

<b>(10) Power</b>	
Issues	<ol style="list-style-type: none"> <li>1. Difficult in supplying sufficient and reliable power to consumers because of: <ul style="list-style-type: none"> <li>• Shortage of the supplying capacity</li> <li>• Sole diesel power system which has a risk of causing blackout</li> </ul> </li> <li>2. Limited coverage area of supplying electricity because of a small distribution network</li> <li>3. Single supplying distribution system</li> <li>4. High electricity tariff rate</li> <li>5. Limited maintenance capability</li> </ol>
Sector Objectives	<p>Supplying reliable electric power for all with less environmental load</p> <ul style="list-style-type: none"> <li>• Extending electricity network to the urban and sub-urban area by 2012,</li> <li>• Realizing 100% electrification in all Siem Reap district by EDC by 2020</li> </ul>
Sector Approach	<p><u>Sector Approaches</u></p> <ol style="list-style-type: none"> <li>1. Upgrading and expanding power facility <ol style="list-style-type: none"> <li>1.1. Additional power source development</li> <li>1.2. Extension and improvement of networks</li> </ol> </li> <li>2. Reinforcement of EdC <ol style="list-style-type: none"> <li>2.1. Review of tariff and connection fee</li> <li>2.2. Strengthening EdC</li> </ol> </li> <li>3. Control under law, ordinance and decree for reduction of environmental load</li> </ol> <div style="text-align: center;"> <pre> graph TD     subgraph Stage1 [1]         A[Installation of Urgent additional power source]     end     subgraph Stage2 [2]         B[Additional power source]         C[Extension of networks]     end     subgraph Stage3 [3]         D[Improvement of networks]     end     A --&gt; B     A --&gt; C     B --&gt; D     C --&gt; D     E[Capacity building] --&gt; D     F[Review of tariff] --&gt; A     F --&gt; B     G[Review of tariff] --&gt; C     G --&gt; D     </pre> <p><b>Figure II.5.29 Overall Scenario for Power Sector</b></p> </div>
Project/ Program	<p>PO-1 Urgent installation of diesel generator</p> <p>PO-2 Project for expansion of existing diesel power station</p> <p>PO-3 Project for extension and expansion of distribution networking</p> <p>PO-4 Project for installation and repair of street light</p> <p>PO-5 Planning of effective use of the electricity for Angkor Wat and other temples</p> <p>PO-6 Planning for electrification for unelectrified area</p> <p>PO-7 Assistance to capacity building for EdC</p>

- PO-8 Assistance to reviewing of power tariff rate
- PO-9 Project for revision and/or set up law, ordinance and decree on the electrical power supply to reduce environmental load
- PO-10 Project to find a sustainable power sources for the Siem Reap district

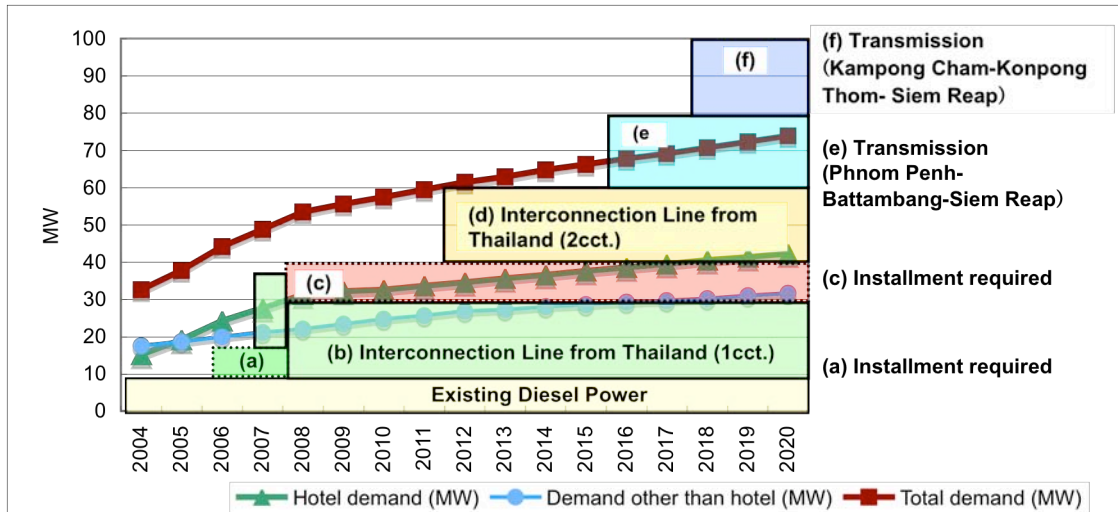


Figure II. 5.30 Power Supply and Demand Forecast

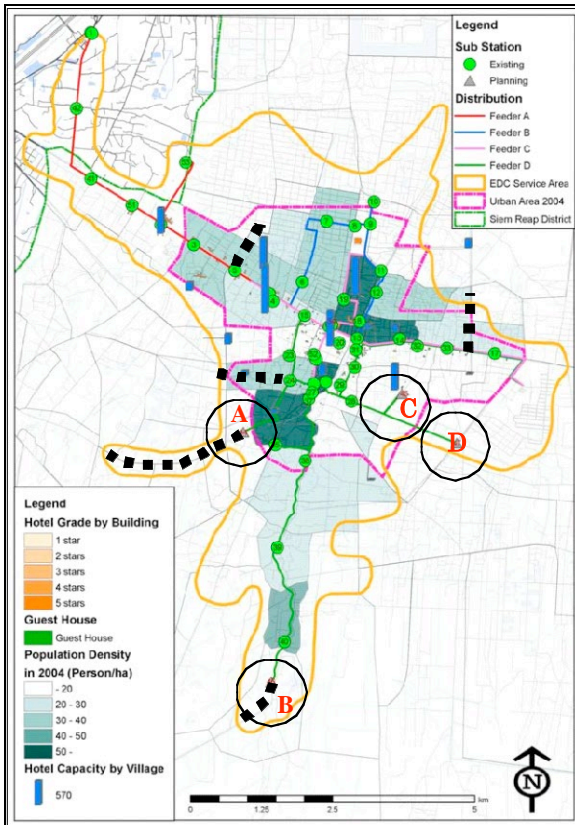


Figure II. 5.31 Distribution Plan in 2004

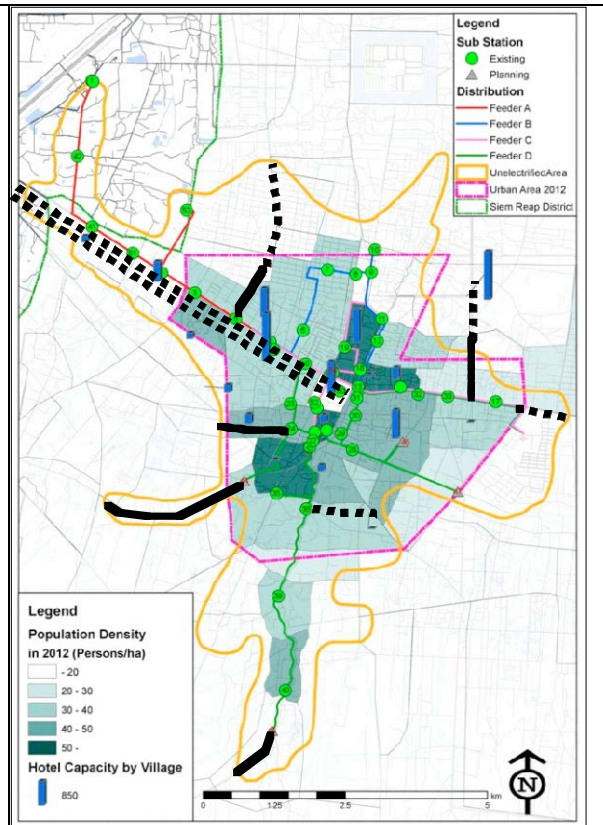
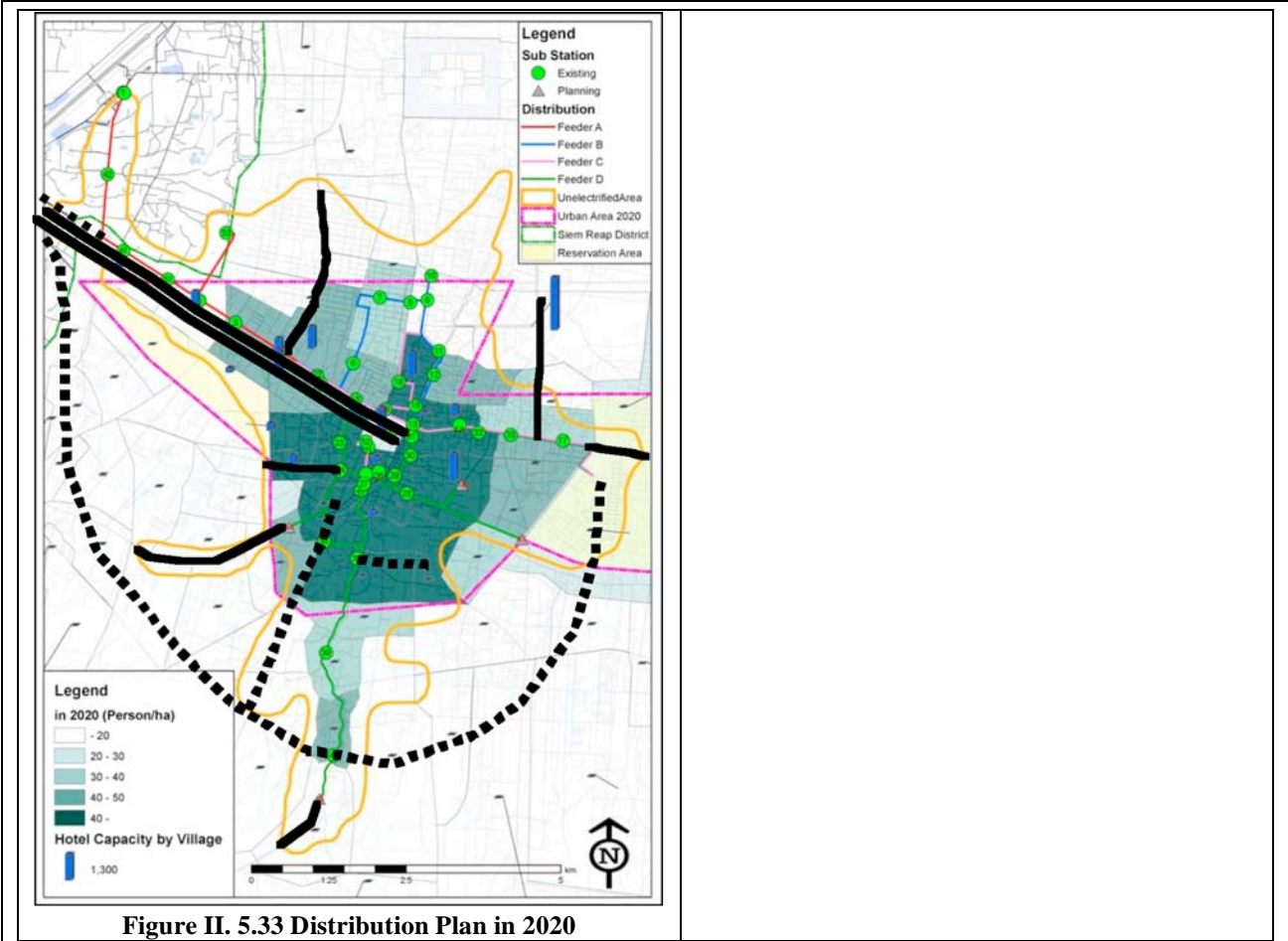
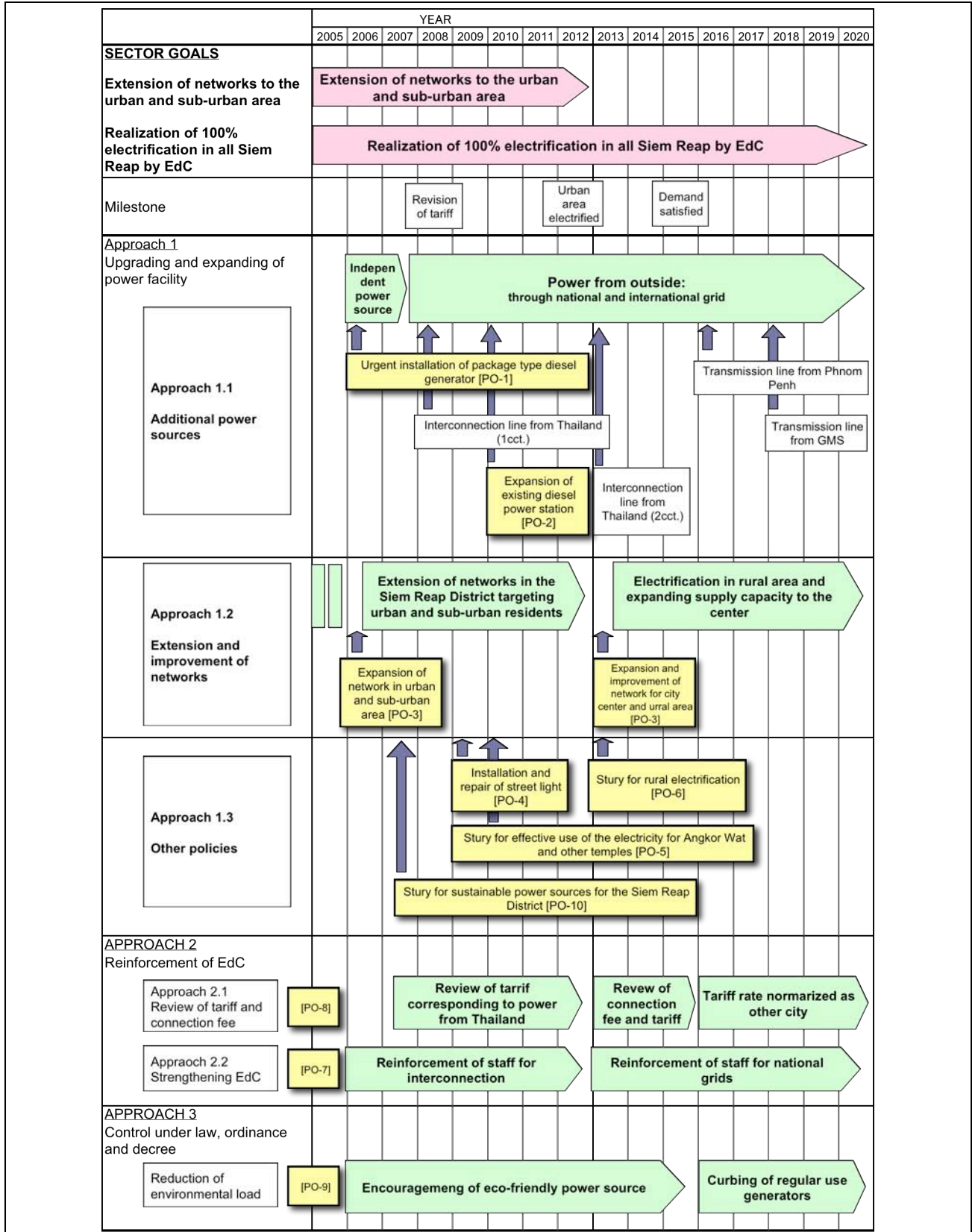


Figure II.5.32 Distribution Plan in 2012





Source: JICA Study Team  
**Figure II.5.34 Improvement sequence up to 2020**



## 6. Projects and Programs

### 6.1 Long List of Project and Programs

This section lists brief description of proposed projects by sector. Detailed descriptions are provided in the Volume 3 of this report.

**Table II.6.1 Long List of Projects and Programs (1/2)**

NO	Corresponding Strategy	Sector	Proj. ID	Title	Brief Description	Implementing Agency	Priority	Cost (1000 US\$)	Schedule		
									2006	2012	2020
1	3,4,5	Urban	U-1	City center area improvement	Various urgent infrastructure and landscaping.	Province, with relevant ministerial departments.	Priority	7,600			
2	3,5,6		U-2	Urban planning capacity building	Capacity development of urban planning visions and land use plan.	DLMUPC, District, APSARA and Province.	Priority	500			
3	3		U-3	Inventory for historical architectures	Making an inventory of French colonial architectures.	APSARA / Siem Reap Province		200			
4	3,5		U-4	Residential development promotion	Provision of quality living environment for new residents.	DLMUPC, District, and Private Sector		n/a			
5	1,3,4,5		U-5	Cultural and Tourism Zone development	Development of the Zone for cultural attractions and high-graded hotels.	APSARA and Private investors		n/a			
6	4,6	Environment	E-1	Institutional capacity development	Improvement of institutional capacity of public sector.	Province, DPWT, DOE and Residents		310			
7	3,4		E-2	Environmental awareness enhancement	Environmental campaign mainly targeted for school children.	Elementary Schools	Priority	330			
8	4,5,6		E-3	Joint fee collection on public services	Joint collection of service charges of water, waste water and solid waste.	Siem Reap Waterworks, DPWT, MICC		310			
9	1,2,3,5,6	Tourism	TO-1	Khmer heritage tourism network and tourism facility development	Promotion of new tourism destinations around Siem Reap.	MOT, SRTO, APSARA, MPWT and MOCFA	Priority	26,550			
10	2,3		TO-2	Night market development	Creation of attractions and optional tours at night.	private sector		260			
11	1,2,3		TO-3	Public-private partnership tourism quality improvement	Public and private partnership in marketing and promotion.	To be determined	Priority	n/a			
12	1,2,6		TO-4	Dev and promotion of community-based eco and village tourism	Field survey, F/S for pilot projects and selection of tourism products, etc.	NGO, APSARA		158			
13	1,2		TO-5	Tour guide training and advanced tour guide system	Strengthening of tour guide training programs and upgrade its license system.	SRTO, MOT, APSARA		211			
14	1,5		TO-6	Study for carrying capacity and site management	Survey/ analysis on tourists movement, capacity of sites and site management.	APSARA		163			
15	1,2,6	Agricultural Diversification and Local Product	A-1	HRD and local product promotion center	HRD of provincial staff and establishment of local products promotion center.	Province, APPC	Priority	80			
16	1,2,6		A-2	One Village and One Product Movement (OVOP)	Promotion of OVOP	Province, APPC		60			
17	1,2,6		A-3	Production village development	Collective village people activities and its linkage with tourism.	Province, APPC		36			
18	1,2,3		A-4	Angkor Products Fair	Hold the APF following the pilot project.	APPC		108			
19	3,5	Transportation	TR-1	French Bridge improvement	Construction of an additional bridge over the SR River.	MPWT	Priority	957			
20	3,5		TR-2	Sub-arterial road network (Phase 1)	Development of 3 routes in urban area.	DPWT, Province	Priority	10,839			
21	3,5		TR-3	Sub-arterial road network (Phase 2)	Completion of Southern Semicircular Road (Hun Sen Piece Road)	MPWT		6,817			
22	3,5		TR-4	Sub-arterial road network (Phase 3)	Development of inner semicircular road.	DPWT, Province		16,736			
23	3,5		TR-5	Sub-arterial road network (Phase 4)	Development of trunk roads in current peri-urban area.	Province		14,921			
24	3,6		TR-6	Institutional improvement for road safety	Traffic law enforcement in licensing, safety and helmet-wearing.	Police, DPWT and Province		7,000			
25	2,3,5		TR-7	Rural heritage road network rehabilitation	Improve roads to the remote Angkor monuments.	MPWT, MRD	Priority	33,150			
26	3,4,5		TR-8	Environmental public transport	Low emission bus system in Archaeological Park	APSARA		7,104			
27	3,4,5		TR-9	Bicycle track construction	Development of exclusive bike lanes in archaeological park.	APSARA		1,417			
28	3,5,6		TR-10	Institutional improvement for efficient road maintenance	Preparation of road inventory/ establishment of monitoring system on road condition.	DPWT, PDRD		1,800			

Note: Priority projects and programs are shaded.

Table II.6.2 Long List of Projects and Programs (2/2)

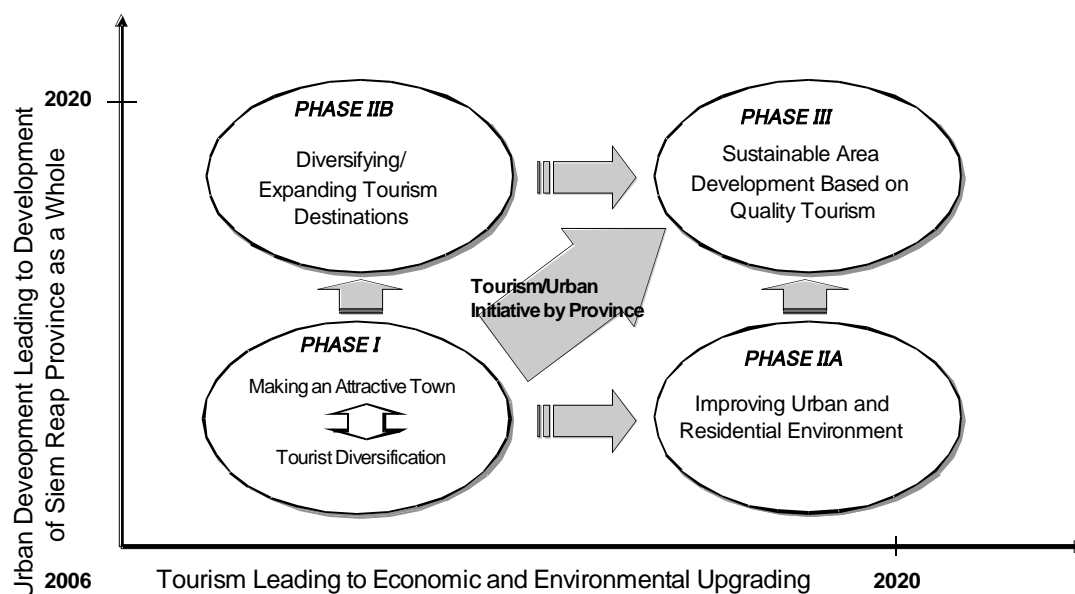
NO	Corresponding Strategy	Sector	Proj. ID	Title	Brief Description	Implementing Agency	Priority	Cost (1000 US\$)	Schedule		
									2006	2012	2020
29	4,5,6	Water	W-1	Provincial regulation on registration of commercial Well	Registration of commercial users and installation of water meters.	Province		0			
30	5,6		W-2	Ministerial Sub-decree on groundwater charges for commercial well use.	Establishment of sub-decree on commercial well use.	Province		0			
31	4,5		W-3	Replacement of old pipeline	Replacement of obsolete pipeline (6.5km) in the city center	MIME	Priority	450			
32	4,5		W-4	Strategic study on integrated water resources management	Preparation of integrated water resources management.	MOWRAM	Priority	7,282			
33	4,5		W-5	Water supply system development of Siem Reap (stage-1)	Establishment of new water supply system.	MIME		13,716			
34	4,5		W-6	Water resources development of North East Baray	Improving North East Baray function as water resource.	MOWRAM		8,320			
35	4,5		W-7	Water supply system development of Siem Reap (stage-2)	Development of water treatment plant and distribution network system.	MIME		12,310			
36	3,4,5,6	Solid Waste	SW-1	Sound solid waste management system development	Institutional and financial system development for solid waste	MICC, Province		1,000			
37	3,4,5,6		SW-2	Strengthening of waste collection system	Improve solid waste collection up to 100% coverage	MICC, Province		300			
38	4,5,6		SW-3	Sanitary landfill	Improvement of current operation at landfill and plan of new landfills.	MICC, Province		2,000			
39	3,4,5	Sewerage/ Drainage	SD-1	Mekong Tourism Dev Proj (A1)	Improvement of town center drainage	MPWT, DPWT (ADB funded)		11,988			
40	3,4,5		SD-2	Urban Dev Proj SR	Drainage and sewerage pipe installment in city center area	Province, DPWT (AFD funded)	Priority	4,800			
41	3,4,5		SD-3	Sewerage (Phase I)	Wastewater collection system in City Center West (Zone 1)	DPWT, MPWT		18,326			
42	3,4,5		SD-4	Sewerage (Phase II)	Wastewater collection system in City Center East and treatment plant.	DPWT, MPWT		17,271			
43	3,4,5		SD-5	Stormwater relief	New western drain in town center.	DPWT, MPWT		10,935			
44	3,4,5		SD-6	Septage management (Phase I)	Septage collection vehicle and septage treatment facility for SD-1.	DPWT, MPWT		1,614			
45	3,4,5		SD-7	Septage management (Phase II)	Septage collection vehicle and septage treatment facility for SD-4.	DPWT, MPWT		1,027			
46	3,4,5		SD-8	Tank effluent disposal (Phase I)	Simplified pipe system for collecting and conveying septic tank by SD-3.	DPWT, MPWT		13,137			
47	3,4,5		SD-9	Tank effluent disposal (Phase II)	Simplified pipe system for collecting and conveying septic tank by SD-4.	DPWT, MPWT		7,634			
48	5,6	Power	P-1	Urgent installation of diesel generators	Installation of new diesel generators of 7MW on EdC site.	EdC	Priority	2,090			
49	5		P-2	Expansion of existing diesel power station	Increase of 10MW diesel power station.	EdC		20,800			
50	5		P-3	Extension and expansion of distribution networks	High and low voltage line extension, installment of new substations and watt-hour meter	EdC		7,800			
51	3,5		P-4	Installation and repair of street light	Improvement of street light for tourists.	District		780			
52	1,3,6		P-5	Effective use of the electricity for Angkor Wat and other temples	Light-up of Angkor monuments by public power source.	APSARA and/or other relevant organization		330			
53	2,5		P-6	Planning for electrification for unelectrified area	Expansion of electrified area as city grows.	EdC		275			
54	5,6		P-7	Assistance to capacity building for EdC	Training of engineers of Siem Reap EdC.	EdC		550			
55	5,6		P-8	Assistance to reviewing of power tariff rate	Revision of tariff by user classification.	EdC/EAC		990			
56	5,6		P-9	Revision of law, ordinances and decree for power to reduce environmental load	Review, revision and setup to reduce environmental load by power sector.	Municipality, EAC, EdC		1,800			
57	5,6		P-10	Sustainable power source development	Alternative power sources exploration.	EdC, MIME		660			
58	6	Local Administration	(Recommendation)								
			L-1	Development committee for project approval	Establish of a committee for integrated operation in the Province.	Province,		0			
59	6		L-2	Human resources development of Province	Human resources development for provincial officers	Province		1,600			
60	6		L-3	Organizational reform of Provincial Government of Siem Reap	Streamlining of organizational structure of the Provincial Government.	Siem Reap Province					
61	6		L-4	Development and efficient operation of laws and regulations	Preparation of legal framework for unified administration.	Province, Ministry of Interior					
62	6	L-5	Financial budget reform for unified administration	Strengthening financial resources of Siem Reap province.	Ministry of Finance and National Assembly						
63	3,6	Community Empowerment	C-1	Land use mapping	Preparation of local maps by workshops	Province, Commune, Local stakeholders		10			
64	3,6		C-2	Community planning	Planning by workshops of local stakeholders	Province, Commune, Local stakeholders		10			
65	3,6		C-3	Community association	A community association to implement a project	Province, Commune, Local stakeholders		10			
66	2,3,6		C-4	Community application	Introduction of bottom-up approach for project planning.	Province, Commune, Local stakeholders		100			
67	2,3,6		C-5	Regulation on co-existing zone	Plan for APSARA Zone 1&2 for coexistence with heritages	APSARA, Commune, Local stakeholders		100			
68	2,3,6		C-6	Angkor management plan and community development	To promote people in poverty to live with heritages	APSARA, Commune, Local stakeholders		3,000			
69	3,6		C-7	People's needs collection	To incorporate people's voices by various medias	Province		1			

Note: Priority projects and programs are shaded.

## 6.2 Criteria and Phasing for Project Identification

### 6.2.1 Criteria

The projects and programs proposed above are all indispensable for the development of Siem Reap. Under the given time frame, however, this study needs to give priority among them. In order to determine the priority, we have reviewed a logical sequence of development prospects, key issues, overall vision and sector strategies in long-term and short-term. The period for this planning is 15 years between the year 2006 and the year 2020, with a mid-point at the year 2012. We define here that the period 2006-2011 is short-term and the period 2012-2020 is long-term.



**Figure II.6.1 Four Phases of Development Towards 2020**

The diagram shows a complicated interdependence of strategies over time. In the main, however, we keep in mind the development phases as shown in the Figure II.6.1.

Phase I	Making a Town More Attractive to Various Tourists
Phase II.A	Improving Urban and Residential Environment
Phase II.B	Diversifying/Expanding Tourism Destinations
Phase III	Sustainable Area Development Based on Quality Tourism

This phasing reflects changing emphasis in overall development of Siem Reap. It is our recommendation that development shall be led by tourism in the urban center in the short-term. An intensive tourism development in and in the vicinity of the urban center in short-term shall be followed by extensive tourism development in the whole province in long term and give spread effects over the local economy. Meanwhile, the intensive tourism development will be conducive to upgrading total environment of the urban center for the tourists as well as the local population. The phasing above based on this recommendation.

An important factor in this phasing is development administration and finance as shown Figure II.6.1. We recommend that a new initiative be taken for strengthening development of administration and finance at the provincial level with a focus on urban and tourism sector in short-term, rather than starting at the commune level with a focus on rural sector. Unlike many other parts in Cambodia where development takes place at the bottom of rural areas, development shall be led by tourism and urban sector as far as in Siem Reap province is concerned.

In view of the total development process shown in Figure II.6.1, we have examined the list of proposed Projects and Programs one by one from the following two view points.

- Short-term importance
- Long-term importance

This illustrates a combination of short- and long-term importance over time.

(1) Short-term Importance

A project should be given priority, because it meets pressing needs and can be effective in short-term.

(2) Long-term Importance

A project should be given priority because:

- it reflects a core concept of the master plan,
- it is essential to realizing the master plan in long-term, and
- it needs early undertaking in view of a long preparation period.

## 6.2.2 Priority Project

Based on the above criteria, this section shortlists the following projects and programs.

**Table II.6.3 Priority Projects and Programs (1/2)**

Sector	Proj. ID	Title	Schedule	Importance		Reasoning
				Short-term	Long-term	
Urban	U-1	City Center Area Improvement	2006-2007	X		A breakthrough to upgrade vividly urban/tourism environment of the city center, with a target on the vicinity of Old Market.
Urban	U-2	Urban Planning Capacity Building	2006-2007		X	Strategic to incorporate and to strengthen urban policy/management in the provincial administration. A priority topic is streamlining of land use planning/management and a more effective provincial committee for city planning.
Environ-ment	E-2	Enhancing Environmental Awareness	2006-2012		X	Important to let the pilot project "A More Beautiful Siem Reap" more sustainable and more broad-based



**Table II.6.4 Priority Projects and Programs (2/2)**

Sector	Proj. ID	Title	Schedule	Importance		Reasoning
				Short-term	Long-term	
Tourism	TO-1	Khmer Heritage Tourism Network and Tourism Facility Dev	2007-2012	X		Important to redescoveer the value of Khmer culture.
Tourism	TO-3	Public-Private Partnership Tourism Quality Improvement	2006-2020	X	X	An essential program to coordinate, specifically for the tourists, various projects, to regulate private sector in advance and to promote the target tourism market.
Agricultural Diversification and Local Product	A-1	HRD and Local Product Promotion Center	2006-2008	X		Important to let the pilot project "Angkor Product Fair" sustainable by strengthening Angkor Products Promotion Center (APPC).
Transportation	TR-1	French Bridge Improvement	2006-2012	X	X	Essential to reinforcing substantially a major East-west access of the city with preserved current Bridge.
Transportation	TR-2	Sub-arterial Road Network (Phase 1)	2006-2008	X	X	Essential to debottleneck the NR6 urgently
Transportation	TR-7	Rural Heritage Network Rehabilitation	2006-2009	X	X	Indispensable to promote diversification of tourism attractions and ensuring easy access scattered historical monuments.
Water	W-3	Replacement of Obsolete Cement Pipeline	2006-2007	X		Unavoidable to replace the old pipes used in the existing system for enabling the full fledged operation of a new water supply project as an integral part of the whole urban water supply system.
Water	W-4	Strategic Study on Integrated Water Resources Management for Siem Reap and Roluos River Basin	2007-2011	X	X	Strategic and urgent to determine the realistic ways and means to substitute unorganized individual groundwater drawing by public water supply on step-by-step basis and ensuring the long-term water management for different beneficiaries and places in Siem Reap.
Sewerage/ Drainage	SD-2	Drainage System Development	2006-2020	X		Essential to improve sanitation and environment of the central part of city where both tourism facilities and population concentrate. An ADB-assisted project plans to develop a treatment plant in this connection.
Power	P-1	Urgent Installation of Diesel Generators	2006-2007	X	X	Effective and easily implementable as an immediate measure to largely alleviate chronic black-out.

The following table summarizes the total project cost with and without priority.

**Table II.6.5 Priority Projects and Programs and Initial Cost Estimate**

Sector		Priority Projects		Other Projects		Total	
		Count	Proj. Cost (thousand \$)	Count	Proj. Cost (thousand \$)	Count	Proj. Cost (thousand \$)
Urban Development	U-1 to 5	2	8,100	3	200	5	8,300
Environment Management	E-1 to 3	1	330	2	620	3	950
Tourism	TO-1 to 6	2	26,550	4	792	6	27,342
Agricultural Divesification and Local Product	A-1 to 4	1	80	3	204	4	284
Transportation	TR-1 to 10	3	44,946	7	55,795	10	100,741
Water	W-1 to 7	2	7,732	5	34,346	7	42,078
Solid Waste	SW-1 to 3			3	3,300	3	3,300
Sewerage/ Drainage	SD-1 to 9	1	4,800	8	81,932	9	86,732
Power	P-1 to 10	1	2,090	9	33,985	10	36,075
Local Administration	L-1 to 5			5	1,600	5	1,600
Community Empowerment	C-1 to 7			7	3,231	7	3,231
Total		13	94,628	56	216,205	69	310,633

### 6.3 Development Packages

Projects and Programs and programs have been proposed as components of the Master Plan. Here reaffirms the supporting strategies by proposed projects and programs (Table II.6.6). In addition, the areas are shown if specific location is identified.

**Table II.6.6 Project and Programs by Strategies and Areas**

	All Area	City	Rural/ Heritage		Tonle Sap Lake
			Rural	Heritage	
Strategy 1 Promoting Tourism Focused on Up-market	TO-3			TO-1	
Strategy 2 Maximizing Local Benefits from Tourism	TO-5, A-1	A-4	TO-5,A-2~4	TO-1	TO-5
Strategy 3 Making Town More Attractive to Tourists		TO-2, A-4, TR-8			
Strategy 4 Making Town More Sustainable in Environment	W-1,4,6	TR-8~9, W-2,3, SW-1~3, SD-1~9, P-10			W-5
Strategy 5 Strengthening Infrastructure for Tourists and People	TR-10	TR-1~5, W-5,7, P-1~4, 8	P-6	P-5	
Strategy 6 Strengthening Local Administration and Finance	A-1, TR-6, C-7	W-1, P-9, C-1~4	TR-7	C-5~6	

Source: JICA Study Team.

Finally, the above matrix is organized into groups of “Development Packages.” Development packages are sets of Projects and Programs and programs in Table II.6.6 and aimed at realizing six strategies in an integrated way (Table II.6.7).

**Table II.6.7 Development Packages**

	All	City	Rural/ Heritage		Tonle Sap
	Area		Rural	Heritage	Lake
Strategy 1 Promoting Tourism Focused on Up-market	Tourism Promotion Support				
Strategy 2 Maximizing Local Benefits from Tourism	Local Product Development			Integrated Improvement of Heritage Park	Eco-Tourism Promotion
Strategy 3 Making Town More Attractive to Tourists		Tourism City Development Residential Area Improvement			
Strategy 4 Making Town More Sustainable in Environment	Integrated Water Resources Development	Urban Environment Improvement	Greening/ Tree Planting		
Strategy 5 Strengthening Infrastructure for Tourists and People		Urban Infrastructure Reinforcement	Road Improvement for Access to Angkor Monuments		
Strategy 6 Strengthening Local Administration and Finance	Capacity Building for Urban / Provincial Development				

Source: JICA Study Team.

## **7. Financial and Institutional Arrangements**

In order to realize the proposed sector plan that incorporate projects/ programs, a series of recommendations are made with reference to institutional and financial arrangements. The recommendations comprise (1) those for the government organizations at the provincial level and (2) those for the government organizations at the national level.

### **(1) Recommendations for the government organizations at the provincial level**

A key is to strengthen, step-by-step, the initiative and authority of the provincial governor. Particularly important recommendations are as follows:

A. Securing common information and understanding among provincial hall, line departments and APSARA Authority regarding policies, plans, budget and projects in the district. This will pave the way to smoother coordination and decision by provincial governor on the developmental activities for Siem Reap.

B. Ensuring overriding authority to permit/prohibit private activities in such priority areas as:

- Land use and building control.
- Environmental monitoring, and
- Use of water resources, both underground and surface.

C. Strengthen the functions of urban policy-making and urban management:

Provincial administration has basically been for rural and agricultural development in Cambodia. Economy and society of Siem Reap, however, are led largely by urban and tourism development. It is in this regard that stronger initiative should be taken at the provincial level for urban policy and management.

D. Strengthen government initiative to ensure effective participation of private sector:

In the light of limited capacity of the government at the provincial level, it is inevitable at least for the time being to make use of private participation. However, the hands-off reliance on private participation without public plan and public monitoring as observed at present causes the misuse of public resources for private interests and a declining quality of services, possibly with a loss of public interests and a fail in sustainable development.

For these recommendations to be realized, it is crucial in the first place to strengthen the provincial institutional basis through the following measures:

1) Strengthen the provincial administration with special stress on:

- Human resources in technical and managerial aspect,
- Financial basis especially for recurrent cost, and
- Database to facilitate effective monitoring of land use, environment, water use and public utility services

2) Improve private participation arrangements

Arrangements of private participation should be made on a more transparent and competitive basis for securing fairness, accountability and efficiency of the entrusted

services in line with the planned sustainable development.

### 3) Fields of private participation

Private participation is recommended in selected fields such as solid waste collection, local product promotion, awareness-building in environmental improvement and tourism promotion.

## **(2) Recommendations for the government organizations at the national level**

A key is to strengthen legislative and technical capacities of line ministries to support the provincial initiative and authority mentioned above. Particularly important recommendations are as follows:

A. Establishing and elaborating the laws, regulations and procedures in the priority areas, including land use control and environmental monitoring, water management. In this connection it is also important to review and streamline division of responsibility among concerned ministries and departments in these priority areas.

B Strengthening technical capacity of line ministries and departments to enable the provincial governor to effectively use its initiative and authority, with a stress on the management of land, environment and water.

C tax reform should be expedited in favor of local developments including those in Siem reap. Ongoing effort such as hotel tax should be realized at the earliest possible time.

This master plan study has proposed 69 projects in wide-ranging fields. A total cost of these projects would amount to 311 million US dollars. Of these, 13 projects have been given priority for the coming five years period. The high priority projects would cost approximately 96 million US dollars.

On the other hand, a total size of the national budget is 723 million US dollars. Of which the amount of capital expenditures is 233 million US dollars in 2004. Assuming that the national budget would expand at an annual rate of 5% during the period 2006-2020 (The rate is 8% on average during the period 2000-2004), a cumulative total of the national capital expenditures would amount to 5033million US dollars. The total project cost of 311 million is equivalent to 6.2 % of this amount. This is little less than the proportion of Siem Reap in the national population being 6.7% in 2004.

Requirement and availability cannot, therefore, be comparable here, especially because off-budget finance is not included in terms of availability. External finance represents 75% of the national total capital expenditures on budget in 2004. It is apparent that the dependence of capital expenditures on the external finance would be much heavier when off-budget finance is taken into account. Despite that, one could infer from these figures that the financial requirements of the proposed projects are not out of all bounds.

At the same time, it should be admitted that Siem Reap, too, would rely largely on the



external finance.

In view of the recommendations above on one hand and an inevitably substantial need for external inputs on the other, we focus on two major subjects for in-depth analysis and proposals: (1) Development administration particularly at the provincial level and (2) Local financing.

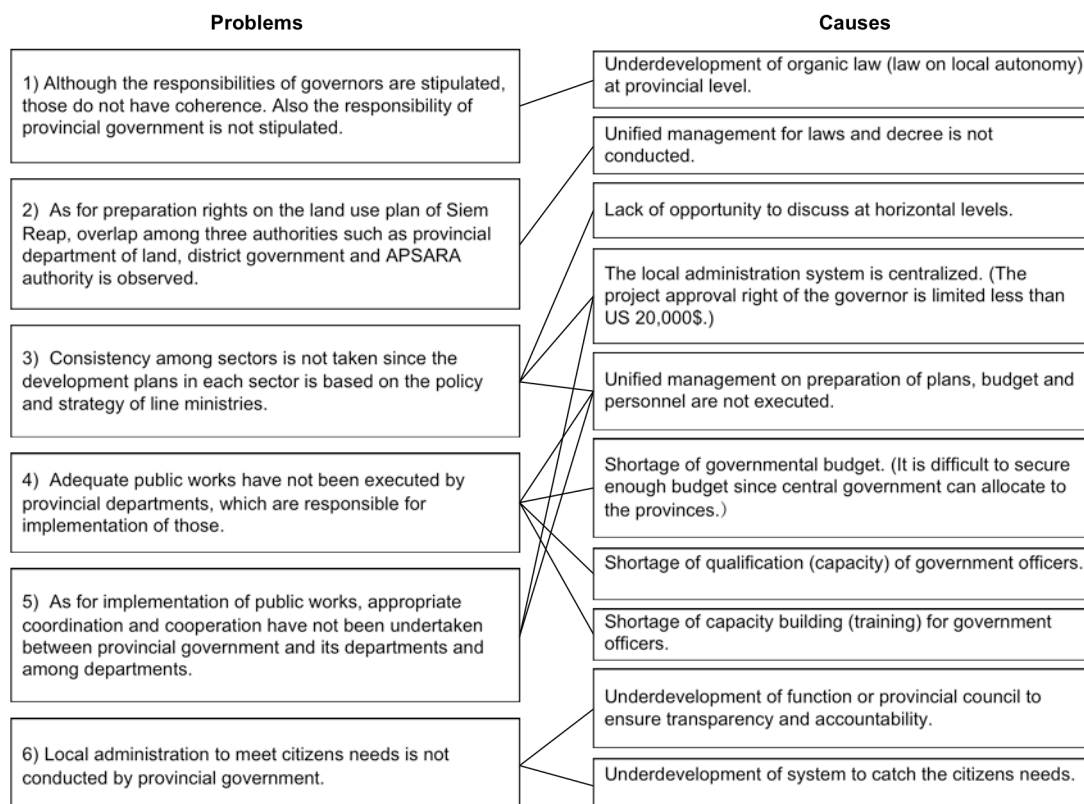
## 7.1 Development Administration

### 7.1.1 Issues

The largest issue is that the present development administration of Siem Reap, primarily the provincial government, does not have enough capacity either to carry out or coordinate development activities in a unified manner. Major issues are as follows:

- Duplication of responsibilities among governmental organizations
- Lack of integration in the development administration at the provincial level
- Insufficient revenue resources
- Weak management capability
- Lack of streamlined legal framework and its enforcement

The problems structure on the development administration at the provincial level is analyzed as Figure II.7.1.



**Figure II.7.1 Problems and Causes of Development Administration at Provincial Level**

It should be noted that now decentralization and deconcentration have widely been discussed in Cambodia. Ministry of Interior is preparing a draft organic law on the sub-national governments and aims at completing it by March 2006. If decentralization and deconcentration are realized, there will be a significant change on the relationship between national and provincial governments as well as between provincial government and line departments.

### **7.1.2 Approaches**

In view of the issues for development administration in Siem Reap, the following five approaches are set as follows:

#### **Approach A Promotion of Unified Administration in Line with the Decentralization and De-concentration Reform**

In the Strategic Framework of Decentralization and De-concentration Reforms (SFDDR) paper issued by the government, a concept of 'unified administration' is strongly advocated as the principle of local administration system. It is necessary to introduce, in the earliest possible time, a unified mechanism for the efficient and effective administration particularly for a fast growing city/region like Siem Reap.

#### **Approach B Strengthening Governance of Siem Reap Province as a Basic Unit for Development Administration at the Local Level**

In order to implement the proposed master plan, it is indispensable to establish responsibility and power of the provincial governor in the administration at local levels. In this connection, a draft of organic law has been prepared in the Ministry of Interior. It will take more than three years to enact the law.

#### **Approach C Securing Own Funds for Unified Administration**

It is also necessary for the unified administration to secure own funds by introducing new tax system and increasing existing local revenues. In the context of reforms, the provincial governors are expected to act as the original owners of the budget of line departments at the provincial level, though it would take much time to reform local finance.

#### **Approach D Following a National Policy to Establish Parliamentary Democracy System from the Viewpoint of Transparency and Accountability at the Provincial Level**

According to the Strategic Framework of Decentralization and De-concentration Reforms (SFDDR) paper, the councils of the provincial and district administrations will be established based on the principle of free democracy to secure transparency and accountability by means of the indirect elections nation-wide. The council system will be introduced after enactment of the organic law. It is important to follow this line and to ensure transparency and accountability.

#### **Approach E Building Legal Framework to Support Unified Administration**

It is necessary to develop and enact a legal framework for unified administration. There are many laws and decrees that are closely linked with the development administration at the local level. Many of them, however, do not function so well as

they are expected, e.g., sub-decrees for registration of hotels and vehicles.

### 7.1.3 Recommendations

#### (1) Establishing a Provincial Development Committee

In line with “Approach A: Unified Administration: and “Approach D: Transparency”, we recommend to establish a development committee for Siem Reap. Aims of the committee are (1) to monitor, evaluate and approve projects, including those under the concession arrangement, (2) to coordinate the ministries and donors concerned with projects in Siem Reap, and (3) to ensure transparency in the process of project approval. An organizational structure of the committee could be as shown in the Figure II.7.2.

There are some trends that the committee can facilitate and accelerate. For example, there are ongoing attempts to strengthen initiative of the governor for development, such as “One Window Service”, the approval of the projects which cost less than 2 million US dollars, an inter-departmental meeting for improving city environment and the one for improving efficiency in local level administration.

Along with this line, the provincial governor could organize a committee, to cover line departments as well as APSARA Authority to let them share information on ongoing and proposed projects in the province. It is also supposed to encourage them to have common understanding on the present situation and the issues for development in the province. Such committee might as well be participated by advisory members such as those from relevant central ministries, international donors, NGOs and business community.

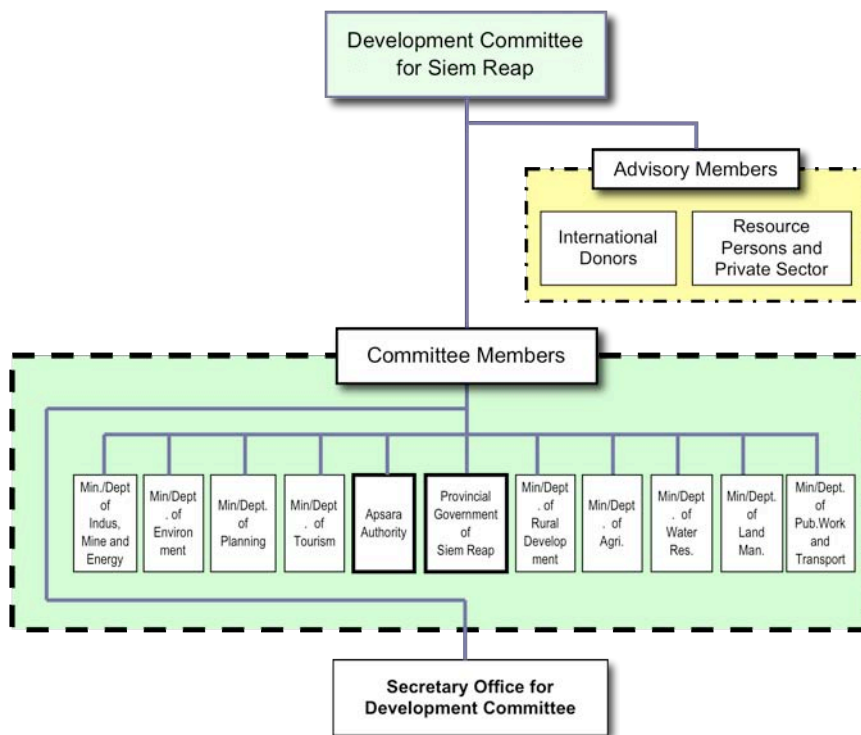


Figure II.7.2 Proposed Organizational Structure for Provincial Development Committee

## **(2) Organizational Reform of Provincial Government**

Siem Reap is different from other provinces in that it is led largely by tourism and urban economies, while most of others are predominantly rural. In view of this, there could be several different ways to strengthen the development administration of Siem Reap. In long term, creating a new entity of "Urban Municipality" could be an option. In short or medium term, however, it is more viable to start with strengthening and modification of the existing settings with an emphasis on the provincial functions for urban policy and urban management. The present trend for decentralization and deconcentration reform is also in line with this way.

Reasons for a stress on the existing set-up are as follows:

1. A present structure of local administration should be maintained as simple as possible, at least until the unified administration is realized at the provincial level.
2. Number of posts should be minimized at the provincial/district level, in view of limited availability of eligible manpower in Siem Reap.
3. Siem Reap/Angkor Town is dependent on the rest of the province in many aspects including water resource, land space, labor and accessibility; it is the provincial government that can overview these aspects.

Thus, firstly, the organizational reform of provincial government should focus on streamlining the overlapping responsibilities within. Secondly, the reform should address itself to the urban policy and urban management. The reform should be proceeded in parallel with the nation-wide decentralization and de-concentration reforms as below:

### Step 1 Prior to the Enactment of Organic Law at the Provincial Level (2006-2009)

- Establishment of Development Committee for unified administration and transparency,
- Establishment of 'Siem Reap Development Fund' for specific public interests
- Establishment of a special unit or a deputy governor in charge of urban policy/management

### Step 2 After Enactment of Organic Law at the Provincial level (2010-2020)

- Removal of a limit to the amount of development projects to be approved by the provincial governor (currently USD 2.0 million),
- Introduction of provincial council to ensure transparency and accountability
- The separation of administrative, legislative and judicial branches at the provincial level.

## **(3) Human Resource Development in Provincial Government**

In response to the Approach A and the Approach B (See page II-7-4), it is indispensable for the local government officials to strengthen capability to manage and monitor public works. Training programs are recommended for the local governmental officers in the short term as shown in Table II.7.1.

**Table II.7.1 Recommended Training for Provincial Governmental Officials**

Expected Public Services	Recommendation of Capacity Building (Training) Programs	Target of Capacity Building
1. Planning Urban MP and Planning Projects	- Planning of Projects based on MP	- Governors and Chiefs of Offices in Provincial Government (PG)
2. Implementation and Management of Public Works (projects)	- Project Management and Monitoring Method, - Project Evaluation	- Management Officers for Public Works in PG - All Provincial Departments Officers
	- Method of Settlement for Land Conflict	- Land Management, Planning and Development, and Investment Officers in PG - Provincial Department Officers of Land Management, Urban Planning, Construction and Land Title
3. Administration Works	- Preparation of Database for Provincial Government Officers and Department Officers, - Statistical Database for Investment and Its Procedure, and - Registration of Enterprises by Computer.	- Land Management, Planning and Development, and Investment Officers in PG - Provincial Department Officers of Land Management, Urban Planning, Construction and Land Title
3. Financial Aspect	- Technical Skill for Budget Management by Computer.	- Financial Management Officers in PG - Provincial Department Officers of Economy and Finance
4. Basic Administration Skills	- Data Management and Analysis, - Statistical Analysis, - Computer Skills (Maintenance, Utilization), - English Conversation, and - Management of Documents.	- All the PG Officers - All Provincial Departments Officers
5. Dissemination of Decentralization and De-concentration Reforms	- Understanding the organic law, - Preparation of Council System, - Preparation of Election, - Understanding Organization and Financial Reform,	- All the PG Officers - All Provincial Departments Officers

#### **(4) Necessary Development and Efficient Operation of Laws and Regulation**

With reference to the Approach A and the Approach E, it is necessary to find a way out of underdevelopment of the laws and decrees and integration of the overlapping decrees concerned with local administration. In particular the following measures should be undertaken by the national government as soon as possible.

##### **1) Integration of the Rights on Preparation of Land Use Plan**

The responsibility of preparing land use plan has been shared among Provincial Department of Land, District Government of Siem Reap and APSARA Authority. It should be made clear that which organization should finally be responsible.

##### **2) Enactment for Underdevelopment of Important Laws Concerned with Local Administration**

The law on water resource management inclusive of water use right and the tourism law have not been enacted even after their drafts had been submitted to the national assembly. The law on water resources management has not been approved due to very slow procedure. As for the tourism law, it is said that it needs to make it consistent with other related laws and regulations in spite of the Prime Minister signed the contents on June 11, 2004. The procedure for enactment of the laws must speed up.



### **3) Necessity of Development of Other Laws Concerned with Local Administration**

Even after laws and decrees were enacted, the issues on inadequate description, improper operation and overlapping are observed at present. Although each ministry is responsible for preparation of decree and sub-decree, no organization has been managing and coordinating overall decrees and sub-decrees. In order to develop and improve the conditions, the legal framework and each law and regulation shall be managed and unified by the sole organizational body.

## **7.2 Local Financing**

Local finance should be strengthened. Siem Reap has special reasons for strengthening its financial base. In the first place, a stronger financial base is interdependent with greater economic benefits from tourists. In the second place, a part of the capital gain from land price escalation should be distributed for the local public interest. Lastly, internationally financed projects considerably concentrate on Siem Reap without sufficient financing for maintenance. However, good urban amenity and environment depend more often on the maintenance itself and small investments rather than large investments, such as those usually financed by international donors.

### **7.2.1 Issues**

Major issues associated with government financing in Siem Reap are summarized as follows.

#### **(1) Insufficient Financial Resources**

Financial resources in Siem Reap provincial government are insufficient, due mainly to the following reasons.

- Major taxes such as profit tax are allocated to national government, and most taxes allocated to provincial government are minor ones.
- Tax collection efforts are said to be weak.
- While national government provides subsidies to each provincial government, the amount of subsidy to Siem Reap provincial government is insufficient.
- Although tourists' entry fee payment to Angkor Park has been increasing every year, none of that payment is transferred to the provincial government.

#### **(2) Inadequate Budget Planning and Implementation**

The scarce budget does not seem to have been allocated or utilized efficiently. The system of government management is fragmented by vertical lines, and coordination of horizontal activities at provincial level faces with many difficulties. Investment projects are directly handled by the national government, except in the SEILA program. Therefore, no one in the province is fully aware of what is going on in the province. Then it is difficult to allocate the scarce budget efficiently to the projects in accordance with the Province's needs.

Regarding budget implementation, a smooth and timely budget implementation has also been difficult. Disbursement of budgetary funds is made on the basis of submission of

payment orders, which are checked by the Department of Economy and Finance. But many signatures are needed to authorize the transactions at different stages. Procurement also requires a lot of paperwork. In addition, cash payments tend to be delayed.

**(3) Inadequate Human Resources**

Human resources in the province do not appear to be adequate, either. For example, government officials of financial department in Siem Reap Province acknowledge that they do not have sufficient knowledge on fiscal matters. In addition, since they have worked for a long time under the centralized system, their attitude is that they always wait for instructions from the national government.

Human resources cannot be effectively utilized without adequate information and equipment, but they are also insufficient. For example, computer equipment is not enough, and even when they are available, government officers who can utilize them are limited. As a related problem, database are absent in many areas.

**(4) Low Levels of Transparency**

Little government fiscal information is available for local residents and for tourists. Financial statements of the provincial government, line departments (provincial share of national budget), and APSARA Authority are not readily available to the public. Although entry fee to Angkor Park is one of the biggest revenue sources, how much the revenue is and how the revenue is allocated are difficult to find.

Low levels of transparency are also found in tax collection, although tax department in general attains a target of pre-determined tax collection every year. As mentioned before, the amount of tax collection is said to be determined by “negotiations,” which might provide discretion to tax collectors.

It is important to note here that the above mentioned problems are partly related with current centralized government structure in Cambodia. For example, the provincial government faces revenue shortages, but the government is unable to introduce a new tax in Siem Reap since it is the role of national government. Likewise, coordination and information sharing between provincial government and line department is weak, but it is also related to vertical Cambodian government structures.

Although details are still unclear (as of December 2005), provincial government is likely to have a larger discretion over tax such as setting tax rates, and some national tax may be allocated to provinces, which should increase the revenue of provincial governments. In addition, with the establishment of unified government, current two budgetary flows are likely to be integrated and the budget of line departments will be directed through provincial government. The coordinating capacity of provincial governor is expected to be strengthened. The decentralization and deconcentration will have a lot of influence on the problems identified in this section and future public financial management.

## 7.2.2 Objectives

### (1) Short-term Objective

It is suggested that an objective associated with local financing in Siem Reap be

***"Government provides adequate financial resources to sustain economic and social development of Siem Reap."***

Siem Reap has been successful in tourism development for the last several years. As a result, the tourism sector employs the largest number of local people in Siem Reap other than the agricultural sector. However, since the tourism development has been so rapid, the government has not been able to catch up with it. Although the number of visitors and land prices are increasing, the government has not been able to fully capture benefits derived from the development. As a result, the government has been unable to provide adequate financial resources to help sustain economic and social development of Siem Reap.

Related problem is reliance on the subsidy from national government. When Siem Reap provincial government and line departments (provincial share of national budget) are combined, the amount of tax and non-tax collected in Siem Reap province and allocated to national government is smaller than the subsidy and other budgetary flows from national government to Siem Reap Province. This implies strong reliance of the Siem Reap provincial government on national government in financial matters. It is desired that Siem Reap province generates enough revenue within the province to finance economic and financial development of Siem Reap and become financially self-sustaining.

### (2) Long-term Objective

A long-term objective of Siem Reap associated with local financing would be:

***"Fiscal revenues in Siem Reap contribute to sustaining economic and social development of Cambodia."***

It is expected that the province becomes a driving force of the country by providing adequate financial resources generated in Siem Reap to the rest of the country. Currently, however, Siem Reap Province is the second poorest, and probably it is not able to fulfill that role.

Needless to say, income redistribution is the function of national government, and it is not the role of Siem Reap provincial government. However, it is desired that government captures adequate financial resources in Siem Reap by means of tax, charges and other methods, and transfers the resources to the national government.

## 7.2.3 Approaches

To attain the above mentioned short-term and long-term sector objectives, the following three approaches are suggested.

- Increase financial resources of the provincial government
- Improve budget planning / implementation and human resources
- Enhance transparency associated with government financing

Each approach is further discussed below.

### **(1) Increase Financial Resources of the Provincial Government**

Increasing financial resources of the provincial government is necessary in many areas. While there are many needs, it is suggested that initially a certain amount be allocated to urban infrastructure development because of its effects on the Siem Reap economy by means of tourism development.

The number of tourists to Siem Reap has been increasing rapidly, and their needs for adequate urban infrastructure has been growing. To respond these needs, the provincial government has allocated a greater share of its budget to infrastructure (particularly road improvement) than other provinces. Other infrastructures such as drainage and sewerage are virtually absent. To sustain the tourism development, urban infrastructure development is necessary, and provincial government would require a greater amount of financial resources.

In fact, external assistance (off-budget resource) should play an important role in financing, particularly, investment in public works in Cambodia. In addition, now the provincial government is able to approve or disapprove investment worth less than US\$ 2 million. Therefore, for the development of urban infrastructure in Siem Reap, it might be necessary to focus initially on foreign assistance and external investments rather than local resources.

In longer term, strengthening local financing is more important. It is because infrastructure requires operation and maintenance, and these expenses should be taken care of by local governments. In addition, some urban infrastructure projects such as small road improvements which are important for local community may not be financed by external sources. In this context, it is necessary for the government to provide adequate financial resources for urban infrastructure in Siem Reap.

Measures to increase financial resources of the provincial government include the following:

- Strengthen tax collection
- Re-allocate existing revenue to the provincial government
- Introduce a new tax/charge and change tax rates

Each measure is discussed below.

#### **1) Strengthen Tax Collection**

Measures that need to be adopted at a provincial level include:

- Develop database of taxpayers,
- Identify arrears in tax and non-tax revenue collection and develop a plan for

collection,

- Identify measures to strengthen non-tax revenue collection,
- Improve identifying turnover in the estimated regime and transfer them to real regime,
- Improve tax payer services,
- Upgrade physical infrastructures such as computers, and
- Provide training on tax office staff members.

## **2) Re-allocate Existing Revenue to the Provincial Government**

It is said that only about 4 percent of total entry fee was used for urban development in Siem Reap. It is proposed to earmark a certain percentage of total entry fee to urban infrastructure development in Siem Reap. APSARA Authority may also benefit from this investment since it may lead to an increase in the number of tourists (or their length of stay), which will increase the entry fee collection. If a 10 percent of the entry fee is allocated to provincial government, the incremental revenue will be approximately US\$ 1.3 million, which almost equals its annual revenue in 2004.

## **3) Introduce a New Tax/Charge and Change Tax Rates**

While allocating a part of entry fee should be given priority, introducing a new tax/charge and/or modifying tax rates are also important to raise revenue of the provincial government. When designing a new tax/charge, it is important to consider tax base. It is suggested that initially incremental revenue will be used for urban infrastructure development. Then, its primary beneficiaries are the tourists, who should bear the new taxes/charges. Again this is a user fee. The following four tax/charges are proposed.

- Implement accommodation tax
- Increase patent tax rates for the service sector
- Introduce ground water pumping charge
- Introduce property tax

Table II.7.2 summarizes expected revenue, advantages and disadvantages of each alternative mentioned above.

## **(2) Improve Budget Planning / Implementation and Human Resources**

A more effective sharing of information and coordination across provincial government and line departments needs to be established. SEILA program is an on-going experiment to establish decentralized planning and budget management. While the financial flow in SEILA program is different from that of public budget system, the method implemented in SEILA program enables not only information sharing but also effective coordination by the governor in allocating resources across line departments. The possibility of this kind of budget allocation system may need to be explored.

Public Financial Management Reform Program (MEF, 2004) also specifies the measures necessary to improve budget planning/implementation. Measures that need to be adopted at a provincial level include the following:

- Examine and implement measures to strengthen budget implementation/cash



flow planning, forecasting and monitoring for the purpose of timely budget releasing.

- Strengthen cash management and budget release planning at the beginning of the year with transparent assumptions including what happens if cash is not available.
- Provide training on bottom up forecasting of cash requirements.
- Strengthen procurement procedures through harmonization of procedures and documentation across public services.
- Plan and undertake a capacity-building process to raise understanding and competence of computer and other facilities in financial areas.

**Table II.7.2 Comparison of Alternative Revenue Sources**

Alternative	Estimated Revenue	Advantage	Disadvantage
1. Transfer a part of Angkor Park entry fee	US\$ 1.3 million (2004) if 10% of entry fee.	<ul style="list-style-type: none"> <li>- Probably this is the biggest source of revenue.</li> <li>- It is the tourism development that demands urban infrastructure development in Siem Reap town. So earmarking a part of tourists' expenses makes sense (a kind of user fee).</li> </ul>	<ul style="list-style-type: none"> <li>- The contract between APSARA Authority and Sokha Company may need to be amended.</li> <li>- There might be a conflict over the use of fund between Sokha Company, APSARA Authority and Provincial Government.</li> </ul>
2. Implement accommodation tax (2% of accommodation fee)	US\$ 0.27 million (2006) by DEF.	<ul style="list-style-type: none"> <li>- Has a feature of user fee.</li> <li>- The law has already been approved, and praka (proclamation) has been issued.</li> <li>- The tax is allocated to province.</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation has been postponed due to opposition.</li> </ul>
3. Increase patent tax rate for service sectors	US\$ 0.07 million (2004).	<ul style="list-style-type: none"> <li>- Tax base is wider than accommodation facilities (No.2) since restaurants and travel agencies are also included.</li> <li>- Has a feature of user fee.</li> </ul>	<ul style="list-style-type: none"> <li>- Expected revenue is small.</li> </ul>
4. Introduce ground water pumping charge	US\$ 0.08 million (2004) if the rate is the same as current water fee.	<ul style="list-style-type: none"> <li>- It is also good for the environment.</li> <li>- Primary revenue sources are hotels, and the charge will be borne by tourists. So this is also a user fee.</li> <li>- If introduced as a charge, National Assembly's approval is not necessary.</li> </ul>	<ul style="list-style-type: none"> <li>- It is necessary to have firms install meter equipment and report to an inspecting agency.</li> <li>- It is difficult to introduce now because groundwater users do not have alternative water sources (not much water saving effects expected).</li> <li>- Expected revenue is small.</li> </ul>
5. Introduce property tax	Unknown but potentially large	<ul style="list-style-type: none"> <li>- Land prices are rapidly increasing in Siem Reap, and government should capture a part of this capital gain.</li> <li>- Property tax is adequate as provincial tax.</li> </ul>	<ul style="list-style-type: none"> <li>- It might be difficult due to political reasons.</li> <li>- Assessing land prices might be difficult.</li> <li>- May need to start without proper land titling system.</li> </ul>

### **(3) Enhance Transparency Associated with Government Financing**

It is important for the government to be transparent on financial matters. There has been a concern within local people as well as donor community on the lack of transparency on government financing. Tax payers are not willing to make tax payment when the amount of tax collected and its uses are unclear, and when they think

that the benefits they receive from government services are not sufficient for what they pay as a tax.

APSARA Authority is not an exception. It is suggested that APSARA Authority make its financial statement available to the public. Without transparency, accountability cannot be established. To facilitate everyone's access to the financial information, APSARA Authority might want to consider publishing the financial statement in website, disaggregated as appropriate.

In addition, the following two measures are suggested to enhance transparency.

**1) Create Siem Reap Development Fund**

It is suggested to create a fund within Siem Reap provincial government (treasury) and the fund be used for urban infrastructure development in Siem Reap. The sources of the fund will be the first four alternatives mentioned in Table II.7.2<sup>1</sup>.

There are two reasons to create the Siem Reap Development Fund on top of the general budget. The first is to enhance transparency. With the fund, the use of revenue will be more traceable and accountable, and it is expected that tourists would be more willing to accept the tax. The second reason is smooth implementation of the projects. Project implementation is often delayed due to cash shortages, and provincial treasury has a power in allocating the cash. By creating a fund, the availability of cash becomes clearer, and it is expected that the cash be delivered in a more timely manner.

It is proposed that the uses of the fund will be limited to the following purposes:

- Improvement and maintenance of roads;
- Operation and maintenance of drainage and sewerage; and
- Solid waste management in public spaces.

These areas are chosen because user fee system does not work well in these areas in general. On the other hand, it is recognized that operation and maintenance costs for public water supply, electricity, and solid waste management in private spaces will be covered by user fees. It might be difficult to allocate the fund to the construction of infrastructures. The majority of the infrastructure will need to be constructed with external funding such as foreign aid.

The geographical area of the uses of fund will be limited to Siem Reap urban areas and its vicinity to ensure that the fund be used primarily for the benefit of tourism. More concretely, it is suggested that the fund be used within Siem Reap district only.

The fund will be handled by the development committee proposed in the previous section. It is important that the allocation of fund be discussed with relevant ministries/departments with an effective coordination of the provincial governor. It is also important that the fund be clearly separated from general provincial budget in the treasury to ensure smooth and timely cash delivery.

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<sup>1</sup> The revenue from property tax should be used for general purposes since it is not a user fee.

According to the Ministry of Economy and Finance, this kind of fund does not exist in Cambodia, but it is possible to create it with approval of the National Assembly.

## **2) Establish a Forum to Enhance Financial Transparency**

It is important for government institutions (provincial government, line departments, APSARA Authority, and other governments) to disclose their revenue and expenses in as detail as possible and make them available to the public. All the financial transactions should become more transparent. Siem Reap District has recently launched One Window Office (OWO). Before, it is said that when a person wanted to start a business, he/she had to get permissions from many offices/persons in exchange for under-the-table payments. However, with OWO, the fee is clearly stated on a wall of the office, and all the transactions can be made in one office quickly. With OWO, transparency has been improved, and it is very popular among people.

## **7.3 Immediate Actions to Be Taken**

Financial and institutional arrangements are continuous process of development. In order for Siem Reap to embark on this continuous process, it needs to take a number of actions, immediately after this master plan study. Such actions include:

- (1) Follow-up of the master plan with special reference to the priority projects. It would be useful for the provincial government to be provided with advisor(s) who can prepare technical documents necessary to facilitate the implementation of priority projects. The advisor(s) are expected to contribute to strengthen technical capability of relevant provincial departments.
- (2) Follow-up of the master plan with special reference to urban planning and the urban project. It would also be useful for the provincial government to be provided with an advisor who can elaborate and adjust urban land use plan and urban project through close coordination with APSARA Authority and Siem reap Ditriect.
- (3) Strengthening of technical and managerial capacity of Angkor Products Promotion Center, which has been organized under the pilot project of this study. It would be useful to send key personnel of APPC to relevant countries/market in order to exchange the information and the ideas on local product promotion.
- (4) Preparing the Strategic Study on Integrated Water Resource Master Plan. As repeatedly discussed, water is the most crucial issue for development in Siem Reap. The study should be implemented as soon as possible in view of a rapid increase in groundwater consumption. At the same time, water management is a key issue for inter-departmental coordination at the provincial level.
- (5) Setting a provincial development committee to follow-up this master plan on periodical basis. The committee is not necessarily a formal but informal and flexible one. International development partners, including JICA, might as well be invited as an advisor/observer in the committee as the case may be.
- (6) Reviewing and identifying respective roles of the relevant authorities, including the provincial governor, in regulating the building activities, the land use change and the

use of groundwater for commercial purpose.

- (7) Realizing accommodation tax. While National Assembly approved law on accommodation tax, its implementation has been postponed. Realizing accommodation will strengthen the financial base of provincial government.

## **8. Environmental and Social Considerations**

This chapter describes the results of Initial Examination of Environmental and Social Impact (IEE) of the Master Plan in accordance with “Guidelines for Environmental and Social Considerations of JICA (2004)” and Cambodian legal framework.

First, as part of IEE, analysis of alternatives is conducted including a without project situation at scenario level and project component level. The master plan based on the scenario in favor of sustainability employed by the Master Plan is comprehensively preferable in terms of the long-term sustainability of the environment and socio-economy.

The project component level analysis is made for the proposed projects in the water resources and water supply, drainage and sewerage, and energy sectors since these projects likely have larger impacts. The proposed project components are preferable in terms of the environmental and social impacts, resource base, realization, and costs.

Second, predicted environmental and social impacts of the Master Plan are scoped. Then, these impacts are examined with proposing assumed mitigation measures, a monitoring plan and a required institutional capacity for EIA.

In the study process of the Master Plan, JICA Study Team and counterpart agencies held a series of stakeholder meetings to incorporate the idea and opinion of stakeholders in decision-making process, to build consensus on the Master Plan among them, and to disclose information of the results of the study to public.

The following sections report the necessity of IEE, the predicted impacts of the Master Plan on environment and society, and the proposed mitigation plan of these impacts.

### **8.1 Necessity of Environmental and Social Conditions**

The Sub-decree on Environmental Impact Assessment Process requires Initial Environmental Impact Assessment (IEIA) or Environmental Impact Assessment (EIA) for the projects. All the listed projects and activities, either publicly or privately implemented, are subject to the IEIA/EIA.

The Ministry of Environment judges whether EIA is necessary or not by reviewing IEIA report. Project or activity owner must bear the cost for IEIA/EIA review. Public participation, assessment of alternatives and mitigation measures, detailed project description, current environmental quality, and results of environmental and social assessment shall be included in the IEIA/EIA report.

This Master Plan study is not required to conduct EIA according to the judgment by the Project Monitoring Office of the Department of Environmental Impact Assessment in the Ministry of Environment. EIA might be required when each of proposed projects is in the implementation stage.



Initial Examination of Environmental and Social Impact (IEE) of the Master Plan is made according to “Guidelines for Environmental and Social Considerations of JICA”.

## 8.2 Adverse Environmental and Social Impacts Predicted

The predicted environmental and social impacts of the study at this stage are scoped. The summary of the predicted environmental and social impacts as a result of scoping and the assumed mitigation measures as Initial Examination of Environmental and Social Impact (IEE) of the study at this stage is summarized in the following table.

**Table 8.1 Summary of Impacts (For all Projects)**

Name of Cooperation Project		The Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town in the Kingdom of Cambodia		
Likely Impacts	Rating	Impact Severity (e.g. magnitude, area extent, duration, frequency, reversibility, likelihood of occurrence)	Methods Used to Predict	Assumed Mitigation Measures
Involuntary Resettlement	C	<ul style="list-style-type: none"> <li>Construction of roads, water/wastewater treatment plants, landfill requires land acquisition (see photos below). Occasion of resettlement is not clear at this stage because accurate locations of these facilities have not set yet. The water/wastewater treatments and landfill are planned to locate in the cultivated land. Therefore, the occurrence of resettlement is expected to be low. But road construction plan possibly requires some households to move.</li> </ul>	<ul style="list-style-type: none"> <li>Check on magnified map with planned locations of the projects</li> <li>Field survey</li> </ul>	<ul style="list-style-type: none"> <li>Careful site selection/setting for the relevant projects to prevent resettlement as much as possible</li> <li>If the resettlement is not avoidable, resettlement plan with the agreement from stakeholders need to be set to avoid involuntary resettlement</li> <li>If involuntary resettlement cannot be avoided, the project should be stopped and reconsidered.</li> </ul>
Local Economy such as Employment and Livelihood, etc.	B	<ul style="list-style-type: none"> <li>Farm land on the border between Chreav and Siem Reap communes is a site proposed for the 15ha wastewater treatment plant though accurate location has not been set</li> </ul>	<ul style="list-style-type: none"> <li>Survey on income of farmers and landownership in the proposed area</li> </ul>	<ul style="list-style-type: none"> <li>Careful consideration for the site setting to minimize the impact.</li> <li>Consideration and implementation of appropriate compensation, and securing employment for the relevant residents</li> </ul>
Cultural Heritage	B	<ul style="list-style-type: none"> <li>The possibility of causing impact is low, but the construction activities for the proposed projects may affect unearthed cultural heritages.</li> </ul>	<ul style="list-style-type: none"> <li>Field survey</li> <li>Archaeological investigation</li> </ul>	<ul style="list-style-type: none"> <li>Conducting an archaeological investigation prior to the commencement of construction. (see the figure below for zoning)</li> </ul>
Local Conflict of Interests	B	<ul style="list-style-type: none"> <li>The conflict of interests on land ownership is expected in the area relating to the suggested land use plan</li> </ul>	<ul style="list-style-type: none"> <li>Meeting with stakeholders</li> <li>Discussion with responsible local authorities</li> </ul>	<ul style="list-style-type: none"> <li>Sufficient meetings and discussion with stakeholders should be held before the master plan is finalized.</li> </ul>
Water Usage or Water Rights and Rights of Common	B	<ul style="list-style-type: none"> <li>If the coordination were not made among administrative offices, the impact would be serious and difficult to reverse.</li> </ul>	<ul style="list-style-type: none"> <li>Meeting with stakeholders</li> <li>Discussion and Coordination with responsible local authorities</li> </ul>	<ul style="list-style-type: none"> <li>Careful coordination needs to be accomplished regarding the projects for water resource development in the master plan.</li> </ul>
Groundwater	B	<ul style="list-style-type: none"> <li>Groundwater may be contaminated by turbid water at the construction stage of the proposed projects. Leachate from the proposed landfill may intrude into groundwater. But, these impacts will be prevented with appropriate mitigation measures.</li> <li>The proposed water resource development requires drilling of deep wells. The drilling has a possibility to</li> </ul>	<ul style="list-style-type: none"> <li>Hydro-geological survey and pumping test</li> <li>Geological survey on permeability of the soil.</li> <li>In-depth study on groundwater</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate measures for preventing groundwater contamination at the construction stage</li> <li>Treatment of the leachate from the landfill site.</li> <li>If negative impact on groundwater is anticipated, the project should be stopped and reconsidered.</li> </ul>

8. Environmental and Social Considerations

		cut aquifer and cause groundwater suspension.	aquifer • Test of groundwater quality	
Hydrological Situation	B	• Dredging and installation of water gates will affect the hydrology of the Siem Reap River. The degree of impact is expected to be relatively high.	• Hydrological survey and simulation	• Appropriate measures need to be considered to minimize the impact on hydrological situation of the Siem Reap River.
Flora, Fauna and Biodiversity	B	• No endangered species have been reported in the study area (excluding the Tonle Sap Lake). In addition, the locations of proposed facilities will be on the cultivated land. Therefore, the impact is limited.	• Information collection • In-depth field survey	• If the proposed project was proved to have serious impacts on flora, fauna and biodiversity, it should be stopped and reconsidered. Careful consideration should be taken for the impact on the ecosystem of the Tonle Sap Lake.
Global Warming	B	• The impact is limited judging from the scale of the projects. Some of the projects will contribute to improve energy efficiency in the study area.	• Estimation on volume of greenhouse gas emission	• Appropriate measures should be considered for the power supply projects in the master plan to minimize greenhouse gases emission. • Energy efficiency and utilization of natural energy should be considered for power supply projects.
Air Pollution	B	• The impact is limited judging from the current air quality and the predicted volume increase of air pollutants emission.	• Estimation of pollution intensity	• Daily coverage of landfill soil to minimize landfill fire occurrences. • Proper covering of construction materials and sprinkling of roads will be required at the construction stage of the proposed projects. • Appropriate maintenance of construction equipments and vehicles, and evenly scheduled construction. • Installation of pollution reduction equipments if necessary.
Water Pollution	B	• The wastewater treatment projects may deteriorate water quality of the Siem Reap River when the operational problems occurred. Leachate from the landfill site may contaminate nearby water body if it is not appropriately treated.	• Field survey (including topographical survey)	• Appropriate control of turbid water control during construction period. • Treatment of the leachate from the landfill site. • Periodical monitoring and inspection of the wastewater treatment facilities.
Soil Contamination	B	• Soil might be contaminated by construction materials and construction waste. Leachate from the proposed landfill might infiltrate into ground and contaminate soil at the operation stage.	• Geological survey	• Inspection of construction materials in advance. • Treatment of the leachate from the landfill site, and establishment of separate treatment system for infectious or hazardous wastes.
Waste	B	• Certain volume of construction waste will be generated if the proposed projects will be implemented. • Effluent and sludge will be generated from the proposed wastewater treatment facilities.	• Review of the capacity of the existing landfill and waste collection system • Consideration of treatment measures of sludge and effluent	• Establishment of appropriate construction waste collection system. • Securing appropriate disposal site.
Noise and Vibration	B	• The degree of noise and vibration will increase to some extent in some portion of the study area if the proposed projects on transportation and facility construction are implemented. • Expansion of power station and installation of new generators will raise noise and vibration level.	• Survey on project locations	• Assure the construction equipment in good condition to minimize noise and vibration. • Appropriate construction schedule/planning/management. • Installation of acoustic wall or buffer zones if necessary.
Ground Subsidence	C	• The impact on ground subsidence is not clear at this stage. • Once the groundwater development	• Hydro-geological survey • Simulation of	• If negative impact is anticipated, the project should be stopped and reconsidered.

		started, the reversibility of the negative impact is very low.	groundwater drawdown • Study on fluctuations of ground and groundwater levels, and on groundwater recovery • Pumping test	
Offensive Odor	B	<ul style="list-style-type: none"> <li>Offensive odor might be generated from decomposed organic wastes in the proposed landfill.</li> <li>Offensive odor might be generated from sludge and effluent generated in the proposed wastewater treatment facilities if appropriate maintenance is not taken.</li> </ul>	<ul style="list-style-type: none"> <li>Survey on project location</li> </ul>	<ul style="list-style-type: none"> <li>Location of landfill or wastewater treatment facilities should be carefully considered.</li> <li>Soil cover should be done in the landfill on daily basis</li> <li>Periodical maintenance of wastewater treatment.</li> </ul>

Note: Rating Criteria:

A: Serious impact is expected.

B: Some impact is expected.

C: Extent of impact is unknown (Examination is needed. Impacts may become clear as study progresses).

### 8.3 Mitigation Plan of Predicted Impacts of MP

A mitigation plan needs to be established to mitigate negative social and environmental impacts caused by implementations of the projects. The plan is to provide inspections and monitoring on environmental/social conditions and mitigation measures during pre-construction, construction and operation periods.

EIA or IEIA on each of the projects proposed in this M/P needs to be conducted during feasibility study and detailed design if it is required by the legal framework of environmental and social conditions in Cambodia.

#### 8.3.1 Environmental Mitigation Measures

##### (1) Pre-Construction Period

###### 1) Consultation with Stakeholders

To avoid local conflicts of interest at an earlier stage, consultations with stakeholders including landowners with small portion of land should be held until all the stakeholders agree to the land use plan proposed in the M/P.

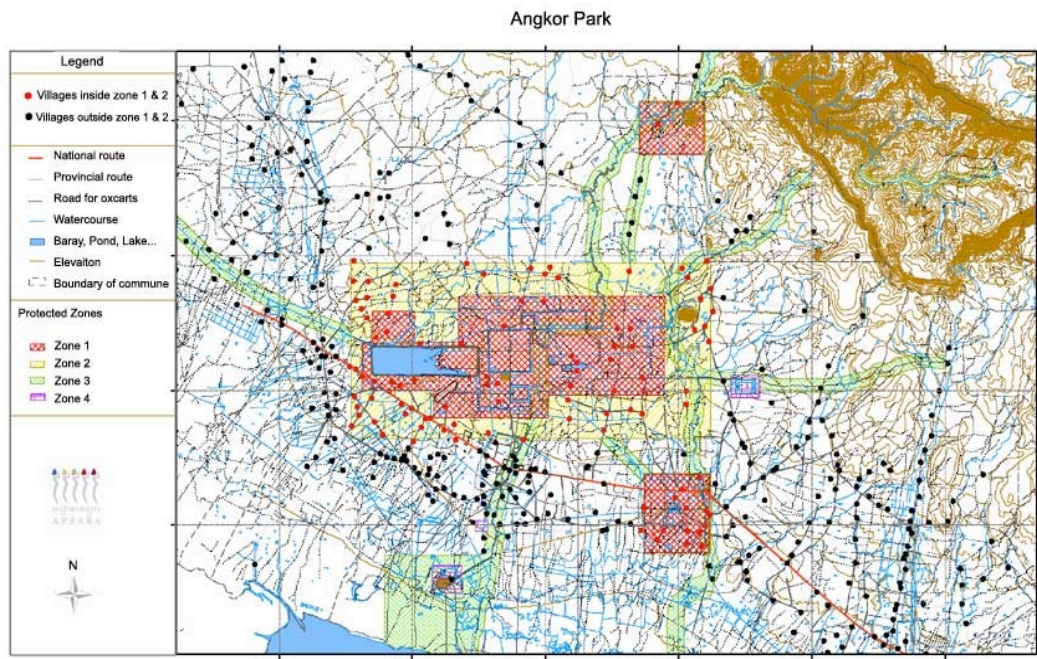
###### 2) Careful Site Selection for Each Project

Sites for each of proposed projects should be carefully selected to minimize relocation and avoid involuntary resettlement, especially in case of the projects requiring vast land area, such as a wastewater treatment plant, a water treatment plant and road constructions. Consultations with stakeholders are imperative on the site selection process. If resettlement cannot be avoided, appropriate resettlement and compensation plans need to be established with agreements from the parties concerned.



### 3) Archaeological Investigation

The study area covers the protected cultural zone defined by a Royal Decree, and an archaeological impact assessment is required for the project proposed in the zone before its implementation. Therefore, archaeological investigation needs to be conducted during pre-construction period. When an archaeologically significant finding is reported, appropriate measures need to be taken.



**Figure 8.1 Protected Cultural Zones in Siem Reap/Angkor Region**

Source: APSARA HP ([http://www.autoriteapsara.org/images/apsara/about\\_apsara/zoning/zoning\\_map.jpg](http://www.autoriteapsara.org/images/apsara/about_apsara/zoning/zoning_map.jpg))

### 4) Securing Alternative Jobs for Landowners of the Project Sites

Alternative jobs need to be secured, if the landowners of the acquired project sites gain income directly from activities based on the land. This measure should be taken even if the acquisition is done based on the agreement.

### 5) Groundwater Quality Test

Suitability of groundwater near Tonle Sap Lake for drinking needs to be tested by

installing test wells. Quality of groundwater in Chong Kneas Commune near Tonle Sap Lake was evaluated in 2000 and the results indicated the quality meets WHO criteria, but the survey should be done again including an arsenic test.

#### **6) Hydro-geological Survey**

Hydro-geological survey including a pumping test needs to be conducted to carefully and sufficiently assess the impact on groundwater table and ground subsidence before water resource development project is implemented. Hydrological studies need to be conducted for the projects with the estimated negative impact on the rivers and reservoirs.

#### **7) Inter-Ministerial Coordination on Water Usage**

Rules and regulations for water allocation by sectors have not been established in Cambodia. Therefore, inter-ministerial coordination needs to be secured to avoid conflicts among related ministries and smoothly carry on the projects regarding water resource development projects.

#### **8) Geological Survey on Soil**

Geological survey on the soil of the planned disposal site should be required to check the permeability. The result of survey should be applied to consideration of leachate treatment measures from the proposed sanitary landfill.

#### **9) Atmospheric Survey**

Studies on wind direction, wind speed and atmospheric stability need to be done, and atmospheric dispersion of pollutants should be simulated to assess accurate impacts of SO<sub>x</sub> and NO<sub>x</sub> emission from the proposed projects to expand the power supply.

### **(2) Construction Period**

#### **1) Mitigation Measures for Impact from Construction Activities**

General mitigation measures to be taken for negative environmental impacts during construction period are described below.

##### **Appropriate Control of Construction Materials**

Contamination of construction materials for land preparation and road construction should be checked before its usage to avoid soil contamination. In addition, construction materials should be properly covered to minimize scattering of dust and other small particulates. Usage and storage of hazardous/toxic materials should be carefully controlled to prevent mixture of the materials and rainwater runoff.

##### **Sprinkling of Roads**

Dust from construction activities needs to be suppressed by sprinkling construction roads especially in the dry season.

##### **Appropriate Maintenance of Construction Equipment and Vehicles**

Noise and emission of gas and odor from construction activities should be minimized with appropriate maintenance of construction equipment and vehicles.

### **Turbid Water Control**

Appropriate measures need to be taken to control turbid water from construction sites to avoid contamination of nearby water bodies.

### **Establishment of Construction Waste Collection System (Includes Securing Appropriate Disposal site)**

Large volume of construction waste will be generated though the amount cannot be estimated at this stage. To prevent illegal dumping of construction waste and facilitate appropriate waste management, appropriate waste collection system with obtaining disposal site needs to be established.

### **Appropriate Construction Schedule/Planning/Management**

Maintaining normal traffic flow near the project site requires careful construction schedule and planning with placement of flagmen at appropriate place. Securing alternative route with an appropriate traffic control during some period of construction phase needs to be considered if necessary. This measure will also contribute to mitigate impacts of noise and vibration caused by construction activities and to decrease emission of greenhouse gases.

### **Installation of Acoustic Wall or Buffer Zone**

Installation of acoustic wall or buffer zone should be considered to minimize noise or vibration by construction activities if there is a social facility near the construction site.

### **2) Appropriate Procedures for Archaeological Discovery**

The construction contractor needs to stop construction activities immediately if any archaeological finding is reported. The findings need to be investigated by archaeologists if necessary, and an appropriate measure needs to be taken to recover it.

### **3) Return of Construction Affected Areas to Original Condition**

All the areas affected by the project implementation need to be recovered to original condition after the construction completion. All equipment, machinery and vehicles for construction should be removed, and construction waste, unused materials and contaminated earth need to be properly disposed.

### **(3) Operation Period**

Various mitigation measures need to be considered and implemented during the operation period by each project. These measures need to be considered and established at a sector M/P or a feasibility study level because the details of each project have not been clarified at this stage. Impact mitigation measures considered at this stage for some projects are described below.

- Landfill gas mainly composed of methane and CO<sub>2</sub> might be generated from the proposed landfill site due to biological decomposition. Therefore, facilities for removing landfill gas need to be installed.
- Spontaneous landfill fire might occur at the proposed landfill site, and the fire generates a large volume of smoke and harmful gas. In addition, offensive odor might be emitted from the proposed landfill site because of decomposition of organic waste. Therefore, soil should be covered daily to minimize occurrence of

landfill fire.

- Treatment ponds need to be prepared to treat leachate generated from the proposed landfill site.
- Installation of equipments might be required to reduce emission of pollutants from diesel generators.
- Periodical survey on ground subsidence needs to be conducted by installing observation facilities and equipments during and after operation period.

### **8.3.2 Environmental Monitoring Plan for Project Implementation**

Serious adverse impacts might be caused without appropriate construction and operation of proposed projects in the M/P even if the projects are properly planned and designed. Therefore, periodic monitoring needs to be conducted during pre-construction, construction and operation period.

Parties responsible for environmental monitoring shift by project implementation phases. Parties responsible for each of implementation phases are as follows:

- 1) Pre-Construction Period: Design and Construction Engineer (supported by Provincial Department of Environment and Department of Public Works and Transport)
- 2) Construction Period: Contractor of Construction (supported by Provincial Department of Environment and Department of Public Works and Transport)
- 3) Operation Period: Provincial Department of Environment, Development Committee (proposed)

The proposed development committee is an organization to evaluate and approve proposed projects in the M/P and to monitor development projects. The committee consists of committee members and advisory members. The committee members include provincial government and APSARA Authority as well as all line departments of the province. The Advisory members consist of international donors, resource persons and private sector.

The contractor of construction should establish an environmental management office that is responsible for implementing impact mitigation measures, and for inspecting and monitoring environmental/social conditions in the project affected area.

Monitoring items, parameters to be monitored, location and frequency of the monitoring at pre-construction and construction stages are shown in table 8.2. Monitoring plan for each of the proposed project during operation phase needs to be considered at sector M/P or feasibility study level. Estimating monitoring cost is difficult at this stage because details of each proposed projects have not been decided. Therefore, the estimation of monitoring cost for each project needs to be done at a sector master plan or a feasibility study stage.

**Table 8.2 Monitoring Plan during Pre-Construction and Construction Phases**

<b>Pre-Construction Phase</b>				
<b>Monitoring Item</b>	<b>Parameters</b>	<b>Location</b>	<b>Frequency</b>	<b>Remarks</b>
Archaeological Investigation	Compliance with related laws and regulations, and APSARA requirements	Project Sites	One Time	All Projects
Test for Groundwater Quality	Fluoride, Manganese, Nitrate, E. coli, Chlorine Residual, Taste/Odor, Iron, Total Dissolved Solids, Arsenic	Test Wells	One Time per Test Well	Water Resource Development Projects
<b>Construction Phase</b>				
<b>Monitoring Item</b>	<b>Parameters</b>	<b>Location</b>	<b>Frequency</b>	<b>Remarks</b>
Construction Activities	Dust, Noise, Offensive Odor, Inspection of Solid Waste	Construction Sites		All Projects
Transportation of Construction Materials	Impact in populated areas along the haul route (noise, air pollution, land use, schedule)	Along Haul Routes	Twice a week	All Projects
Transportation Control	Traffic Sign, Signboard for Attention, Schedule	Construction Related Sites	Daily	All Projects
Underground Water	Conductivity, pH, Chlorine	Monitoring Well	Daily	Water Resource Development Projects, Drainage/Sewerage Projects
Surface Water Quality	DO, SS, COD, Total-N, Total-P, Conductivity, Total Dissolved Solids, NH <sub>3</sub> , Coliform	Locations Affected by Construction Activities	Weekly	All Projects
Disposal of Dredge Material	Compliance with Disposal Plan, Suspended Solids	Dredge Disposal Sites,	Weekly during dredging	Dredging Related Projects
Preservation of Archaeological Findings	Archaeological Findings	Archaeological Discovery Sites	Daily during excavation	Projects with Archaeological Discovery
Recovery of Construction Site	Removal of Construction Materials and Waste	Construction Sites	After completion of construction	All Projects

Source: JICA Study Team

**Responsible Parties of the Monitoring Plan**

<b>Project Phase</b>	<b>Responsible Parties</b>	<b>Supporting Parties</b>
Pre-Construction Period	Design and Construction Engineer	Provincial Department of Environment Provincial Department of Public Works and Transport
Construction Period	Contractor of Construction	Provincial Department of Environment Provincial Department of Public Works and Transport

Source: JICA Study Team

**8.3.3 Institutional Capacity Building**

Capacity building will be required for the Environmental Impact Assessment Office in Provincial Department of Environment to strengthen capacity to undertake EIA or IEIA at provincial level. Training by an international EIA specialist should be given to the office staff if some of the projects proposed in the M/P will proceed to the next stage.

Training for staff in the Department of Environment and the Department of Public Works and Transport is recommended to appropriately implement the above-mentioned environmental monitoring plan. Training should be provided by an domestic or international environmental specialist with skills and knowledge for monitoring. In addition, materials for environmental monitoring during construction and operation phases need to be provided to the Department of Environment.

Capacity building for relevant organizations to appropriately operate each of the proposed projects needs to be considered at sector M/P or feasibility study level.