study Team

Table 1.18 Total engineering base cost & study estimation all resources all cost components (in current prices)

Major cost category	2002			2003			2004			2005			2006			Total			Total (In percent)		
	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total
1. Civil Works Road Component/MTIHS	0.00	0.00	0.00	26.23	5.90	32.13	28.07	5.99	34.06	0.00	0.00	0.00	0.00	0.00	0.00	54.30	11.89	66.19	14.36	21.19	15.24
2) All other Civil Works *)	0.00	0.00	0.00	64.52	6.45	70.97	69.03	6.55	75.58	73.86	6.64	80.50	0.00	0.00	0.00	207.41	19.64	227.05	54.84	34.99	52.28
3) Equipment Component	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.98	4.03	9.01	0.00	0.00	0.00	4.98	4.03	9.01	1.32	7.18	2.07
4) Physical Contingency **)	0.00	0.00	0.00	9.08	1.24	10.32	9.71	1.25	10.96	7.64	0.87	8.50	0.00	0.00	0.00	26.43	3.35	29.78	6.99	5.98	6.85
5) Environmental Improvement Study	0.00	0.00	0.00	3.11	11.21	14.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.11	11.21	14.32	0.82	19.97	3.30
6) Zoning Control Study	*0.00*	*0.00*	*0.00*	*0.24*	*0.88*	*1.12*	*0.13*	*0.45*	*0.58*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.37*	*1.33*	*1.70*	*0.10*	*2.37*	*0.39*
7) Engineering Base Cost Sub-total	0.00	0.00	0.00	103.18	25.68	128.86	106.94	14.24	121.18	86.48	11.54	98.01	0.00	0.00	0.00	296.60	51.45	348.05	78.43	91.68	80.14
8) Land Acquisition; Compensation;	33.62	0.00	33.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.62	0.00	33.62	8.89	0.00	7.74
9) Related Administration OH ***)	0.50	0.00	0.50	1.70	0.00	1.70	1.81	0.00	1.81	1.47	0.00	1.47	0.00	0.00	0.00	5.48	0.00	5.48	5.72	0.00	1.26
10) Duty & Levies on Imports	0.00	0.00	0.00	1.02	0.00	1.02	1.03	0.00	1.03	0.87	0.00	0.87	0.00	0.00	0.00	2.92	0.00	2.92	0.77	0.00	0.67
11) Value -added-tax at 12 percent	4.03	0.00	4.03	12.10	1.63	13.73	12.94	1.66	14.60	10.48	1.38	11.87	0.00	0.00	0.00	39.56	4.67	44.23	10.46	8.32	10.18
12) GOG Contribution Sub-total	38.16	0.00	38.16	14.82	1.63	16.45	15.78	1.66	17.44	12.82	1.38	14.20	0.00	0.00	0.00	81.58	4.67	86.25	21.57	8.32	19.86
13) Project Base Cost (All resources)	38.16	0.00	38.16	118.00	27.31	145.31	122.72	15.90	138.62	99.29	12.92	112.21	0.00	0.00	0.00	378.18	56.12	434.30	100.00	100.00	100.00

Note: Unit: Million Current Quetzales
*) All other civil works includes all physical buildings, related utilities and landscaping., as well as the 2 km access road at El Ceibal/San Martin.
**) Physical contingency for civil works is assumed at 10 percent and for the equipment component at 5 percent.
***) Related administrative overhead covers the salaries and related expenditures incurred by the "Implementing/Management Entity" and other related technical Ministries. It is assessed at 1.5 percent of engineering base cost.

Source: JICA Study Team

(4) Proposed project financing structure

The main features of the financing structure as implicitly already reflected above are summarized as:

- After finalization of Guatemala's established internal reviewing and approval procedure, the GOG seeks external financial assistance under a sovereign guaranteed loan agreement
- After the loan agreement is signed, the Ministry of Public Finance allocates the appropriate amounts to the relevant line ministries and/or entities responsible financially for "their" project components
- The allocation by the MOF is treated as a "budget support" item, and
- Hence, no repayment "terms & conditions" apply back to the MOF.

(5) Estimated total investment cost

In view of the proposed financing structure, there is no need to establish the project's repayment schedule and debt-service capability in view of the fact that the cash flow is treated as "budget support". There is nevertheless a need to establish the total cost to Guatemala's economy. Hence, interest-during-constructions (IDC) needs to be computed and added to the project base cost, in order to arrive at the total investment requirements, or the capital that will need to be borrowed on the external ODA capital market for pilot project implementation.

Table 1.19 presents the detailed project investment cost (all resources and all cost components), which amount to Quetzales 463.73 million, roughly equivalent to US dollar 57.97 million or ¥ 7,013.92 million. Table 1.20 presents the summary overview of project investment cost in Quetzales, US dollar and Japanese ¥ by major cost components only.

Table 1.19 Total investment cost estimation all resources all cost components (current prices)

Major cost category	2002			2003			2004			2005			2006			Total			Total [in percent]		
	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total
1) Civil Works Road Component/MTIHS	0.00	0.00	0.00	26.23	5.90	32.13	28.07	5.99	34.06	0.00	0.00	0.00	0.00	0.00	0.00	54.30	11.89	66.19	14.36	21.19	15.24
2) All other Civil Works*)	0.00	0.00	0.00	64.52	6.45	70.97	69.03	6.55	75.58	73.86	6.64	80.50	0.00	0.00	0.00	207.41	19.64	227.05	54.84	34.99	52.28
3) Equipment Component	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.98	4.03	9.01	0.00	0.00	0.00	4.98	4.03	9.01	1.32	7.18	2.07
4) Physical Contingency **)	0.00	0.00	0.00	9.08	1.24	10.32	9.71	1.25	10.96	7.64	0.87	8.50	0.00	0.00	0.00	26.43	3.35	29.78	6.99	5.98	6.86
5) Environmental Improvement Study	0.00	0.00	0.00	3.11	11.21	14.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.11	11.21	14.32	0.82	19.97	3.30
6) Zoning Control Study	0.00	0.00	0.00	0.24	0.88	1.12	0.13	0.45	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.37	1.33	1.70	0.10	2.37	0.39
7) Engineering Base Cost Sub-total	0.00	0.00	0.00	103.18	25.68	128.86	106.94	14.24	121.18	86.48	11.54	98.01	0.00	0.00	0.00	296.60	51.45	348.05	78.43	91.68	80.14
8) Land Acquisition; Compensation;	33.62	0.00	33.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.62	0.00	33.62	8.89	0.00	7.74
9) Related Administration OH ***)	0.50	0.00	0.50	1.70	0.00	1.70	1.81	0.00	1.81	1.47	0.00	1.47	0.00	0.00	0.00	5.48	0.00	5.48	6.72	0.00	1.26
10) Duty & Levies on Imports	0.00	0.00	0.00	1.02	0.00	1.02	1.03	0.00	1.03	0.87	0.00	0.87	0.00	0.00	0.00	2.92	0.00	2.92	0.77	0.00	0.67
11) Value -added-tax at 12 percent	4.03	0.00	4.03	12.19	1.63	13.73	12.94	1.66	14.60	10.48	1.38	11.87	0.00	0.00	0.00	39.56	4.67	44.23	10.46	8.32	10.18
12) GOG Contribution Sub-total	38.16	0.00	38.16	14.82	1.63	16.45	15.78	1.66	17.44	12.82	1.38	14.20	0.00	0.00	0.00	81.58	4.67	86.25	21.57	8.32	19.85
13) Project Base Cost (All resources)	38.16	0.00	38.16	118.00	27.31	145.31	122.72	15.90	138.62	99.29	12.92	112.21	0.00	0.00	0.00	378.18	56.12	434.30	100.00	100.00	100.00
14) Working Capital Requirements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
15) Interest During Construction-IDC	0.00	0.00	0.00	3.68	0.00	3.68	5.74	0.00	5.74	5.07	0.00	5.07	14.94	0.00	14.94	29.43	0.00	29.43			
16) TOTAL INVESTMENT COST	38.16	0.00	38.16	121.68	27.31	148.99	128.46	15.90	144.36	104.36	12.92	117.28	14.94	0.00	14.94	407.61	56.12	463.73			

Note: Unit: Million Current Quetzales

Source: JICA Study Team

Table 1.20 Summary overview of project investment cost

Parameter	LC	FC	Total	LC	FC	Total	LC	FC	Total
	(Unit: Quetzales)			(Unit: US dollars)			(Unit: Japanese Yen)		
1) Engineering Base Cost	296.60	51.45	348.05	37.08	6.43	43.51	4,486.08	778.18	5,264.26
2) Land Acquisition & Administrative Overhead	39.10	0.00	39.10	4.89	0.00	4.89	591.39	0.00	591.39
3) Levies & VAT *)	42.48	4.67	47.15	5.31	0.58	5.89	642.51	70.63	713.14
4) Working Capital	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5) IDC	29.43	0.00	29.43	3.68	0.00	3.68	445.13	0.00	445.13
6) Total Capital Cost	407.61	56.12	463.73	50.95	7.02	57.97	6,165.10	848.82	7,013.92

Note: Unit: million

Source: JICA Study Team

1.3.9. Economic Benefits

The magnitude and distribution pattern over time of direct and indirect economic gross benefits is, in principle, determined by four dependent variables. Namely:

- The absolute number of international and domestic visitors
- The average length-of-stay
- The average expenditure per day per expenditure category, and
- The distribution of visitors over market segmentation expressed in monetary terms.

Direct and indirect economic benefits that follow the definitions outlined below are employed in the analysis.

(1) Direct economic gross benefits

Direct economic gross benefits are defined as those that result from the increments in number of tourists, average length-of-stay; average expenditure and distribution over market segmentation achievable under "with" pilot projects as measured against the "without" pilot project scenarios. Regional economic distribution effects have not been taken into account, due to the lack of reliable cross-regional input-output data.

(2) Indirect economic gross benefits

Indirect economic gross benefits often cited are creation of workers in tourism related industries, increase in employment in the construction industry, multiplier effects generated by tourism consumption and the induced construction works, balance-of-payments effects generated by the inflow of foreign exchange into the economy, increased Government revenues through additional direct and indirect taxes, strengthening of the economic structure and other related business activities. However, not all of these indirect benefits are easily quantifiable and an empirical data-base on such effects in the Guatemalan economy does not yet exist. It is also somewhat problematic to use cross-country empirical data. Hence, only the benefits derived at from indirect employment creation and the multiplier effects are taken into account[25]. The following formulas were employed as a proxy to compute indirect economic benefits:

- Indirect employment. The number of direct employees in the hotel industry varies between one to two persons per room according to interviews with the hotel trade. It is estimated that indirect employment in tourism related industries varies between 1.5 to three persons per direct hotel industry employed person. Two indirect employees are assumed per additionally created employed person in hotels, in order to remain on the conservative side of the economic benefit computation. The average number of workers per hotel room is assumed at 1.5 and the average turnover of related industries is assumed at Quetzales 80,000. The cumulative increase in room numbers is adopted as the calculation base

- Implementation of pilot and related short-term projects as well as construction of additional accommodation facilities will have a strong impact on the construction and civil works industry. The increase in construction and civil works related workers is assumed proportionally to accommodation construction according to the following assumptions: investment per 5-star hotel room about Quetzales 1 million and induced employment 10 people, investment per 4-star hotel room about Quetzales 800,000 and induced employment seven workers, investment per 3-star hotel room about Quetzales

[25] A descriptive discussion of some of the other indirect benefits is undertaken in the Section on impact and risk assessment.

600,000 and induced employment five workers, investment per 2-star hotel room about Quetzales 400,000 and induced employment four people, investment per 1-star hotel room about Quetzales 200,000 and induced employment three persons and investment into no-star hotel room about Quetzales 40,000 and induced employment two people

- Multiplier effect generated by tourists' consumption. The intermediate input in the hotels and restaurants sub-sector is estimated to range between 15 per cent to 25 per cent. A 20 per cent base-rate is assumed and it is further assumed that about only 30 per cent are sourced locally, due to the relative low level of economic development in the Department
- Multiplier effect of construction and related civil works. The multiplier effect in these sub-sectors is assumed at 50 per cent and it is further assumed that only 25 per cent are sourced locally.

1.3.10. Cost-Benefit Analysis (CBA) and Projected Project Returns - EIRR

Direct economic gross benefits in financial prices reflecting the "with" and "without" scenarios are summarized in Table 1.21 and indirect economic gross benefits also in financial prices are summarized in Table 1.22.

As indicated earlier, the "without" scenario reflects a situation under which no pilot and related short-term projects are implemented and market distribution remains unchanged at year 2000 characteristics. The "with" scenario reflects implementation of the pilot and related short-term projects and the Department Petén receives a higher share of visitors to Guatemala, the bed-nights increase in response to higher attractiveness of tourism resources and market characteristics shift over the planning horizon to higher value market segments.

Table 1.21 Direct gross economic benefits for "with" and "without" scenarios

SCENARIOS	*2000*	*2010*	*2020*
A) "Without" Case	175.20	232.80	351.20
B) "With" Case	175.20	437.60	893.76
Differential A to C	0.00	204.80	542.56

Note: Unit: million Quetzales
Source: JICA Study Team.

Table 1.22 Indirect gross economic benefits for "with" and "without" scenarios

Calendar Year	Life Cycle Year	Indirect Gross Benefit 1	Indirect Gross Benefit 2	Multiplier Effects		Total Indirect Economic Benefits
				Tourist Consumption	Construction Sub-sector	
2002	-4	0.00	15.56	2.16	0.00	17.72
2003	-3	0.00	15.56	2.16	17.68	35.40
2004	-2	0.00	15.56	2.16	17.68	35.40
2005	-1	0.00	15.56	2.16	12.19	29.91
2006	1	10.41	15.56	2.16	0.00	28.13
2007	2	10.41	15.56	2.16	0.00	28.13
2008	3	10.41	15.56	2.16	0.00	28.13
2009	4	10.41	15.56	2.16	0.00	28.13
2010	5	10.41	15.56	2.16	0.00	28.13
2011	6	16.59	26.88	3.22	0.00	46.69
2012	7	16.59	26.88	3.22	0.00	46.69
2013	8	16.59	26.88	3.22	0.00	46.69
2014	9	16.59	26.88	3.22	0.00	46.69
2015	10	16.59	26.88	3.22	0.00	46.69
2016	11	16.59	26.88	3.22	0.00	46.69
2017	12	16.59	26.88	3.22	0.00	46.69
2018	13	16.59	26.88	3.22	0.00	46.69
2019	14	16.59	26.88	3.22	0.00	46.69
2020	15	16.59	26.88	3.22	0.00	46.69
2021	16	16.59	26.88	3.22	0.00	46.69
2022	17	16.59	26.88	3.22	0.00	46.69
2023	18	16.59	26.88	3.22	0.00	46.69
2024	19	16.59	26.88	3.22	0.00	46.69
2025	20	16.59	26.88	3.22	0.00	46.69
Total		300.90	543.26	67.72	47.55	959.43

Note: All values are in financial prices and indirect economic benefits 1 derive from indirect labor generation generated by hotels and indirect economic benefits 2 derive from indirect labor generated by investments
Unit: Number/Quetzales
1. All values are in financial prices.
2. Indirect economic benefits 1: derived at from indirect labor generation.
3. Indirect economic benefits 2: derived at from indirect labor generated by investments.

Source: JICA Study Team.

After converting all financial economic cost and financial direct and indirect economic gross benefits into economic prices, the economic internal rate of return (EIRR) is computed. The results of the EIRR computations for the "with" as measured against the "without" scenario are illustrated in Table 1.23. The computation results are interpreted to signify the following:

- The EIRR is with 19.61 per cent in a reasonable range indicating the overall economic *viability of the proposed pilot and supporting short-term projects*
- The net-present-value (NPV) indicators are positive for a discount rate of 5 per cent, 10 per cent and 15 per cent. The NPV value turns, however, negative at a 20 per cent discount rate. The choice of a proper discount or cut-off rate is for any project always subject to many deliberations and, under normal circumstances, the cost of capital to the borrower is selected to represent a suitable cut-off rate. Two conclusions may, therefore, be drawn from the resulting NPV values. Firstly, if capital is borrowed at a 2 per cent rate, as is assumed for the proposed projects, then the projects will be highly viable. Secondly, on the other hand, if the borrowing rate moves into the rate

range commercially available in Guatemala, i.e. at or around 20 per cent, the projects would move into doubtful economic viability[26]

- Another conclusion to be drawn is that a shift into higher market value segments over the planning horizon of some 20 years is essential for increasing total net benefits to be generated by the pilot and supporting short-term projects.

Table 1.23 El Peten department Pilot Project economic costs and benefits (constant 2001 economic prices)

Year	Life cycle year	Economic cost													Economic benefits			Net economic benefits
		Land acquisition	Admini-strative OH	Civil works	Env. & planning studies	Equipment compo-nent	Physical contin-gency	Insurance	Levies & duty	Taxes	O&M costs roads	O&M costs facilities	O&M costs equipment	TOTAL	Gross economic benefits	Gross indirect & multiplier benefits	Total benefits	
2002	-4	31.42	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.82	0.00	14.76	14.76	-17.06
2003	-3	0.00	1.28	65.14	11.29	0.00	6.52	0.00	0.00	0.00	0.00	0.00	0.00	84.23	0.00	27.31	27.31	-56.92
2004	-2	0.00	1.28	65.14	0.41	0.00	6.52	0.00	0.00	0.00	0.00	0.00	0.00	73.35	0.00	27.31	27.31	-46.04
2005	-1	0.00	0.98	44.64	0.00	5.51	4.75	0.00	0.00	0.00	0.00	0.00	0.00	55.88	0.00	23.42	23.42	-32.46
2006	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	7.27	23.61	30.88	18.70
2007	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	14.54	23.61	38.15	25.97
2008	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	14.54	23.61	38.15	25.97
2009	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	14.54	23.61	38.15	25.97
2010	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	14.54	23.61	38.15	25.97
2011	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2012	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2013	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2014	9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2015	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2016	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2017	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2018	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2019	14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2020	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2021	16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2022	17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2023	18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2024	19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
2025	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	10.56	0.82	12.18	38.52	38.48	77.00	64.83
Accumulated		31.42	3.94	174.92	11.70	5.51	17.79	0.00	0.00	0.00	15.90	211.20	16.40	488.78	643.23	788.10	1,431.33	942.55

EIRR	19.61%
NPV at 5%	386.22
NPV at 10%	153
NPV at 15.0%	47
NPV at 20.0%	-3

Note: Unit: Number/Quetzales
1. The O&M roads cost component covers the access pathway and the walking trail only. The O&M costs for all access roads that fall under the jurisdiction of MICIVI are to be covered by the Ministry's regular budget.
2. The O&M component for other facilities excludes O&M expenditures for the hotel facility, since this facility will be leased out to the private sector which will have to assume O&M responsibilities.

Source: JICA Study Team.

[26]) The fact that there is no long-term (say 20 years) capital market in Guatemala is neglected here.

1.3.11. EIRR Sensitivity Analysis

In a final step on the economic appraisal side, a sensitivity test is conducted that investigates, firstly how the EIRR will change, if the cost and benefit sides are either over- or underestimated by 10 percent and 20 percent, respectively. This range is selected, since 20 percent is the maximum allowable error margin in either estimating costs or benefits. Secondly, the sensitivity test allows for some observation of whether the overall economic viability of the projects under consideration is either more affected by cost or benefit changes. The sensitivity test is conducted for the "with" against the "without" scenarios. The numerical results of the sensitivity test analysis are summarized in Table 1.24.

Table 1.24 Results of sensitivity analysis EIRR El Petén department projects

	ECONOMIC COSTS				
NET-BENEFITS	Minus 20%	Minus 10%	No Change	Plus 10%	Plus 20%
Plus 20%	EIRR 33.76%	EIRR 28.61%	EIRR 24.86%	EIRR 21.96%	EIRR 19.61%
Plus 10%	EIRR 29.84%	EIRR 25.47%	EIRR 22.20%	EIRR 19.61%	EIRR 17.48%
No Change	EIRR 26.24%	EIRR 22.49%	**EIRR 19.61%**	EIRR 17.28%	EIRR 15.34%
Minus 10%	EIRR 22.85%	EIRR 19.61%	EIRR 17.05%	EIRR 14.95%	EIRR 13.18%
Minus 20%	EIRR 19.61%	EIRR 16.77%	EIRR 14.48%	EIRR 12.58%	EIRR 10.96%

Source: JICA Study Team.

The main conclusions that are derived at from the sensitivity test results are:

- In the worse case, i.e. the economic cost are 20 percent higher than estimated and economic net benefits are overestimated by 20 percent, the projects' EIRR will be around 11 percent, well below the now in Guatemala prevailing capital cost interest rate
- In the best case, that is economic cost are actually 20 percent lower and economic net benefits are higher by 20 percent, the projects' EIRR will be around 34 percent, well above the now in Guatemala prevailing capital cost interest rate
- Any EIRR in between the above range is potentially possible, depending on the extent to which either economic cost and/or net benefits were either under- or overestimated
- The response rate or spread to changes in economic cost is higher (26.24<19.61<15.34) than to changes in economic net benefits (24.86<19.61<14.48), *suggesting that it may be important to lower cost and, hence*
- It is important that the GOG employs a QCBS approach when tendering the projects *for private sector execution.*

1.3.12. Financial Project Analysis – FIRR of the "Base Case"

All computations for calculating the financial rate of return or FIRR are undertaken in financial constant 2001 price base and covering the pilot project comprising the 5 projects *related to archaeology only. All other cost-stream items are considered under the* "all

components & all resources" principle. As is the present case in Guatemala, a split entrance fee for international and domestic visitors is applied. Also, there are separate entrance fees for the site itself and the facilities located on the sites.

The cost and revenue components are:

(1) Project cost streams and draw-down schedule

The project base cost for the pilot project is computed based on data provided for in Table 1.17. The individual cost items are estimated as:

- Pilot project engineering base cost = Quetzales 67.55 million, including 10 per cent contingency for civil works and 5 per cent for the equipment component
- Land acquisition cost: Quetzales 3.0 million
- Administrative overhead: Quetzales 0.045 million
- Duties and levies on all imports: Quetzales 1.03 million
- Value added tax at 12 per cent: Quetzales 8.11 million, and
- Total pilot project base cost (all components & all resources): Quetzles 79.79 million.

The underlying draw down schedule is:

- 2002: land acquisition and related administrative overhead and value added tax
- 2003: fifty per cent of civil works
- 2004: fifty per cent of civil works, and
- 2005: delivery of equipment component in the last quarter of that year.

The "operation and maintenance (O&M)" cost are as introduced in Section 1.3.8, item (2). Not included under the O&M component are O&M expenditures for access roads to the sites themselves, since these expenditure items will be covered by the line Ministry. The monetary value of the O&M expenditures is summarized in Table 1.25.

Table 1.25 Estimated O&M cost by major cost components (constant 2001 prices)

O&M Item	Annual O&M Budget Requirement
Road routine maintenance	0.048
O&M physical facilities	4.690
Maintenance equipment	0.750
Total	5.488

Source: JICA Study Team.

(2) Project revenue streams

Two types of revenue streams are considered for the "base-case" and all other computations, namely revenues generated by visitors accessing the sites and the facilities

on the sites and, revenues generated by the sale of "other goods and services" as explained later in the text. The international and domestic visitor streams to the sites, the museums and centers on the sites and the corresponding revenue streams are summarized in Table 1.26.

The "base case" is defined such that it reflects the prevailing situation in the fee structure. In other words, the revenue stream generated by visitors is based on a flat entrance fee of Quetzales 50 for the site and Quetzales 25 for the facilities to be paid by international visitors, and Quetzales 15 for the site and Quetzales 5 for the facilities to be paid by domestic visitors. No additional revenues are generated from either sales of "other goods & services" and/or the lease of land and/or property.

The result of the FIRR analysis for the base-case is 1.92 per cent. That indicates that, from a purely financial point of view, the pilot project does not under such fee structure reflect a very promising financial viability. This is so, because total revenues under the given entrance fee structure without generating any other revenue streams cover normal O&M expenditures only as of 2010, and secondly accumulated net-revenue streams over the life cycle of the pilot project are comparatively modest in comparison with accumulated base and O&M cost streams. That situation points at some fundamental questions as regards entrance fee policy for archaeological sites, museum, study & research centers and so on. These issues are addressed in the following Section.

Table 1.26 Results of "base case" financial rate of return – FIRR

		Full Cost/Full Revenues				
				Revenue Streams		
Calendar Year	Cycle Year	Base Cost	O&M Cost	Visitors	Other Revenues	Net Revenue
2002	-4	(3.05)	0.00	0.00	0.00	(3.05)
2003	-3	(35.51)	0.00	0.00	0.00	(35.51)
2004	-2	(35.51)	0.00	0.00	0.00	(35.51)
2005	-1	(5.67)	0.00	0.00	0.00	(5.67)
2006	1	0.00	(5.49)	2.24	0.00	(3.25)
2007	2	0.00	(5.49)	3.24	0.00	(2.25)
2008	3	0.00	(5.49)	4.23	0.00	(1.26)
2009	4	0.00	(5.49)	5.37	0.00	(0.12)
2010	5	0.00	(5.49)	6.34	0.00	0.85
2011	6	0.00	(5.49)	7.84	0.00	2.35
2012	7	0.00	(5.49)	9.66	0.00	4.17
2013	8	0.00	(5.49)	11.91	0.00	6.42
2014	9	0.00	(5.49)	12.99	0.00	7.50
2015	10	0.00	(5.49)	13.57	0.00	8.08
2016	11	0.00	(5.49)	14.02	0.00	8.53
2017	12	0.00	(5.49)	14.02	0.00	8.53
2018	13	0.00	(5.49)	14.02	0.00	8.53
2019	14	0.00	(5.49)	14.02	0.00	8.53
2020	15	0.00	(5.49)	14.02	0.00	8.53
2021	16	0.00	(5.49)	14.02	0.00	8.53
2022	17	0.00	(5.49)	14.02	0.00	8.53
2023	18	*0.00*	(5.49)	14.02	0.00	8.53
2024	19	*0.00*	(5.49)	14.02	0.00	8.53
2025	20	*0.00*	(5.49)	14.02	0.00	8.53
Accumulated		*(79.74)*	*(109.76)*	*217.58*	*0.00*	*28.09*
FINANCIAL IRR						***1.92%***

Note: Unit: million Quetzales

Source: JICA Study Team

Table 1.27 Revenues generated by international and domestic visitors to archaeological sites 2006 to 2026 (prevailing fee per site & facility) - part 1 (constant 2001 financial prices)

	Life	Uaxactun			Yaxhá			Nakún			Ceibal			Aguateca			TOTAL		
Year	Cycle Year	Internat. Visitors	Domestic Visitors	Revenues	Internat. Visitors	Domestic Visitors	Revenues	Internat. Visitors	Domestic Visitors	Revenues	Internat. Visitors	Domestic Visitors	Revenues	Internat. Visitors	Domestic Visitors	Revenues	Internat. Visitors	Domestic Visitors	Revenues
2002	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	1	7,623	2,393	427,045	8,615	10,349	595,965	2,179	760	120,350	11,856	4,330	657,750	4,730	856	249,340	35,403	18,688	2,050,470
2007	2	10,695	2,851	577,065	10,561	10,873	691,145	4,358	1,521	243,715	14,117	4,606	774,940	6,099	988	319,770	45,821	20,839	2,603,635
2008	3	14,597	3,894	788,260	12,652	11,482	804,830	6,537	2,281	361,065	18,810	4,900	914,000	7,864	1,141	410,315	58,460	23,698	3,278,470
2009	4	19,939	5,319	1,076,735	15,157	12,063	938,795	8,716	3,041	481,415	20,015	5,212	1,078,930	10,149	1,317	526,755	73,967	26,952	4,102,630
2010	5	27,237	6,337	1,456,905	18,158	12,673	1,097,995	10,895	3,802	601,780	23,832	5,545	1,274,775	13,074	1,521	676,515	93,196	29,878	5,107,970
2011	6	37,206	7,550	1,973,536	21,753	13,314	1,287,378	13,074	4,561	722,115	28,377	5,899	1,507,320	16,658	1,756	869,225	117,267	33,080	6,359,574
2012	7	50,823	8,995	2,676,076	26,060	13,988	1,512,911	15,253	5,321	842,465	33,798	6,275	1,783,537	21,736	2,028	1,117,230	147,661	36,607	7,932,150
2013	8	69,424	10,717	3,631,963	31,220	14,696	1,781,456	17,432	6,841	974,215	40,232	6,675	2,111,713	28,027	2,342	1,436,459	186,335	41,271	9,935,806
2014	9	69,424	10,717	3,631,955	37,402	15,439	2,101,692	19,611	7,601	1,094,565	47,904	7,101	2,501,710	28,027	2,342	1,436,480	202,368	43,201	10,766,402
2015	10	69,424	10,717	3,631,956	44,808	16,221	2,483,691	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	211,953	44,742	11,268,756
2016	11	69,424	10,717	3,631,955	53,680	17,041	2,939,598	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	220,825	45,562	11,724,663
2017	12	69,424	10,717	3,631,955	53,680	17,041	2,939,615	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	220,825	45,562	11,724,680
2018	13	69,424	10,717	3,631,955	53,680	17,041	2,939,615	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	220,825	45,562	11,724,680
2019	14	69,424	10,717	3,631,955	53,680	17,041	2,939,615	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	220,825	45,562	11,724,680
2020	15	69,424	10,717	3,631,955	53,680	17,041	2,939,615	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	220,825	45,562	11,724,680
2021	16	69,424	10,717	3,631,955	53,680	17,041	2,939,615	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	220,825	45,562	11,724,680
2022	17	69,424	10,717	3,631,955	53,680	17,041	2,939,615	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	220,825	45,562	11,724,680
2023	18	69,424	10,717	3,631,955	53,680	17,041	2,939,615	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	220,825	45,562	11,724,680
2024	19	69,424	10,717	3,631,955	53,680	17,041	2,939,615	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	220,825	45,562	11,724,680
2025	20	69,424	10,717	3,631,955	53,680	17,041	2,939,615	21,790	8,361	1,214,915	47,904	7,101	2,501,715	28,027	2,342	1,436,480	220,825	45,562	11,724,680
Accumulated		1,070,823	176,659	56,191,645	763,386	361,508	42,691,941	337,745	127,700	18,802,750	763,874	128,655	40,123,540	444,851	40,053	22,843,370	3,380,680	774,575	180,652,646

Note: Unit: Quetzales

1) It is assumed that the facilities will be opened in January 2006 and that fees will be levied as of that date.

2) A split entrance fee is applied, Q 50 for international and Q 15 for domestic visitors.

Source: JICA Study Team.

Table 1.28 Revenues generated by international and domestic visitors to museums & centers 2006 to 2026 - part 2 (constant 2001 financial prices)

Year	Life Cycle Year	Reg. Center Mayan Study			El Ceibal Site Museum			Sayarche Cultural Center			n.a			n.a			TOTAL		
		Internat. Visitors	Domestic Visitors	Revenues	Internat. Visitors	Domestic Visitors	Revenues	Internat. Visitors	Domestic Visitors	Revenues	Internat. Visitors	Domestic Visitors	Revenues	Internat. Visitors	Domestic Visitors	Revenues	Internat. Visitors	Domestic Visitors	Revenues
2002	-4																		
2003	-3																		
2004	-2																		
2005	-1																		
2006	0	2,906	1,646	51,820	4,769	1,109	77,065	3,689	705	58,860							11,363	3,460	187,745
2007	1	5,811	3,294	103,635	9,531	2,218	154,100	7,380	1,412	376,060							22,725	6,924	633,795
2008	2	8,716	4,942	155,450	14,300	3,327	231,135	11,071	2,119	564,145							34,087	10,388	950,730
2009	3	11,621	6,590	207,265	19,066	4,436	308,170	14,762	2,826	752,230							45,443	13,852	1,267,665
2010	4	14,526	8,238	259,080	23,832	5,545	385,205	18,453	3,533	568,920							56,811	17,316	1,233,205
2011	5	17,431	9,886	310,895	28,598	6,654	462,240	22,144	4,240	706,720							68,173	20,780	1,479,855
2012	6	20,336	11,534	362,710	33,364	7,763	539,275	25,835	4,947	824,520							79,535	24,244	1,726,505
2013	7	23,241	13,182	414,525	38,130	8,872	616,310	29,526	5,654	942,320							90,897	27,708	1,973,155
2014	8	26,146	14,830	466,340	42,896	9,981	693,345	33,217	6,361	1,060,120							102,259	31,172	2,219,805
2015	9	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2016	10	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2017	11	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2018	12	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2019	13	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2020	14	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2021	15	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2022	16	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2023	17	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2024	18	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2025	19	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
2026	20	26,146	14,830	466,340	47,662	11,090	770,380	33,217	6,361	1,060,120							107,025	32,281	2,296,840
Accumulated		444,486	252,102	7,927,800	786,432	182,985	12,711,405	564,681	108,129	18,595,335							1,795,599	543,216	39,234,540

Note: Unit: Quetzales
1) It is assumed that the facilities will be opened in January 2006 and that fees will be levied as of that date.
2) A split entrance fee is applied, namely Q 15 for international and Q 5 for domestic visitors.

Source: JICA Study Team.

1.3.13. General Entrance Fee Policy and Fee Rate Structure & FIRR Response

The generally accepted policy rule is that revenues generated by a project or any entity for that matter must at least cover regular O&M expenditures generated by the same project/entity, in order for the project/entity to be considered to be worth for further viability consideration. It is clear from the above data that under the projected number of visitors and the prevailing entrance fee structure, expected revenues during the first five operational years (i.e. from 2006 to 2010) do not cover O&M expenditures.

The fundamental questions are therefore:

- What entrance fee levels would be required to cover O&M and in addition generate a reasonable gross margin, and are such entrance fee levels realistic and/or realizable under the prevailing conditions in Guatemala
- What is the proximate size of additional revenues that need to be generated by sales of "other goods and services and/or lease of land of property, and
- Are implied O&M expenditures in general within reasonable limits of regular budget resources of the technical line Ministries.

In addition to the base case, three financial scenarios are defined as follows, in order to address the first question. The parameter defining the scenarios are:

- "Base case" scenario: as already indicated above

- Revenue scenario 1: Entrance fees for international visitors to the sites and the facilities on the sites are doubled to Q 100 and Q 50, respectively. However, no additional revenues are generated from the sales of "other goods and services" and/or the lease of land and/or property
- Revenue scenario 2: Entrance fees for international visitors to the sites and the facilities on the sites are doubled to Q 100 and Q 50, respectively. Also, additional revenues are generated from the sales of "other goods and services" to international visitors only amounting on average to Q 50, and
- Revenue scenario 3: Entrance fees for international visitors to the sites and the facilities on the sites are doubled to Q 100 and Q 50, respectively. Also, additional revenues are generated from the sales of "other goods and services" to international visitors only amounting on average to Q 100.

The FIRR results achievable under all four scenarios is presented in Table 1.29 and they are summarized as follows:

Table 1.29 Response of FIRR to revenue scenarios - results of pilot project FIRR Peten (2001 constant price base)

		Prevailing Fee Structure					International Q100site/Q50 facility					International Q100site/Q50 facility/Aplus Q50 person					International Q100site/Q50 facility/Aplus Q100 person				
Calendar Year	Cycle Year	Base Cost	O&M Cost	Revenue Other	Revenue Visitors	Net Revenue	Base Cost	O&M Cost	Revenue Other	Revenue Visitors	Net Revenue	Base Cost	O&M Cost	Revenue Other	Revenue Visitors	Net Revenue	Base Cost	O&M Cost	Revenue Other	Revenue Visitors	Net Revenue
2002	-4	(3.05)	0.00	0.00	0.00	(3.05)	(3.05)	0.00	0.00	0.00	(3.05)	(3.05)	0.00	0.00	0.00	(3.05)	(3.05)	0.00	0.00	0.00	(3.05)
2003	-3	(35.51)	0.00	0.00	0.00	(35.51)	(35.51)	0.00	0.00	0.00	(35.51)	(35.51)	0.00	0.00	0.00	(35.51)	(35.51)	0.00	0.00	0.00	(35.51)
2004	-2	(35.51)	0.00	0.00	0.00	(35.51)	(35.51)	0.00	0.00	0.00	(35.51)	(35.51)	0.00	0.00	0.00	(35.51)	(35.51)	0.00	0.00	0.00	(35.51)
2005	-1	(5.67)	0.00	0.00	0.00	(5.67)	(5.67)	0.00	0.00	0.00	(5.67)	(5.67)	0.00	0.00	0.00	(5.67)	(5.67)	0.00	0.00	0.00	(5.67)
2006	1	0.00	(5.49)	0.00	2.24	(3.25)	0.00	(5.49)	0.00	4.42	(1.07)	0.00	(5.49)	1.77	4.42	0.70	0.00	(5.49)	3.51	4.42	2.47
2007	2	0.00	(5.49)	0.00	3.24	(2.25)	0.00	(5.49)	0.00	6.10	0.61	0.00	(5.49)	2.23	6.10	2.90	0.00	(5.49)	4.58	6.10	5.19
2008	3	0.00	(5.49)	0.00	4.23	(1.26)	0.00	(5.49)	0.00	8.01	2.52	0.00	(5.49)	2.92	8.01	5.44	0.00	(5.49)	5.85	8.01	8.37
2009	4	0.00	(5.49)	0.00	5.37	(0.12)	0.00	(5.49)	0.00	10.21	4.72	0.00	(5.49)	3.70	10.21	8.42	0.00	(5.49)	7.40	10.21	12.12
2010	5	0.00	(5.49)	0.00	6.34	0.85	0.00	(5.49)	0.00	12.78	7.29	0.00	(5.49)	4.66	12.78	11.95	0.00	(5.49)	9.32	12.78	16.61
2011	6	0.00	(5.49)	0.00	7.84	2.35	0.00	(5.49)	0.00	15.84	10.35	0.00	(5.49)	5.86	15.84	16.21	0.00	(5.49)	11.73	15.84	22.08
2012	7	0.00	(5.49)	0.00	9.66	4.17	0.00	(5.49)	0.00	19.53	14.04	0.00	(5.49)	7.38	19.53	21.43	0.00	(5.49)	14.77	19.53	28.81
2013	8	0.00	(5.49)	0.00	11.91	6.42	0.00	(5.49)	0.00	24.07	18.58	0.00	(5.49)	9.32	24.07	27.90	0.00	(5.49)	18.63	24.07	37.22
2014	9	0.00	(5.49)	0.00	12.99	7.50	0.00	(5.49)	0.00	26.31	20.82	0.00	(5.49)	10.12	26.31	30.94	0.00	(5.49)	20.24	26.31	41.06
2015	10	0.00	(5.49)	0.00	13.57	8.08	0.00	(5.49)	0.00	27.54	22.05	0.00	(5.49)	10.60	27.54	32.65	0.00	(5.49)	21.19	27.54	43.24
2016	11	0.00	(5.49)	0.00	14.02	8.53	0.00	(5.49)	0.00	28.44	22.95	0.00	(5.49)	11.04	28.44	33.99	0.00	(5.49)	22.08	28.44	45.03
2017	12	0.00	(5.49)	0.00	14.02	8.53	0.00	(5.49)	0.00	28.44	22.95	0.00	(5.49)	11.04	28.44	33.99	0.00	(5.49)	22.08	28.44	45.03
2018	13	0.00	(5.49)	0.00	14.02	8.53	0.00	(5.49)	0.00	28.44	22.95	0.00	(5.49)	11.04	28.44	33.99	0.00	(5.49)	22.08	28.44	45.03
2019	14	0.00	(5.49)	0.00	14.02	8.53	0.00	(5.49)	0.00	28.44	22.95	0.00	(5.49)	11.04	28.44	33.99	0.00	(5.49)	22.08	28.44	45.03
2020	15	0.00	(5.49)	0.00	14.02	8.53	0.00	(5.49)	0.00	28.44	22.95	0.00	(5.49)	11.04	28.44	33.99	0.00	(5.49)	22.08	28.44	45.03
2021	16	0.00	(5.49)	0.00	14.02	8.53	0.00	(5.49)	0.00	28.44	22.95	0.00	(5.49)	11.04	28.44	33.99	0.00	(5.49)	22.08	28.44	45.03
2022	17	0.00	(5.49)	0.00	14.02	8.53	0.00	(5.49)	0.00	28.44	22.95	0.00	(5.49)	11.04	28.44	33.99	0.00	(5.49)	22.08	28.44	45.03
2023	18	0.00	(5.49)	0.00	14.02	8.53	0.00	(5.49)	0.00	28.44	22.95	0.00	(5.49)	11.04	28.44	33.99	0.00	(5.49)	22.08	28.44	45.03
2024	19	0.00	(5.49)	0.00	14.02	8.53	0.00	(5.49)	0.00	28.44	22.95	0.00	(5.49)	11.04	28.44	33.99	0.00	(5.49)	22.08	28.44	45.03
2025	20	0.00	(5.49)	0.00	14.02	8.53	0.00	(5.49)	0.00	28.44	22.95	0.00	(5.49)	11.04	28.44	33.99	0.00	(5.49)	22.08	28.44	45.03
Accumulated		(79.74)	(109.80)	0.00	217.58	28.04	(79.74)	(109.80)	0.00	439.21	249.67	(79.74)	(109.80)	169.03	439.21	418.70	(79.74)	(109.80)	338.06	439.21	587.73
FINANCIAL IRR						1.92%					10.97%					15.23%					18.60%

Note: Unit: million Quetzales
Major assumptions are: 1) O&M expenditures exclude the portion for the road sections; 2) double fee for international visitors; 3) additional revenues per international visitor at Q 50 or Q 100, respectively.

Source: JICA Study Team.

- The FIRR for the "revenue scenario 1" is with 10.97 per cent significantly higher than the FIRR for the "base case". However, with a prevailing cost of capital ranging between 14 to 18 per cent, the FIRR is not high enough to be attractive
- The FIRRs for the revenue scenarios 2 and 3 are with 15.23 and 18.60 per cent in an attractive range.

The following conclusions and recommendations must be drawn from the above picture:

- Prevailing entrance fee levels for sites and museums for international visitors are too low. They should perhaps be standardized at least for "World Heritage Sites" and doubled
- It is necessary from a financial viability point of view to generate a minimum of additional Q 50 per international visitors, preferably an additional Q 100, in order to bring the financial viability of the pilot project into a range that is attractive to the ownership entity. Such additional revenues may result either from the sales of "other goods and services" and/or the lease of land and/or property located on the sites, and
- The appropriate authorities should adjust nominal fee levels on a regular basis (perhaps every two to three years) at lest to reflect general inflationary developments within the economy.

It appears as regards O&M expenditures to be absorbed by regular budget resources of the line ministries concerned, that an annual routine maintenance expenditure level of some Quetzales 574,000 for the road segment (excluding periodic maintenance) can perhaps realistically be assumed for the Ministry of Communications, Infrastructure and Human Settlement. That ministry has a total budget in FY 2001 of some Quetzales 2,274.4 million or about 10 percent of that year's total national budget.

However, the Ministry of Culture and Sports on the contrary has in FY 2001 a total budget of Quetzales 185.2 million, equivalent to some 0.81 percent of the total national budget in that FY. An annual additional O&M expenditure of some estimated Quetzales 5.49 million for the five upgraded sites and facilities, which would represent some 2.96 percent of their current budgetary resources may, given the Ministry's broad scope of functions and responsibilities, be considered a heavy burden to MICUDE/IDAEH. This underlines the above assertion that revenue streams must cover the additional O&M expenditures generated by the realization of the pilot project.

1.3.14. Construction Method

Two potential approaches are possible either directly by the line entities concerned or through tendering and sub-contracting to the private sector as seems to be the common practice in Guatemala. If the sub-contracting to the private sector approach is adopted, the numbers in the feasibility calculation would have to be adjusted for "duties & levies" and the VAT, which would then actually not reflect direct project cost, but direct revenues to the GOG generated by project realization.

1.3.15. Implementation Time Schedule

Total project realization is assumed at three years beginning in 2003. It is assumed that loan preparation, from assessment mission to signature of the loan agreement will take up to one year, i.e. 2002. Hence, the facilities could be opened to the public in January 2006.