

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
PUBLIC WORKS AND TRANSPORT INSTITUTE (PTI)
MINISTRY OF PUBLIC WORKS AND TRANSPORT

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

**THE PROJECT FOR
URBAN DEVELOPMENT MASTER
PLAN STUDY
IN VIENTIANE CAPITAL**

**FINAL REPORT
< APPENDIX >**

MARCH 2011

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.
INTERNATIONAL DEVELOPMENT CENTER OF JAPAN
PACET CORP.
ORIENTAL CONSULTANTS CO., LTD.

EID
JR
11-051

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
PUBLIC WORKS AND TRANSPORT INSTITUTE (PTI)
MINISTRY OF PUBLIC WORKS AND TRANSPORT

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

**THE PROJECT FOR
URBAN DEVELOPMENT MASTER
PLAN STUDY
IN VIENTIANE CAPITAL**

**FINAL REPORT
< APPENDIX >**

MARCH 2011

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.
INTERNATIONAL DEVELOPMENT CENTER OF JAPAN
PACET CORP.
ORIENTAL CONSULTANTS CO., LTD.

The exchange rate used in the report is

JNY 86.19 = USD 1

JNY 0.010 = LAK 1

(average in 2010)

The Project for Urban Development Master Plan Study in Vientiane Capital

Final Report <Appendix>

TABLE OF CONTENTS

Appendix 1: Current Conditions and Regulatory Framework	App.1-1
1.1 Current Socioeconomic Conditions	App.1-1
1.2 Current Conditions of Urban Planning and Land Use	App.1-24
1.3 Current Conditions of Infrastructure	App.1-76
1.3.1 Road and Transport.....	App.1-76
1.3.2 Water Supply	App.1-84
1.3.3 Sewerage/Wastewater	App.1-107
1.3.4 Drainage.....	App.1-115
1.3.5 Solid Waste	App.1-121
1.3.6 Parks, Open spaces and Greenery.....	App.1-132
1.4 Relevant Development Projects	App.1-155
1.5 Overview of Constraints and Planning Issues.....	App.1-172
Appendix 2: Results of the Social Survey.....	App.2-1
2.1 Outline of the Social Survey	App.2-1
2.2 Summary Result of the Social Survey	App.2-4
2.3 Justification through the Feedback of the Social Survey	App.2-12
2.4 Results of the Household Survey	App.2-21
2.5 Results of the Key Informant Survey.....	App.2-50
Appendix 3: Environmental and Social Consideration	App.3-1
3.1 Outline of Environmental and Social Considerations	App.3-1
3.2 Institutions and Legislation	App.3-2
3.3 Current Social and Environmental Conditions.....	App.3-5
3.4 Involvement of Stakeholders.....	App.3-18
3.5 Comparison and Evaluation of Alternatives of Urban Structures	App.3-20
3.6 Outline of Environmental Management Plan (EMP).....	App.3-26

Appendix 4: Urban Landscape Improvement	App.4-1
4.1 Urban Landscape Design Concept for Model Streets	App.4-1
4.2 Urban Landscape Guideline for ZPP-Ua	App.4-8
4.3 Lesson learnt from the Cases of Historical Urban Landscape Conservation in Japan.....	App.4-17
Appendix 5: Parks, Open spaces and Greenery	App.5-1
5.1 Relevant Laws, Regulations and Plans	App.5-1
5.2 A Survey of Green Spaces Coverage Ratio by Satellite Samplings.....	App.5-5
5.3 A Survey of Public Parks Utilization	App.5-9
5.4 A Survey of Green Scenery Coverage	App.5-13
5.5 Planting Trees Catalogs.....	App.5-18
Appendix 6: Capacity Development	App.6-1
6.1 Technical Transfer Workshop.....	App.6-1
6.2 Training in Japan	App.6-3
6.3 Issue Analysis Workshop (PCM)	App.6-7
Appendix 7: A Brochure of the Urban Development Master Plan -Proposal-	App.7
	<as of November 2010>

List of Tables

	<u>Page</u>
Table 1.1.1: Population and Annual Average Growth Rate in Census Years.....	App.1-2
Table 1.1.2: GRDP per Capita in Lao PDR and Provinces in 2008	App.1-3
Table 1.1.3: Comparison of Demographic Change in Lao PDR and Vientiane Capital.....	App.1-4
Table 1.1.4: Comparison of Population and Urban Population by Districts	App.1-4
Table 1.1.5: Change of Population Density by Districts	App.1-5
Table 1.1.6: Comparison of Labor Force Structure between Vientiane Capital and Lao PDR.....	App.1-6
Table 1.1.7: Percentages of Farming Population and Non-farming Population	App.1-6
Table 1.1.8: Monthly Consumption and Percentage of Own Products	App.1-7
Table 1.1.9: No. of Factories in Vientiane Capital in 2008	App.1-8
Table 1.1.10: No. of Level-1 Factories in Vientiane Capital in 2008.....	App.1-9
Table 1.1.11: No. of Foreign Factories in Vientiane Capital in 2008.....	App.1-9
Table 1.1.12: No. of Factory Labors in Vientiane Capital in 2008.....	App.1-9
Table 1.1.13: Distribution of Apparel Industries in Vientiane Capital	App.1-10
Table 1.1.14: Estimated Balance of Rice Production and Demand in Vientiane Capital	App.1-13
Table 1.1.15: Harvested Areas of Vegetables in Vientiane Capital (2008-09)	App.1-14
Table 1.1.16: Organic Farmer Group in Vientiane Capital under PROFIL.....	App.1-15
Table 1.1.17: Harvested Areas of Industrial Cash Crops in Vientiane Capital (2008-09).....	App.1-16
Table 1.1.18: Irrigated Rice Area and Production in Recent 10 Years in Vientiane Capital .	App.1-17
Table 1.1.19: Irrigated Areas by Type of Irrigation in Vientiane Capital (2008-09 Dry Season).....	App.1-17
Table 1.1.20: Livestock Production in Vientiane Capital.....	App.1-18
Table 1.1.21: Livestock Production by Farms in Vientiane Capital	App.1-19
Table 1.1.22: No of Agro-Business Companies by Major Business Item	App.1-20
Table 1.1.23: Companies Invested by Foreign Country	App.1-20
Table 1.1.24: Distribution of Markets in Vientiane Capital	App.1-22
Table 1.1.25: No. of Hotels and Guesthouses in Vientiane Capital in 2007, 2008 and 2009	App.1-22
Table 1.1.26: Commercial Development Projects in Vientiane Capital	App.1-23
Table 1.2.1: Main Rights and Duties of the Land Management Authorities	App.1-25
Table 1.2.2: Regions and Categories of Land.....	App.1-25
Table 1.2.3: Classification of Land Use Zone	App.1-26
Table 1.2.4: ROW of Road.....	App.1-27
Table 1.2.5: Number of Lanes and Width of Pedestrian.....	App.1-27
Table 1.2.6: Width of Lane	App.1-27
Table 1.2.7: Building Setback	App.1-27
Table 1.2.8: Building-to-Land Ratio, Building Height and Floor Area Ratio by Land Use by City Level.....	App.1-28
Table 1.2.9: Classification of Cities	App.1-29
Table 1.2.10: Contents of each Urban Plan by Level	App.1-29
Table 1.2.11: Organizations of implementation and approval of an urban plan by level.....	App.1-30
Table 1.2.12: No. of Urban Master Plan by City Level and by Organization provided.....	App.1-30
Table 1.2.13: Area of Urban Land in the Urban Master Plan.....	App.1-30
Table 1.2.14: Road Classification in Lao PDR.....	App.1-32

Table 1.2.15: Rights and Duties of OPWT and Village Administrative Authorities	App.1-32
Table 1.2.16: Contents of Road Design Manual.....	App.1-33
Table 1.2.17: Contents of the Draft of Building Control.....	App.1-35
Table 1.2.18: Main Role of Divisions related to urban planning and development	App.1-38
Table 1.2.19: Major Functions and No. of Staffs of PTI.....	App.1-39
Table 1.2.20: Number of Villages managed by DPWT & VUDAA.....	App.1-40
Table 1.2.21: Main Duties of DPWT	App.1-40
Table 1.2.22: Main Duties of Three Offices	App.1-40
Table 1.2.23: Number of Buildings handled by DPWT	App.1-41
Table 1.2.24: Main Duties of Units in OPWT.....	App.1-42
Table 1.2.25: Number of Staffs in OPWT & VUDAA, Building handled by OPWT	App.1-42
Table 1.2.26: Main Duties and Rights of VUDAA	App.1-43
Table 1.2.27: Income Sources of VUDAA.....	App.1-44
Table 1.2.28: Number of Building handled by VUDAA.....	App.1-44
Table 1.2.29: Progress of Establishment of Municipality	App.1-46
Table 1.2.30: Present Land Use Categories for Urban Area.....	App.1-55
Table 1.2.31: The Main Part of the Guideline	App.1-56
Table 1.2.32: Summary of Present Coverage Ration, Height of Building and Plot Ratio for Vientiane Capital.....	App.1-57
Table 1.2.33: Comparison of Present and Maxim Plot Ratio	App.1-58
Table 1.2.34: The applied regulations for Land Use Zone in Vientiane Capital	App.1-63
Table 1.2.35: Building set-back Regulation	App.1-63
Table 1.2.36: Land Use Changes.....	App.1-66
Table 1.2.37: Population and Urban Villages by District.....	App.1-69
Table 1.2.38: Population and Density by Distance.....	App.1-69
Table 1.2.39: Population Distribution Pattern (2005)	App.1-70
Table 1.3.1: Growth of Traffic Volume	App.1-76
Table 1.3.2: Number and Trend of Registered Vehicles in Lao PDR.....	App.1-77
Table 1.3.3: Public Transport Vehicle.....	App.1-81
Table 1.3.4: Urban Bus Service by VSBC	App.1-81
Table 1.3.5: Long Distance Bus Service by VSBC	App.1-82
Table 1.3.6: Yearly Operational Results	App.1-82
Table 1.3.7: Parking Space in City Center	App.1-83
Table 1.3.8: Bacteriological Parameters.....	App.1-87
Table 1.3.9: Physical-Chemical Parameters	App.1-87
Table 1.3.10: Health Significant Chemical Parameters.....	App.1-88
Table 1.3.11: Benefit Monitoring and Evaluation (BME) 2000-2009 in Vientiane Capital..	App.1-89
Table 1.3.12: Water Demand Projection in Vientiane Capital.....	App.1-90
Table 1.3.13: Existing Water Treatment Plant in Vientiane Capital as of July 2010.....	App.1-94
Table 1.3.14: Existing Reservoirs and Pumping Station in Vientiane Capital as of July 2010.....	App.1-95
Table 1.3.15: Existing Pipe Length of Water Network by Pipe Material in 2009	App.1-97
Table 1.3.16: Maximum and Minimum Water Level and Discharge of the Mekong River..	App.1-98
Table 1.3.17: Monthly Average Water Level and Discharge of the Nam Ngum River	App.1-99
Table 1.3.18-1: Financial Statement of Vientiane Capital prepared by NPVC	App.1-101
Table 1.3.18-2: Financial Statement of Vientiane Capital prepared by WSRC.....	App.1-102
Table 1.3.19: Water Tariff applied in May 2009 to Vientiane Capital.....	App.1-102

Table 1.3.20: Water Tariff revised in September 2009 to Vientiane Capital	App.1-103
Table 1.3.21: Demand at Industrial Zone at Vientiane	App.1-103
Table 1.3.22: Rural Water Supply Development Plan in Vientiane Capital (2010 – 2015)	App.1-105
Table 1.3.23: Wastewater Effluent Standard Parameters.....	App.1-109
Table 1.3.24: Wastewater Effluent Standard Categories	App.1-109
Table 1.3.25: Result on Survey in Sanitary Facility for Sample Households	App.1-111
Table 1.3.26: Drainage Facility for the Sample Households.....	App.1-116
Table 1.3.27: Frequency of Flood for the Sample Households	App.1-116
Table 1.3.28: Meteorology in Vientiane Capital	App.1-116
Table 1.3.29: Summary of Drainage Catchment Area in Urban Vientiane Capital	App.1-119
Table 1.3.30: Discharge Volume by Generation Source.....	App.1-123
Table 1.3.31: Subscribers of Solid Waste Collection Service in the Vientiane Capital.....	App.1-124
Table 1.3.32: Coverage Rates of Solid Waste Collection Service by District.....	App.1-125
Table 1.3.33 Number of Staff.....	App.1-125
Table 1.3.34: Equipment for the Solid Waste Collection	App.1-125
Table 1.3.35: Solid Waste Disposal of KM32 Landfill Site (1/2)	App.1-128
Table 1.3.36: Solid Waste Disposal of KM32 Landfill Site (2/2)	App.1-129
Table 1.3.37: Functions to be expected of Public Parks, Open spaces and Greenery in Urban Areas.....	App.1-133
Table 1.3.38: Functions expected in each type of spaces	App.1-133
Table 1.3.39: Public Park and Green Area	App.1-134
Table 1.3.40: Summarized Table of Public Parks, Open spaces and Greenery in Vientiane Capital	App.1-136
Table 1.3.41: The Areas of Public Parks, Open spaces and Greenery per person	App.1-137
Table 1.3.42: The Divided Areas into urban areas and suburbs	App.1-138
Table 1.3.43: Management Authorities of each open spaces.....	App.1-140
Table 1.3.44: Public Parks in Vientiane Capital	App.1-140
Table 1.3.45: Facilities and Equipments in Public Parks	App.1-144
Table 1.3.46: Contributing Functions by Public Parks.....	App.1-145
Table 1.3.47: Roadside Trees in Vientiane Capital.....	App.1-146
Table 1.3.48: Roundabouts and Road islands in Vientiane Capital.....	App.1-148
Table 1.3.49: Remaining Marshes and Current Conditions in Urbanized Area	App.1-152
Table 1.4.1: Summary of Relevant Development Projects.....	App.1-156
Table 1.5.1: Cities in North and Northeast Thailand.....	App.1-172
Table 1.5.2: GRDP and GRDP per Capita of the Northern and the Northeastern Provinces of Thailand in 2008	App.1-172
Table 1.5.3: Comparison of Harvested Areas of Major Crops in recent 10 years	App.1-174
Table 1.5.4: Constraints, Present Condition and Planning Issues of Legal and Regulatory	App.1-180
Table 1.5.5: Problems and Planning Issues of Road and Transport	App.1-183
Table 1.5.6: Constraints and Planning Issues of Water Supply	App.1-184
Table 1.5.7: Constraints and Planning Issues of Sewerage/Wastewater System.....	App.1-185
Table 1.5.8: Constraints and Planning Issues of Drainage System	App.1-186
Table 1.5.9: Constraints and Planning Issues of Solid Waste Management.....	App.1-187
Table 1.5.10: Constraints and Planning Issues of Public Parks, Open spaces and Greenery	App.1-189
Table 2.1.1: Outline of the Household Survey	App.2-1
Table 2.1.2: Sample Numbers of the Household Survey by District and Village Category	App.2-2
Table 2.1.3: Whole Village Numbers (2005) and HHS Target Village Numbers by District..	App.2-2

Table 2.1.4: Outline of the Key Informant Survey	App.2-3
Table 2.2.1: Demographic Growth between 1995 and 2005 by District	App.2-9
Table 2.2.2: Lacking or Insufficient Infrastructure by District.....	App.2-10
Table 2.2.3: Top Three (3) Problem Items for “Priority 1”, “Priority 2”, and “Priority 3” ...	App.2-11
Table 2.3.1: SWOT Analysis at the Whole Vientiane Capital Level.....	App.2-13
Table 2.3.2: Relevance of the Household Survey to the Development Visions	App.2-14
Table 2.3.3: Reasons for the Question on Development Visions about Spatial Extent	App.2-15
Table 2.3.4: Correspondence of the Six (6) Planning Zones to the Nine (9) Districts	App.2-16
Table 2.3.5: Main Land Use Potentials for the Future by Planning Zone	App.2-17
Table 2.3.6: Important Development Visions by Planning Zone.....	App.2-18
Table 2.3.7: Development Visions about Spatial Extent by Planning Zone.....	App.2-20
Table 2.4.1: Household Structure	App.2-21
Table 2.4.2: Number of the Household Members by Sex and by Age Group	App.2-22
Table 2.4.3: Educational Background of the Household Members (Real Number).....	App.2-24
Table 2.4.4: Educational Background of the Household Members (Percentage).....	App.2-24
Table 2.4.5: Commute Frequency of the Outer Districts’ Household Members	App.2-27
Table 2.4.6: Diffusion of Four-wheeled Car.....	App.2-29
Table 2.4.7: Diffusion of Motorcycle	App.2-30
Table 2.4.8: Diffusion of Bicycle	App.2-31
Table 2.4.9: Demographic Growth between 1995 and 2005 by District	App.2-35
Table 2.4.10: Water Consumption per Day per Capita by District.....	App.2-36
Table 2.4.11: Parking Places by District.....	App.2-42
Table 2.5.1: Samples for the Key Informant Survey	App.2-50
Table 2.5.2: Lacking or Insufficient Infrastructure by District.....	App.2-50
Table 2.5.3: Comparatively Satisfactory Infrastructure by District.....	App.2-51
Table 2.5.4: Top Three (3) Problem Items for “Priority 1”, “Priority 2”, and “Priority 3” ...	App.2-52
Table 3.2.1: List of Legislations on Environmental and Social Considerations in Lao PDR..	App.3-3
Table 3.2.2: Project Process and Resettlement Outputs	App.3-5
Table 3.3.1: Meteorology in Vientiane Capital 2007.....	App.3-6
Table 3.3.2: Protected Areas in Vientiane Capital	App.3-8
Table 3.3.3: Administration	App.3-9
Table 3.3.4: Demography 2009	App.3-10
Table 3.3.5: Unemployment Rates 2005	App.3-11
Table 3.3.6: Distribution of Economic Activities 2005	App.3-11
Table 3.3.7: Distribution of Water Sources for Drinking and Cooling 2005.....	App.3-12
Table 3.3.8: Distribution of Electricity Use 2005.....	App.3-12
Table 3.3.9: Distribution of Main Energy Sources for Cooking 2005.....	App.3-12
Table 3.3.10: Distribution of Toilet Types 2005.....	App.3-12
Table 3.3.11: Subscribers of Solid Waste Collection Service in Vientiane Capital.....	App.3-13
Table 3.3.12: Coverage Rates of Solid Waste Collection Service by District.....	App.3-13
Table 3.3.13: Solid Waste Disposal of KM18 and KM32 Landfill Sites	App.3-13
Table 3.3.14: Outpatient Department (OPD) Cases of Diseases by District 2007/2008	App.3-14
Table 3.3.15: Literacy Rates 1995/2005.....	App.3-14
Table 3.3.16: Education Completed 2005 (Aged 6 years and above)	App.3-14
Table 3.3.17: Ambient Air Quality in Vientiane Capital Sep. 2002 – Feb. 2003	App.3-17
Table 3.3.18: Wastewater Quality in Vientiane Capital Jan. – Dec. 2000	App.3-17

Table 3.5.1: Spatial SWOT Matrix.....	App.3-21
Table 3.5.2: Comparison of Urban Structure Alternatives (Social Environment).....	App.3-22
Table 3.5.3: Comparison of Urban Structure Alternatives (Natural Environment and Pollution).....	App.3-24
Table 3.5.4: Evaluation of Urban Structure Alternatives.....	App.3-25
Table 3.6.1: Before Implementation (Design Phase).....	App.3-27
Table 3.6.2: Before Implementation (Construction Phase)	App.3-28
Table 3.6.3: After Implementation (Operation Phase).....	App.3-29
Table 4.2.1: Comparison between Luang Prabang and Vientiane Capital Guideline.....	App.4-8
Table 4.2.2: Sample of the Palette of traditional colors or natural colors	App.4-13
Table 5.1.1: Articles in Law on Urban Plans.....	App.5-1
Table 5.1.2: Articles in Land Law	App.5-1
Table 5.1.3: Articles in National Socio-economic Development Plan	App.5-2
Table 5.1.4: Articles in National Strategy on Environment.....	App.5-2
Table 5.1.5: Articles in Social Economic Development Plan of Vientiane Capital.....	App.5-2
Table 5.1.6: Public Park and Green Area	App.5-3
Table 5.2.1: Outline of a “Survey of Green Spaces Coverage Ratio by Satellite Samplings”	App.5-5
Table 5.3.1: Outline of a “Survey of Public Parks Utilization”.....	App.5-9
Table 5.4.1: Outline of a “Survey of Green Scenery Coverage”	App.5-13
Table 5.4.2: Tree Species and Green Coverage.....	App.5-16
Table 5.5.1: Planting Tree Catalogs.....	App.5-19
Table 6.1.1 : Contents of Technical Transfer Workshop.....	App.6-2
Table 6.1.2 : Comment for Technical Transfer Workshop.....	App.6-2
Table 6.2.1 : Trainees in Training in Japan.....	App.6-3
Table 6.2.2 : Schedule of Training in Japan	App.6-6
Table 6.3.1: Participant of PCM Workshop.....	App.6-7
Table 6.3.2: Agenda of PCM Workshop.....	App.6-8
Table 6.3.3: PDM (Group 1)	App.6-13
Table 6.3.4: PDM (Group 2)	App.6-13
Table 6.3.5: PDM (Group 3)	App.6-14
Table 6.3.6: Overall Evaluation of the two days PCM Workshop.....	App.6-15

List of Figures

	<u>Page</u>
Figure 1.1.1: Past Socioeconomic Development of Lao PDR	App.1-1
Figure 1.1.2: GDP Growth Rate and Contribution of Industries	App.1-2
Figure 1.1.3: Employment Population and other population	App.1-5
Figure 1.2.1: Structure of the Government of Lao PDR	App.1-35
Figure 1.2.2: Structure of the Mayor's Office of Vientiane Capital	App.1-36
Figure 1.2.3: Structure of MPWT	App.1-37
Figure 1.2.4: Structure of DHUP.....	App.1-38
Figure 1.2.5: Structure of PTI	App.1-39
Figure 1.2.6: Structure of DPWT in Vientiane Capital	App.1-41
Figure 1.2.7: Structure of OPWT in District	App.1-43
Figure 1.2.8: Structure of VUDAA	App.1-45
Figure 1.2.9: Urban Planning for Vientiane in 1920	App.1-48
Figure 1.2.10: Urban Planning for Vientiane in 1934	App.1-48
Figure 1.2.11: Urban Planning for Vientiane in 1952	App.1-49
Figure 1.2.12: Urban Planning for Vientiane 1994 – 2002	App.1-50
Figure 1.2.13: Location and Function of Urban Centers in Vientiane Capital	App.1-51
Figure 1.2.14: Existing, New and Future Urban Areas for Vientiane, 2010.....	App.1-52
Figure 1.2.15: Present Land Use Zoning Scheme	App.1-54
Figure 1.2.16: Location Map of Registered National Level of National Heritage in Vientiane Capital	App.1-61
Figure 1.2.17: Location Map of Identified Urban Heritages in Historical Conservation Zone.....	App.1-62
Figure 1.2.18: Area Demarcation of Building Permit by VUDAA, DPWT and OPWT	App.1-64
Figure 1.2.19: Current Spatial Structure of Vientiane Capital	App.1-65
Figure 1.2.20: Land use 1995.....	App.1-67
Figure 1.2.21: Land use 2005.....	App.1-67
Figure 1.2.22: Urban Expansion of Central Area.....	App.1-68
Figure 1.2.23: Current Coverage Ratio of West-East (Private House).....	App.1-70
Figure 1.2.24: Current Coverage Ratio of North-South (Private House).....	App.1-71
Figure 1.2.25: Current Plot Ratio of West-East (Private House).....	App.1-71
Figure 1.2.26: Current Plot Ratio of North-South (Private House).....	App.1-71
Figure 1.2.27: Current Building Height of West-East(Private House).....	App.1-72
Figure 1.2.28: Current Building Height of North-South (Private House).....	App.1-72
Figure 1.2.29: Urban Center of Vientiane Capital (the area around Settha Thirath Road) ...	App.1-73
Figure 1.2.30: Urban Center of Vientiane Capital (the area within Kampengmoung Road)	App.1-73
Figure 1.2.31: Urban Center of Vientiane Capital (the area around Dongdock).....	App.1-74
Figure 1.2.32: Urban Center of Vientiane Capital (the area around Ban Muang Noi).....	App.1-74
Figure 1.2.33: Urban Center of Vientiane Capital (the area around Tha Ngou)	App.1-75
Figure 1.3.1: Survey Locations	App.1-76
Figure 1.3.2: Number of Registered Vehicles in Lao PDR	App.1-77
Figure 1.3.3: Road Classification Proposed in JICA Urban Transport Master Plan	App.1-78
Figure 1.3.4: Existing Carriageway Width.....	App.1-79
Figure 1.3.5: Road Surface Condition.....	App.1-80

Figure 1.3.6: Ministry of Public Works and Transportation (MPWT) Related in Water and Wastewater	App.1-85
Figure 1.3.7: Organization Chart of NPVC.....	App.1-86
Figure 1.3.8: Existing Water Supply System in Vientiane Capital.....	App.1-91
Figure 1.3.9: Existing Water Supply System in Vientiane Capital.....	App.1-92
Figure 1.3.10: Location of Existing Water Supply Service Area in Vientiane Capital.....	App.1-93
Figure 1.3.11: Pictures of Major WTPs in Vientiane Capital.....	App.1-94
Figure 1.3.12: Intake for Irrigation used also for Dongmakkhay WTP at the Nam Ngum River	App.1-99
Figure 1.3.13: Location of Rural Water Supply Development Plan (2010-2015).....	App.1-106
Figure 1.3.14: Location Map and Picture of Septage Dumping Site.....	App.1-112
Figure 1.3.15: Pictures of the EU Ponds and the Layout of the Pilot Sewerage Project.....	App.1-113
Figure 1.3.16: Pilot DEWAT System for Dormitory in Faculty of Engineering and Effluent Water.....	App.1-113
Figure 1.3.17: Existing Drainage System in Urban Vientiane Capital.....	App.1-118
Figure 1.3.18: Schematic Layout for Drainage System in Urban Area of Vientiane City ..	App.1-119
Figure 1.3.19: Existing Water Retarding Pond in Vientiane Capital	App.1-120
Figure 1.3.20: Organization Chart of VUDAA and Solid Waste Management.....	App.1-122
Figure 1.3.21: Collection Service Coverage Area	App.1-124
Figure 1.3.22: Location of KM32 Landfill Site	App.1-126
Figure 1.3.23: Annual Volume of Solid Waste Disposal of KM32 Landfill Site.....	App.1-128
Figure 1.3.24: Existing Layout and Conditions of KM32 Landfills	App.1-130
Figure 1.3.25: Definition of Public Parks, Open spaces and Greenery	App.1-132
Figure 1.3.26: Map of “Parks and Green Area” in Current Urban Master Plan.....	App.1-135
Figure 1.3.27: Park Area per Person in Comparison with Cities around the World.....	App.1-137
Figure 1.3.28: Locations of Public Parks, Open Spaces and Greenery in the Whole Vientiane Capital	App.1-138
Figure 1.3.29: Locations of Public Parks, Open Spaces and Greenery in Urban Areas of Vientiane Capital	App.1-139
Figure 1.3.30: Locations of Existing Public Parks	App.1-142
Figure 2.2.1: Average Family Size by District	App.2-4
Figure 2.2.2: Population Pyramid of the Interviewed Households in Vientiane Capital (2010)	App.2-4
Figure 2.2.3: Occupation of the Interviewed Family Members by District	App.2-5
Figure 2.2.4: Location of Workplace/ School of the Interviewed Household Members	App.2-6
Figure 2.2.5: Means of Transport for Daily Commute by District.....	App.2-6
Figure 2.2.6: Annual Cash Income and Expenditure by District and Village Type.....	App.2-7
Figure 2.2.7: Land Area by District.....	App.2-7
Figure 2.2.8: Building-to-Land Ratio by District.....	App.2-8
Figure 2.2.9: Floor Area Ratio by District.....	App.2-8
Figure 2.2.10: Living Period of Time at the Actual Dwelling Places by District.....	App.2-9
Figure 2.2.11: Problems about the Actual Urban Planning System	App.2-10
Figure 2.2.12: Development Visions at the Whole Vientiane Capital Level by District.....	App.2-11
Figure 2.3.1: Working Flow for Formulating the Development Visions.....	App.2-12
Figure 2.3.2: Development Visions for Vientiane Capital (Feedback out of the Household Survey)	App.2-14
Figure 2.3.3: Development Visions about Spatial Extent at Vientiane Capital Level.....	App.2-15
Figure 2.3.4: Percentages of the Working Population in the Interviewed HH by Industry	

and District	App.2-17
Figure 2.3.5: Development Visions at District Level	App.2-18
Figure 2.3.6: Four (4) Options for the Question about the Spatial Vision for 2030	App.2-19
Figure 2.3.7: Development Visions about Spatial Extent at Vientiane Capital Level	App.2-20
Figure 2.4.1: Ethnic Attribute of the Householders.....	App.2-21
Figure 2.4.2: Average Family Size by District	App.2-22
Figure 2.4.3: Household Members Distribution by Age Group and by Sex	App.2-23
Figure 2.4.4: Educational Background of the Household Members	App.2-24
Figure 2.4.5: Occupation of the Interviewed Family Members by District	App.2-25
Figure 2.4.6: Location of Workplace/ School of the Interviewed Household Members	App.2-26
Figure 2.4.7: Means of Transport for Daily Commute by District.....	App.2-26
Figure 2.4.8: Commuters' Ratio to the Total Population by District.....	App.2-27
Figure 2.4.9: Main Purposes of the Commute from the Outer Districts to the Inner Districts by District	App.2-28
Figure 2.4.10: Movements for Buying Daily Perishable Food by District.....	App.2-28
Figure 2.4.11: Annual Cash Income and Expenditure by District and Village Type.....	App.2-29
Figure 2.4.12: Savings (Cash + Bank Deposit) by District and Village Type	App.2-29
Figure 2.4.13: Diffusion of Four-wheeled Car	App.2-30
Figure 2.4.14: Diffusion of Motorcycle	App.2-30
Figure 2.4.15: Diffusion of Bicycle.....	App.2-31
Figure 2.4.16: Diffusion of Vehicles by District	App.2-31
Figure 2.4.17: Diffusion of Vehicles by Income Group	App.2-32
Figure 2.4.18: Diffusion of TV Set, Refrigerator, and Washing Machine by District.....	App.2-32
Figure 2.4.19: Heat Source for Cooking by District	App.2-33
Figure 2.4.20: Land Area by District.....	App.2-33
Figure 2.4.21: Building-to-Land Ratio by District.....	App.2-34
Figure 2.4.22: Floor Area Ratio by District.....	App.2-34
Figure 2.4.23: Living Period of Time at the Actual Dwelling Places by District.....	App.2-35
Figure 2.4.24: Water Supply Systems by District	App.2-36
Figure 2.4.25: Answer for the Question "Does your household buy mineral water?"	App.2-37
Figure 2.4.26: Percentages of the Existence of Black Water Facilities by District	App.2-37
Figure 2.4.27: Percentages of the Existence of Grey Water Facilities by District	App.2-38
Figure 2.4.28: Experiences of Inundation by District	App.2-38
Figure 2.4.29: Drainage Facilities by District	App.2-39
Figure 2.4.30: Power Supply by District.....	App.2-39
Figure 2.4.31: Experiences of Power Cut.....	App.2-40
Figure 2.4.32: Existence of Public Parks by District.....	App.2-40
Figure 2.4.33: Answers for the Question "Where do your children usually play?" by District	App.2-41
Figure 2.4.34: Answers for the Question about Expectations for a Park nearby by District.....	App.2-42
Figure 2.4.35: Parking Places by District.....	App.2-43
Figure 2.4.36: Parking Charge by District.....	App.2-43
Figure 2.4.37: Weekly Household Solid Waste Volume by District.....	App.2-44
Figure 2.4.38: Main Components (Weight Base) of the Household Solid Waste	App.2-44
Figure 2.4.39: Percentages of the Households that Use Public Collection Service	App.2-45
Figure 2.4.40: Monthly Payment for the Public Collection Service by District	App.2-45
Figure 2.4.41: Reasons for not using the Public Waste Collection Service by District.....	App.2-46

Figure 2.4.42: How to Dispose of Household Waste by District.....	App.2-46
Figure 2.4.43: Development Visions at District Level	App.2-47
Figure 2.4.44: Development Visions at the Whole Vientiane Capital Level.....	App.2-48
Figure 2.4.45: Expectations for Urban Planning Policy by District.....	App.2-48
Figure 2.4.46: Attitude toward the Participatory Approaches in Urban Planning by District.....	App.2-49
Figure 2.5.1: Problems about the Actual Urban Planning System	App.2-51
Figure 2.5.2: Main Actors for the Solution of the Actual Urban Planning System	App.2-52
Figure 2.5.3: Development Visions at District Level	App.2-53
Figure 2.5.4: Development Visions at the Whole Vientiane Capital Level by District.....	App.2-53
Figure 3.3.1: Geography.....	App.3-6
Figure 3.3.2: Riverine System.....	App.3-7
Figure 3.3.3: Vegetation and Locations of Protected Areas	App.3-9
Figure 3.3.4: Demographic Change	App.3-10
Figure 3.3.5: Distribution of Schools	App.3-15
Figure 3.3.6: The Ancient Walls.....	App.3-16
Figure 4.2.1: Cases of setback area design in Luang Prabang	App.4-14
Figure 4.2.2: Cases of nightscape design in Luang Prabang.....	App.4-15
Figure 4.3.1: Items the agreement can be covered	App.4-18
Figure 4.3.2: Object area of Landscape Law.....	App.4-19
Figure 4.3.3: Main sanctuary of Ise Grand Shrine	App.4-19
Figure 4.3.4: Before and after of Oharai-machi street.....	App.4-20
Figure 4.3.5: Before and after of Kawagoe Ichibangai street.....	App.4-21
Figure 5.1.1: Map of “Parks and Green Area” in Current Urban Master Plan.....	App.5-3
Figure 5.1.2: Regulations for land use zone related to public parks and open spaces	App.5-4
Figure 5.2.1: Current Green Spaces Coverage Ratio in Satellite Sampling Areas.....	App.5-5
Figure 5.2.2: Current Green Spaces Coverage Ratio in Land Use	App.5-6
Figure 5.2.3: Current Green Spaces Coverage Ratio in Distances from Urban Center	App.5-7
Figure 5.2.4: Current Green Spaces Coverage Ratio in Land Use Zones	App.5-8
Figure 5.3.1: Four (4) Public Parks the survey conducted	App.5-9
Figure 5.4.1: Green Scenery Coverage in each Street.....	App.5-13
Figure 5.4.2: Green Scenery Coverage in each Street with a Map.....	App.5-14
Figure 5.4.3: Green Scenery Coverage in each Point.....	App.5-14
Figure 5.4.4: Green Scenery Coverage and Height of Trees.....	App.5-15
Figure 5.4.5: Green Scenery Coverage and Width of Roads.....	App.5-15
Figure 5.5.1: Tree Species to be Planted and those Characteristics	App.5-18
Figure 6.2.1 : General Concept of Training in Japan.....	App.6-4
Figure 6.2.2 : General Concept of Training Course	App.6-5
Figure 6.3.1: Problem Tree (Group 1).....	App.6-9
Figure 6.3.2: Problem Tree (Group 2).....	App.6-10
Figure 6.3.3: Problem Tree (Group 3).....	App.6-10
Figure 6.3.4: Objective Tree (Group 1).....	App.6-11
Figure 6.3.5: Objective Tree (Group 2).....	App.6-12
Figure 6.3.6: Objective Tree (Group 3).....	App.6-12

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AFTA	ASEAN Free Trade Zone
AIT	Asian Institute of Technology
APB	Agriculture Promotion Bank
ASEAN	Association of South-East Asian Nations
BRT	Bus Rapid Transit
BST	Bituminous Surface Treatment
CBD	Central Business District
CBS	Community Based Sanitation
COS	Building Total Floor Area/Area Ratio
C/P	Counterpart
DANIDA	Danish International Development Agency
DAF	Department of Agriculture and Forestry
DIC	Department of Information and Culture
DOIC	Department of Industry and Commerce
DOE	Department of Environment
DoS	Department of Statistic
DF/R	Draft Final Report
DHUP	Department of Housing and Urban Planning
DMA	District Metered Area
DPI	Department of Planning and Investment
DPRA	Development Projects Responsible Agency
DPWT	Department of Public Works and Transport
FAR	Floor Area Ratio
FTA	Free Trade Agreements
EA	Environmental Assessment
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Economic Partner Agreement
ERP	Electric Road Pricing
ESIAD	Environment and Social Impact Assessment Department
FDI	Foreign Direct Investment
F/R	Final Report
GIS	Geographic Information System
GMS	Greater Mekong Sub-region
GOL	Government of Lao People's Democratic Republic
GOJ	Government of Japan
GDP	Gross Domestic Products
GPZ	German Technical Cooperation
GRDP	Gross Regional Domestic Products
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (German society for technical cooperation)
IC/R	Inception Report
IEE	Initial Environmental Evaluation
IEIA	Initial Environmental Impact Assessment
IT/R	Interim Report
JICA	Japan International Cooperation Agency
JST	JICA Study Team

LOI	Law on Investment
LAK	Lao PDR Kip
LMA	Land Management Authority
MAF	Ministry of Agriculture and Forestry
MIC	Ministry of Information and Culture
MOIC	Ministry of Industry and Commerce
MPI	Ministry of Planning and Investment
MPWT	Ministry of Public Works and Transport
MRC	The Mekong River Commission
NLMA	National Land Management Authority
NGO	Non-governmental Organization
NRW	Non Revenue Water
NUL	National University of Laos
NPVC	Nam Papa Vientiane Capital, Water Supply Company of the Vientiane Capital
OJT	On the Job Training
OPWT	Office of Public Works and Transport
PACSA	Public Administration and Civil Service Authority
P/R	Progress Report
PTI	Public Works and Transportation Institute
PPP	Public Private Partnership
S/C	Steering Committee
SEA	Strategic Environmental Assessment
SHM	Stakeholder Meeting
S/W	Scope of Work
SWMDS	Solid Waste Management and Disposal Section
SWOT	Strength, Weakness, Opportunity, and Threat
TDM	Traffic Demand Management
UCDS	Urban Cleaning and Decoration Service
UDAA	Urban Development Administration Authority
UDMP	Urban Development Management Program
UD MP	Urban Development Master Plan
USD	US Dollar
VC	Vientiane Capital
VCR	Vehicle Capacity Ratio
V-GIS	GIS Database of Vientiane
VIP	Vientiane Industrial Park
VLP	Vientiane Logistic Park
VSBC	Vientiane State Bus Company
VS WCS	Vientiane Solid Waste Collection Service
WASA	Water Supply Authority
WaSRO	Water Supply Regulatory Office
W/G	Working Group
WREA	Water Resources and Environment Administration
WTO	World Trade Organization
WSD	Water Supply Division
WSRC	Water Supply Regulatory Committee
WTP	Water Treatment Plant
WUA	Water User's Association
VUDAA	Vientiane Urban Development Administration Authority



Appendix 1

Current Conditions and Regulatory Framework

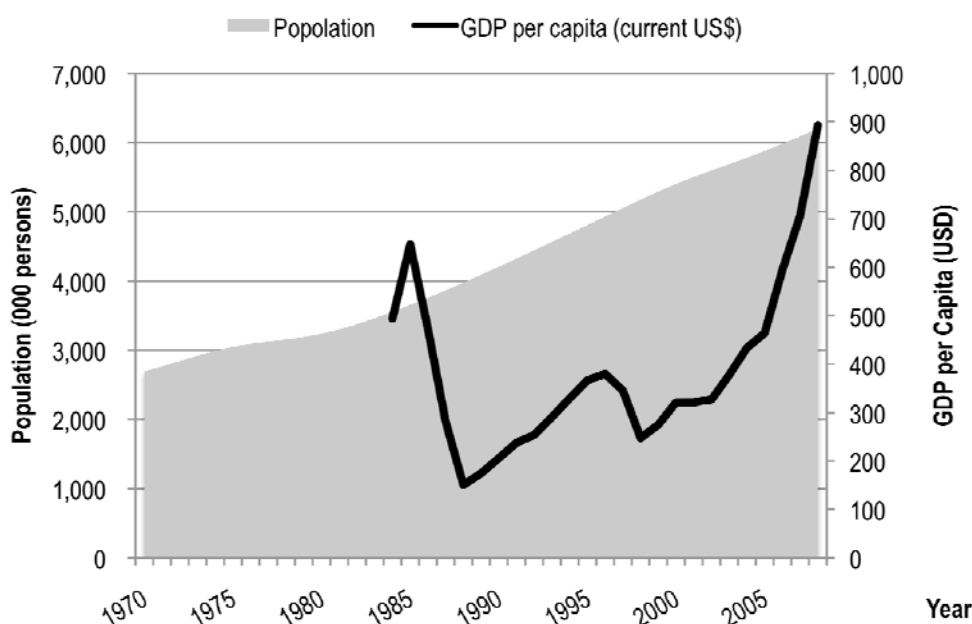
APPENDIX 1: CURRENT CONDITIONS AND REGULATORY FRAMEWORK

1.1 Current Socioeconomic Conditions

1.1.1 Socioeconomic

(1) National Socioeconomic Development

Figure 1.1.1 shows the trend of socioeconomic development in Lao PDR, and Table 1.1.1 summarizes the population and the annual average growth rates in the census years. The population of Lao PDR had doubled from 2.9 million in 1976 to 5.6 million in 2005, which shows a growth rate higher than the average in the East Asia and Pacific region¹. The growth rate, however, is gradually got lowered, from 2.5% in the decade between 1976 and 1985 to 2.0% between 1995 and 2005. According to the Statistical Yearbook 2009, population passed the 6.1 million mark in 2009.



Source: World Development Indicators 2010, World Bank

Figure 1.1.1: Past Socioeconomic Development of Lao PDR

¹ Annual average population growth rate Lao PDR from 1976 to 2005 recorded 2.3%. The rate is 0.9 point higher than population growth in East Asia & Pacific (data from World Development Indicators 2009).

Table 1.1.1: Population and Annual Average Growth Rate in Census Years

Year	1976	1985	1995	2005
Total Population (000 persons)	2,886	3,618	4,605	5,622
Annual Average Growth Rate (%)	-	2.5	2.4	2.0

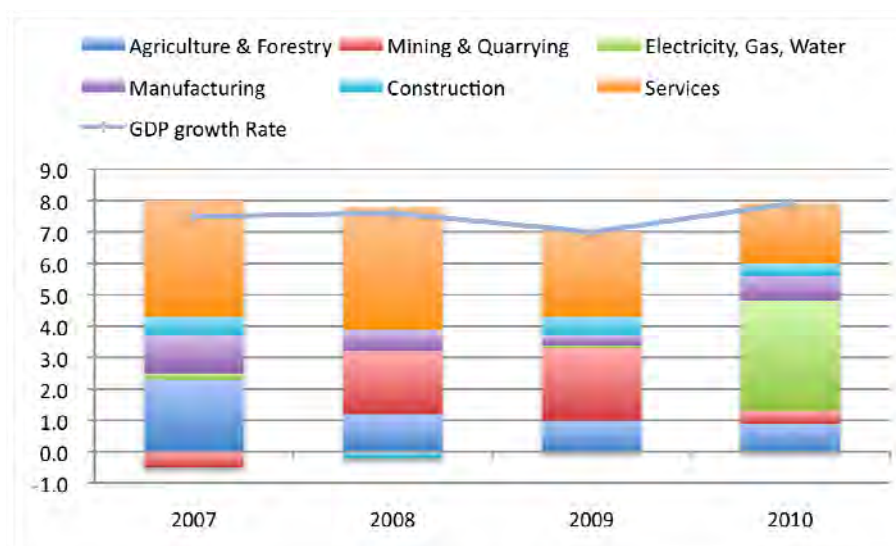
Source: Statistical Yearbook 1975-2005, 2007, Department of Statistic (DoS)

In the Census 2005 report, all villages² in Lao PDR are classified into 3 categories: an “urban” village, a “rural with road” village and a “rural without road” village. The defined characteristics of urban village are as follows:

- The village must lie in municipal vicinity where the district or provincial authority is located, and there must be either more than 600 residents or more than 100 households.
- There is a road for motor vehicle access to the village.
- The majority of households in the village are electrified.
- There is tap water supply in service to the majority of households.
- There is a market in the village.

Population of urban villages in 2005 was 1,523 thousand, sharing approximately 27% of the total population. The percentage has increased by a 10% point since 1995.

Figure 1.1.2 shows the GDP growth and the contribution of industries to GDP growth in recent years. Though the world economy experienced economic slowdown in 2008 and 2009 due to the Global Financial Crisis, the affect to Lao PDR was limited. The figure shows that service, mining & quarrying are major contributors to the recent rapid growth. Out of 7.6% growth, the combined share of service and the mining & quarrying was 5.9% in 2008. Contribution of agriculture, manufacturing and construction is around 0.5% to 1.0% during the same period. In 2010, large contribution of electricity, gas and water is expected due to the commencement of operation of Nam Then 2 Dam. On the other hand, contribution of mining and quarrying is limited after rapid growth of investment and production in 2008 and 2009.



Note: Figures in 2009 are estimation and figures in 2010 are projection.

Source: Lao PDR Economic Monitor Mid-Year Update May 2010, World Bank Lao Office

Figure 1.1.2: GDP Growth Rate and Contribution of Industries

² Village (Ban in Lao language) is the 3rd level governmental body below Province and District in Lao PDR.

Regarding recent economic development of Vientiane Capital, according to Department of Planning and Investment (DPI), the annual average growth rate of Gross Regional Domestic Products (GRDP) from 2001 to 2005 was 9.8%. Composition of industry in 2005 was 23% for the primary (agriculture, fishery and forestry), 52% for the secondary (manufacturing, mining, construction and electric power production) and 25% for the tertiary (wholesale and retail trade, tourism financial service, real estate and business service and public administration, etc). However, reliability of these figures is not high due to the lack of consistency with the national economic statistics.

JICA Study Team calculated GRDP of Vientiane Capital as well as other provinces in 2008 by using the results of the 3rd Lao Expenditure and Consumption Survey 2002-03 (LECS3), and Census of Business Establishment in 2006. According to the analysis, GRDP of Vientiane Capital in 2008 amounted to LAK 10.5 trillion and contributed 23% in the national GDP (LAK 46.2 trillion). GRDP per capita in Vientiane Capital was equivalent to USD 1,585 or 1.7 times higher than the average of Lao PDR (USD 891) in the same year.

Table 1.1.2: GRDP per Capita in Lao PDR and Provinces in 2008

Unit: USD

	GRDP per Capita
Lao PDR	891
Phongsaly	579
Luangnamtha	789
Oudomxay	642
Bokeo	747
Luangprabang	925
Huaphanh	669
Xayabury	994
Vientiane Capital	1,585
Xiengkhuang	739
Vientiane	1,030
Borikhamxay	888
Khammuane	786
Savanakhet	720
Saravane	549
Sekong	552
Champasak	828
Attapeu	751

Source: Calculated by JST based on Statistical Yearbook 2008, LECS 3 and Economic Census 2006

(2) Demographic Change

The population of Vientiane Capital was 795,000 in 2009, according to “Basic Statistics Data on Socio-Economic Department 2008/2009 of Vientiane Capital”³. The population growth of Lao PDR between 1985 and 2005 was 2.2%, while the growth rate of Vientiane Capital recorded 3.1% in the same period as indicated in Table 1.1.3. As a result, the share of population of Vientiane Capital to Lao PDR has increased from 10.5% to 12.4% during the same period.

³ Population estimation in Vientiane Capital was underestimated with a methodology that share of population in Vientiane Capital accounted for 12.3 to 12.4 % of national population. Department of Planning and Investment recognized this problem, and changed estimation method in 2009. As a result, population growth rate of Vientiane Capital jumped up from 2.0 % during 2005 and 2008 to 7.4% in 2009.

Table 1.1.3: Comparison of Demographic Change in Lao PDR and Vientiane Capital

	Population (1000 persons)		Share of Vientiane Capital (%)	Population Density (persons/km ²)	
	Lao PDR	Vientiane Capital		Lao PDR	Vientiane Capital
1985	3,618	381	10.5	15.3	97.2
1995	4,605	532	11.5	19.4	135.7
2005	5,622	698	12.4	23.7	178.1
2006	5,748	712	12.4	24.3	181.6
2007	5,874	726	12.4	24.8	185.2
2008	6,000	740	12.3	25.3	188.8
2009	NA	795	NA	25.3	202.8

Note: Figures in 1985, 1995 2005 are based on census, and those in other years are estimation by Department of Statistics, Ministry of Planning and Investment

Source: Statistical Yearbook 1975-2005 and annual issues; Basic Statistics Data on Socio-Economic Development 2008/2009 of Vientiane Capital

The change in total population and urban population (namely those who are living in urban villages) in 9 districts are shown in Table 1.1.4. The urban population in 7 districts, excluding Sangthong District and Mayparkngum District, had increased during 1995 to 2005. In Hadxaifong District, the proportion of urban population to total population was 78% in 2005.

The annual average population growth rate was 2.8% in Vientiane Capital during 1995 to 2005. During the same period, it was 4.4% in Xaythany District (northeast of the downtown of Vientiane Capital along National Road No 13), 3.8% in Sangthong District (western edge of Vientiane Capital), and 3.0% in Sikhottabong District (west of the downtown of Vientiane Capital where Wattay International Airport is located). Regarding the urban population, the annual average growth rate of urban population was 5.6% in Vientiane Capital, and 12.5% in Xaythany District, 11.3% in Naxaithong District (northwest of the downtown of Vientiane Capital along National Road No 13) and 5.8% in Xaysetha District (east of the downtown of Vientiane Capital).

Table 1.1.4: Comparison of Population and Urban Population by Districts

	Population		Urban Population		Percentage of Urban Population (%)		Percentage of Urban Village (%)	
	1995	2005	1995	2005	1995	2005	1995	2005
Chanthabouly	58,855	68,858	57,740	68,858	98	100	97	100
Sikhottabong	74,251	99,908	64,639	84,598	87	85	78	80
Xaysetha	75,255	97,514	55,333	97,514	74	100	57	100
Sisattanak	58,178	68,686	55,724	68,686	96	100	95	100
Naxaithong	44,104	58,368	19,312	56,204	44	96	36	90
Xaythany	97,829	150,793	38,429	125,195	39	83	26	63
Hadxaifong	64,962	78,338	32,961	60,949	51	78	42	67
Sangthong	16,728	24,215	1,771	1,787	11	7	3	3
Mayparkngum	33,945	45,041	4,889	5,938	14	13	9	8
Vientiane Capital	524,107	691,721	330,798	569,729	63	82	46	68

Source: Results of Census in 1995 and 2005

One of the reasons for a rapid increase in urban population in Vientiane Capital is a large increase in the number of Urban Villages as indicated in the 8th and 9th columns of Table 1.1.4. However, the population of Vientiane Capital is likely to increase in future too with the expected transmigration of population from the rural area to urban area. This transmigration is mainly due to the growth and rapidly developing job opportunities in manufacturing and service sectors in Vientiane Capital. In addition, a number of higher educational institutions are also located in Vientiane Capital, which

attracts younger generations from all over the nation to Vientiane Capital to peruse higher studies. Most of these younger generations will find jobs in Vientiane Capital and may live with their family in the future. These facts will accelerate further migration from rural area to urban area.

Table 1.1.5: Change of Population Density by Districts

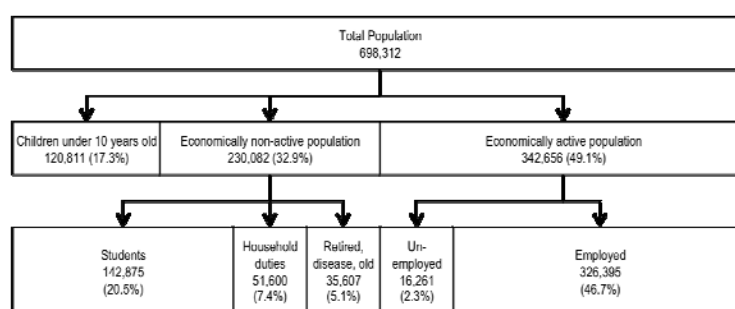
District	Population (Persons)			Area (km ²)	Population Density (Persons/km ²)		
	1995	2005	2009		1995	2005	2009
Chanthabouly	58,855	68,858	78,407	29	2,029.5	2,374.4	2,703.7
Sikhottabong	74,251	99,908	113,763	140	530.4	713.6	812.6
Xaysetha	75,255	97,514	111,037	147	511.9	663.4	755.4
Sisattanak	58,178	68,686	78,211	31	1,876.7	2,215.7	2,522.9
Naxaithong	44,104	58,368	66,462	1,131	39.0	51.6	58.8
Xaythany	97,829	150,793	171,705	916	106.8	164.6	187.5
Hadxaifong	64,962	78,338	89,202	258	251.8	303.6	345.7
Sangthong	16,728	24,215	27,573	622	26.9	38.9	44.3
Mayparkngum	33,945	45,041	51,287	646	52.5	69.7	79.4

Source: Results of Census in 1995 and 2005; Basic Statistics Data on Socio-Economic Development 2008/2009 of Vientiane Capital

The population density in 1995, 2005 and 2009 is summarized in Table 1.1.5. Accordingly, it is possible to classify the districts into 4 groups from this table. The first group consists of Chanthabouly District and Sisattanak District with the population density more than 2,500 person/km² in 2009. Sikhottabong District and Xaysattha District constitute the second group which had the population density of 750 to 800 persons/km² in 2009. The third group is Hadxaifong and Xaythany with the population density of 150 to 350 persons/km², and the fourth and the final group is Mayparkngum, Naxaithong and Sangthong which had the population density of less than 100 persons/km². As for an average increase in the population density during 2005 and 2009, Chanthabouly recorded the highest (82.3 persons per year), followed by Sisattanak (76.8 persons per year), Sikhottabong (24.7 persons per year) and Naxaithong (23.0 persons per year). The average increase in other districts is only 1 to 10 persons per year.

(3) Labor force

According to Census 2005 Report, 49.1% of the total population is classified as “Economically Active Population”, namely people who either can work or are willing to work. Out of the remaining 50.9%, 17.3% were children under 10 years old, 20.5% were students, 7.4% were workers for household duties and 5.1% were retired due to disease or of old age as illustrated in Figure 1.1.3.



Source: Census 2005 Report

Figure 1.1.3: Employment Population and other population

Table 1.1.6 shows comparison of labor force structure between Vientiane Capital and Lao PDR. The following differences are observed.

- There is not much difference in percentage for Economically Active Population (Employed population plus Unemployed population), however, the percentage of unemployed population in Vientiane Capital is 1.6% higher than the average of Lao PDR. In the national level, agriculture may be contributing in lowering down the unemployment rate.
- There is a significant difference in percentage of population engaged in household duties. This may be mainly due to involvement of family members such as housewives in agriculture activities in rural areas. Such opportunities are very limited in Vientiane Capital.
- As expected, the percentage of students in Vientiane Capital is 3.7 percent higher than the national level. This is due to existence of many higher educational institutes in Vientiane Capital. However, the trend is not same for the percentage of children under 10 years old. In Vientiane Capital, it is 8.5 percent lower than the national level.

Table 1.1.6: Comparison of Labor Force Structure between Vientiane Capital and Lao PDR

	Vientiane Capital		Lao PDR	
	(Persons)	(Percent)	(Persons)	(Percent)
Total Population	698,318	100.0	5,621,982	100.0
Employed	326,395	46.7	2,738,893	48.7
Unemployed	16,261	2.3	37,820	0.7
Retired, disease and old	35,607	5.1	224,503	4.0
Household Duties	51,600	7.4	183,532	3.3
Students	142,875	20.5	943,661	16.8
Children under 10 years old'	120,811	17.3	1,450,123	25.8

Source: Census 2005 Report

Table 1.1.7 shows the percentages of farming population and non-farming population by districts. At the national level, as per 2005 statistics, the percentage of farming population was 78.5% and in Vientiane Capital, it was only 35.3%. The percentages of farming population in districts were classified into 3 groups, high percentage in farming, high percentage in non-farming type and intermediate. Four (4) central districts (Chanthabouly, Sikhottabong, Xaysetha and Sisattanak) were grouped in "high non-farming population" group, where the percentage of non-farming population exceeded 80%. Three (3) suburb districts (Naxaithong, Xaythany and Hadxaifong) were grouped in intermediate group, where the percentages of farming population and non-farming population were almost balanced. Two (2) remote districts (Sangthong and Mayparkngum) with majority engaged in farming were grouped in "high percentage of farming population". The percentage of farming population exceeded 80% in these districts.

Table 1.1.7: Percentages of Farming Population and Non-farming Population

	Farming population (%)	Non-farming population (%)
Chanthabouly	2.6	97.4
Sikhottabong	11.0	88.9
Xaysetha	17.1	82.9
Sisattanak	3.0	97.0
Naxaithong	48.0	52.0
Xaythany	48.8	51.1
Hadxaifong	46.2	53.9
Sangthong	90.4	9.5
Mayparkngum	84.6	15.4
Total of Vientiane Capital	35.3	64.7
Lao PDR	78.5	21.5

Source: Census 2005

(4) Consumption and Own Products

Table 1.1.8 indicates monthly consumption of households and the percentage of own products in the monthly consumption by province. The data was collected from the Expenditure and Consumption Survey in 2002/03 (LECS 3) and from 2007/08 (LECS 4). Vientiane Capital has a dominant position in monthly consumption both in LECS 3 and LECS 4. The consumption amount is more than twice of other provinces. However, increase in consumption amount from LECS 3 to LECS 4 is 1.7 times, which is lower than other 17 provinces.

Percentage of own products consumption is at lowest level in Vientiane Capital. The percentage was only 5% in LECS 4. About 95% of consumed goods (foods, daily goods and durable goods) and services are purchased at markets or commercial facilities. It means that the residents in Vientiane Capital have already entered into consuming society stage as a result of economic development and an introduction of market mechanism (New Economic Mechanism) in 1986.

Table 1.1.8: Monthly Consumption and Percentage of Own Products

	LECS 3		LECS 4	
	Monthly Consumption	Percentage of own products	Monthly Consumption	Percentage of own products
Phongsaly	763	57.4	1,259	50.5
Luangnamtha	1,029	41.2	1,655	34.1
Oudomxay	804	49.2	1,735	37.8
Bokeo	833	49.8	1,279	42.0
Luangprabang	1,118	25.0	2,178	21.6
Huaphanh	939	50.0	1,472	48.8
Xayabury	1,102	32.6	3,035	18.5
Vientiane Capital	1,900	6.1	3,183	5.3
Xiengkhuang	1,062	41.6	2,191	30.0
Vientiane	1,212	23.1	1,858	26.8
Borikhamxay	963	36.8	2,019	26.2
Khammuane	873	43.1	1,872	32.8
Savannakhet	965	33.9	2,365	22.5
Saravan	684	47.7	1,456	42.5
Sekong	804	46.5	1,519	35.3
Champasak	1,054	22.9	2,300	20.2
Attapeu	838	38.3	1,760	30.4

Source: LECS3, LECS4 report

(5) On-going and Future 5-year Socioeconomic Development Plans

In the on-going socioeconomic development plan from 2006 to 2010, the following targets for socioeconomic development were prepared:

- Population: The target population of Vientiane Capital will be about 838,000 persons in 2010 with an increase in population of 136,000 persons in 5 years.
- GRDP: The target GRDP will be LAK 11,130 billion in 2010, in which the agriculture sector will be LAK 1,892 billion (17%) with an annual average growth rate of 7.8%, industry sector will be LAK 6,143 billion (55.2%) with an annual average growth rate of 12.5%, and service sector will be LAK 3,094 billion (27.8%) with an annual average growth rate of 11.3%.
- GRDP per Capita: The average GRDP growth rate will be no less than 9% during the planning period, and per capita income will not be less than USD 1,300 in 2010.
- Role of agriculture: Agriculture sector will be important in preparing and making enough stock of rice and foodstuff.

- Manufacturing: Vientiane Capital will promote manufacturing projects, including the 12 projects identified as the priority projects.
- Infrastructure: Vientiane Capital will continue to develop the basic social economic infrastructure, and district offices will make efforts to develop clean and green districts.
- Human Resource Development and enhancement of R&D function: Development of qualified human resources such as science and technology staff, technicians and skilled labor should be promoted in Vientiane Capital. Scientific Research and Development centers and socioeconomic research centers should be established so that Vientiane Capital will lead the progress and advancement of science and technology, and highly qualified human resources development.
- Social Development: The compulsory education level in rural areas should be primary school. And it is necessary to improve access to public health services, and to extend life expectancy of people in average more than 68 years old.

Targets of the next 5-year plan after 2011 are still in discussion within the administrative circle of Vientiane Capital; however, the following are the main discussion points according to DPI.

- Population: Population will be 951,255 persons in 2015. Population growth rate will be 3%, comprising 2% of natural growth plus 1% of social growth during 2010 and 2015.
- GRDP: Average GRDP growth rate will be 12% during the planning period, and GRDP per capita will be equivalent to USD 3,900 in 2015.
- Composition of industrial sectors: composition of industrial sectors will be 15.8% for agriculture, 52.3% for industry and 26.6% for service. It was 18.0% for agriculture, 46.8% for industry and 27.8% for service in 2009.
- Balanced development: In the previous socioeconomic 5-year plans, economic development is the most prioritized target. However, balanced development between economic development and environment conservation will be the most important target in the next 5-year plan.
- An idea of zoning is a key to achieve balanced development as mentioned above. A zoning scheme for newly developed area should be prepared, as well as zoning for industrial development.

1.1.2 Industrial Development

(1) Concentration of Factories in Vientiane Capital

In 2008, 66% of the large scale factories (Level-1) in Lao PDR were concentrated in Vientiane Capital as shown in Table 1.1.9., However, on comparing with national data, only 9% of all factories are located here.

Table 1.1.9: No. of Factories in Vientiane Capital in 2008

	No. of Factories			
	Level-1	Level-2	Level-3	Total
Vientiane Capital (A)	566	103	1,503	2,172
Lao PDR (B)	857	492	22,817	24,166
Share of Vientiane Capital (A)/(B)	66%	21%	6.6%	9%

Source: Ministry of Industry and Commerce (MOIC)

Classifications of factories into Level-1, 2 and 3 are shown in the above table and are defined below following the law on the processing industry.

- Level 1 factory: means a type of large-scale factory with a total labor force in excess of 200 people or mechanized power in excess of 200 horsepower or which has a high level of environmental impact.
- Level 2 factory: means a type of medium-scale factory with a total labor force from 51 to 200 people or mechanized power from 51 to 200 horsepower or which has a medium level of environmental impact.
- Level 3 factory: means a type of small-scale factory with a total labor force from 10 to 50 people or mechanized power from 5 to 50 horsepower or which has a low level of environmental impact.

The apparel industry makes up a vast majority of Level-1 factories in Vientiane Capital, which accounts for 530 out of total 566, as shown in Table 1.1.10.

Table 1.1.10: No. of Level-1 Factories in Vientiane Capital in 2008

	Vientiane Capital	Lao PDR	Share of Vientiane Capital
Wearing apparel, dressing, and dyeing	530	531	100%
Wood and wood products	8	41	20%
Food products and beverage	6	23	26%
Textile	10	10	100%
Others	12	262	5%
Total	566	857	66%

Source: MOIC

In 2008, there were 134 foreign invested factories in Vientiane Capital, which accounted for 55% of Lao PDR and the results are shown in Table 1.1.11.

Table 1.1.11: No. of Foreign Factories in Vientiane Capital in 2008

	No. of Factory Labor
Vientiane Capital (A)	134
Lao PDR (B)	245
Share of Vientiane Capital (A)/(B)	55%

Source: MOIC

Table 1.1.12 shows the number of factory labor. In 2008, it was approximately 50,000 in Vientiane Capital, accounting for 41% of Lao PDR.

Table 1.1.12: No. of Factory Labors in Vientiane Capital in 2008

	No. of Factory Labor
Vientiane Capital (A)	49,785
Lao PDR (B)	121,979
Share of Vientiane Capital (A)/(B)	41%

Source: MOIC

(2) Geographical Distribution of Factories

Table 1.1.13 shows the geographical distribution of factories in the apparel industry, which is the largest industry in Vientiane Capital. They are located mainly in the central part of Vientiane Capital including Chanthabouly, Sikhottabong, Xaysetha, Sisattanak Districts and the western part of Xaythany district.

The table highlights the list of member of association in the Lao Garment Industry. Of the total 54 associations, 53 are located in Vientiane Capital. Large-scale apparel industries mostly export the apparel products to European and other foreign countries by utilizing the General System of Tariff Preferences (GSP). The capital city, especially its central part is a convenient location for communicating with Ministry of Industry and Commerce (MOIC) to obtain the certificates of origin for GSP. Therefore, most apparel factories are located in the central part of Vientiane Capital.

Table 1.1.13: Distribution of Apparel Industries in Vientiane Capital

	District	No. of Factory
1	Chanthabouly	5
2	Sikhottabong	10
3	Xaysetha	9
4	Sisattanak	15
5	Naxaithong	2
6	Xaythany	8
7	Hadxaifong	4
8	Sangthong	0
9	Mayparkngum	0
	Total	53

Source: Association of the Lao Garment Industry (2008)

Besides the apparel factories, several major factories are located along the Thadeua road, including Lao Tobacco, Honda New Chipxen, Lao Soft Drink, TSB, Tokyo Coil Engineering, Lao Brewery and Vientiane Steel Industry.

There are 16 factories located in the new industrial zone called Koksaaat Industrial Zone or Industrial Zone Km 21.

(3) Industrial Zone/Industrial Areas

In Vientiane Capital, there are following industrial zones or the area of industries located within commercial, residential, and agricultural areas.

- Central part where many factories are located such as apparel factories
- Old industrial zone on the sides of Thadeua Road with the total area of 673 ha
- New industrial zone with the total area of 2,000 ha located south of Km 21 National Road No.13 South (Koksaaat Industrial Zone)

1) Central part of Vientiane Capital

As described above, most of apparel factories are located in the central area of the city. Some of them are located in the congested area and are mixed with the commercial facilities. In such a case, factories may cause a trouble of traffic jam for transportation and commuting.

Some of the factories are also located in the residential area. Apparel factories in Sisattanak District are good example of this. According to Sisattanak District office, factories have no

negative impact as they are environmentally-friendly light industries and mostly medium size factories. Road improvement for better transport efficiency for the factories located along the roads has been implemented step by step.

There are some factories in the rice paddies areas too such as in Sikhottabong and Xaythany Districts. In these places, factories are mostly served by unpaved roads. Factories located in these places are probably faced with the transport difficulties especially during rainy season.

2) Old industrial zone along Thadeua Road

According to Regulation of Vientiane City Development Plan (2000-2010), the old industrial zone was identified along Thadeua Road starting from Somsanook village to Nongvank, Nonghai, Salakham and Somvantai villages. Recently Thadeua Road has been improved under the Vientiane Road No.1 development project implemented by the grant aid from Japanese Government. This zone is very convenient in terms of transportation via improved Thadeua Road, and proximity to the Friendship Bridge.

There are modern factories in this industrial zone. However, recently new factories have not been built there, as the Government changed the policy on land use of this area to protect the environment. Current state of this industrial zone is mostly rice paddies, except the area directly along the Thadeua Road.

3) Koksaa Industrial Zone (Industrial Zone Km 21)

Vientiane Capital Government issued a decree on Koksaa Industrial Zone (No. 602/ Vientiane Capital) dated 29 December 2005 for future industrialization in Vientiane Capital. According to the decree, new investment of the manufacturing industry will be encouraged to Koksaa Industrial Zone (or usually regarded as Industrial Zone Km 21) and the relocation of existing manufacturers will be enforced there in future. Based on the decree, Public Works and Transport Institute (PTI) prepared a land use plan.

Department of Industry and Commerce (DOIC), Vientiane Capital, has taken charge of development of this industrial zone. There are only 16 factories in this industrial zone at present. In order to encourage the investment to this industrial zone, it is necessary to invite investors to develop basic infrastructure including roads, water supply, and electric power supply; and residences for factory workers.

Environmental management should be carried out to protect residents in the industrial zone and surrounding areas. Environmental impact assessment (EIA) should be done by investors at the pre-investment stage. Management body of the industrial zone should carry out environmental measurement at regular intervals. If environment deterioration related incident is detected, the management body should find out the reasons and give an order for remedial action.

(4) Master Plan for Development of Industrial Zone Km 21 and Neighboring Area

PTI has been conducting *the Study of Master Plan for Development Industrial Zone Km 21 and around Vientiane Capital to 2010-2020 and vision towards 2020*, since May 2009. The draft report of master plan was prepared and presented to Vientiane Capital and MPWT. It will shortly be authorized by Prime Minister as a decree.

The Master Plan Study has been conducted for an area of 70,000 ha, covering part of 5 districts of Vientiane Capital, namely: Sisattanak, Xaysetha, Xaythany, Hadxaifong, and Mayparkngum.

According to the site survey in 2009, there are 136 villages in the study area with a total population of 201,393 and 36,180 households.

In addition to Industrial Zone Km 21, there are 12 national activities in the study area, namely: National Road No. 13-South (26 km), 450 years road (around 19 km), SEA game stadium (182 ha), cemetery for the unknown soldiers (24 ha), solid waste disposal site (750 ha), Dong Phosy protection area (1,790 ha), railway preservation area, new town area (1,000 ha), international airport preservation (4,550 ha), cultural park (88 ha), SEA game golf course (227 ha), and resettlement area in Xaisomboun Village (100 ha). Besides these national activities as described in the draft report of Master Plan Study, private investment projects have been announced for commercial activities such as tourism, housing, commercial complex, and amusement, in the study area.

The area defined by Master Plan Study is expected to be major economic center in future; and will contribute in the economic development of Vientiane Capital. The area is expected to maintain the stable population density in the existing center of Vientiane Capital.

1.1.3 Agricultural Development

(1) Topography

Vientiane Capital is topographically divided into two large areas, i) Central and Eastern Plain Area and ii) Western Mountainous Area. The central and eastern plain area is a lowland area with an elevation of 100 to 200 m a.s.l., occupying more than 70% of a total of 300,000 ha of Vientiane Plain, which consists of the Mekong river basin and the Nam Ngum river downstream basin. The western mountainous area is a middle mountainous area with an elevation of 300 to 600 m a.s.l., consisting of the Phou Pha Nang Mountains adjacent to the western part of Vientiane Plain and a mass of middle mountains in Sangthong district.

Agriculture is active in the central and eastern plain areas, particularly in rice farming. However, the Vientiane Plain is not a simple flat plain area but forms a complicated topography with lowland swamps and individual hills (called as a “Buttle”, with a height of about 30 m). Swamps are one of features of the Vientiane Plain, but they do not always have water all year round. They are submerged in the wet season due to a high water level. The depth of water becomes more than 10 m in some places; but they dry up in the dry season. Such swamp areas are not utilized for agriculture. Rice farming is done in the areas between the lowland swamps and Buttles, where the drainage condition is relatively good and the lands are not submerged in the wet season.

The southern most part of Hadxaifong District (the southern most curved part of the Vientiane Plain, adjacent to Thailand) is a plain area with a very specific topographical feature composed of rather new alluvium, where no Buttles more than 170 m exist. As for agriculture, various kinds of vegetable and industrial cash crops such as tobacco have been planted for long capitalizing on the advantageous location adjacent to a big market of Vientiane Capital.

(2) Crops

1) Rice

Rice is staple food for Lao people and a very important crop in terms of food security, which is one of the most important national policies of Lao PDR. Laos has achieved self-sufficiency in rice in 2000 for the whole country. There are some different conditions of rice sufficiency, however, among the regions. Farmers produce surplus rice in the plain areas along the Mekong river, but the people in northern and eastern areas normally experience rice deficit for several months a year. Supply of rice to those areas is one of the important issues now.

The general situation of rice production in Vientiane Capital is that the amount of rice production in the wet season is enough for the consumption within Vientiane Capital and that in the dry season surplus is shipped to other provinces for consumption or sold to the companies such as beer and noodle manufacturers as materials for processing.

In order to make projection on the balance of rice demand and supply, 180 kg of milled rice was applied for the rice demand per capita per year, which is equivalent to 350 kg of un-milled rice adopted in the 6th Agriculture Sector 5-years Development Plan. As shown in Table 1.1.14, there have been 40,000 to 70,000 ton of surplus per year compared to about 300,000 ton of annual rice production in the past 5 years. (Year 2008 is an exception when rice field in Vientiane Capital was largely damaged by a flood and the rice production dropped by more than 40,000 ton.)

As described above, the balance of rice is positive at present. However, it is clearly projected that the balance of rice will turn negative in the future considering the estimated demand of rice in 2030 to be about 490,000 ton with a projected population of 1.4 million people.

Under such projection, even though the government continuous efforts to promote the policy of “Strengthening of Rice Farming”, import of rice from neighboring provinces such as Bolikhamxay, Savannaket and Vientiane provinces will be necessary..

Table 1.1.14: Estimated Balance of Rice Production and Demand in Vientiane Capital

Year	2004	2005	2006	2007	2008
Total Rice Production (ton)	295,380	300,200	297,175	324,120	263,285
- Season Rice (ton)	192,100	201,600	200,075	219,695	161,315
- Irrigated Rice (ton)	103,280	98,600	97,100	96,000	99,825
- Upland Rice (ton)	-	-	-	8,425	2,145
Total Rice Demand (ton)	234,150	244,300	249,200	254,100	259,000
- Population (person)	669,000	698,000	712,000	726,000	740,000
- Demand per capita (kg),*/	350	350	350	350	350
Estimated Balance (ton)	61,230	55,900	47,975	70,020	4,285

Source: Statistics data of DoS, MPI and the Study team’s estimation.

2) Vegetables

Next to rice, vegetable farming in the suburbs of Vientiane Capital characterizes the agriculture in Vientiane Capital. The farmers grow various kinds of vegetables at gardens around their houses and on the river banks where watering is suitable particularly in the dry season. All the vegetables such as leaf lettuce, herbs, sweet corn, beans, cucumber, chili, eggplant, tomato, pumpkin and water melon, etc. are grown for sale at the markets in Vientiane Capital.

The vegetable harvested area in Vientiane Capital in 2008-09 was about 5,600 ha, and those by district are shown in Table 1.1.15.

Table 1.1.15: Harvested Areas of Vegetables in Vientiane Capital (2008-09)

(Unit: ha)

Crop	District (*)									Total
	Chan.	Sikh.	Xays.	Sisat.	Naxa.	Xayt.	Hadx.	Sang.	Park.	
Leaf vegetables	40	436	93	39	348	541	410	35	92	2,034
Cauliflower, etc.	-	52	-	9	245	12	302	-	2	622
Radish, etc.	-	22	25	3	180	133	82	23	11	479
Chili	-	115	-	-	8	6	4	13	-	146
Cucumber	-	18	-	-	29	3	90	27	-	167
Eggplant	-	147	-	-	5	1	-	29	-	182
Watermelon	-	-	-	-	30	2	8	-	25	65
Tomato	-	50	-	-	-	-	-	-	-	50
Baby corn	-	11	-	-	-	-	-	-	-	11
Sweet corn	-	16	-	3	127	13	96	-	42	333
“Mampao”	-	-	-	-	-	-	85	36	4	89
Sweet potato	-	20	-	-	-	-	11	-	-	31
Others	-	348	60	10	227	448	310	18	55	1,476
Total	40	1,235	178	64	1,199	1,159	1,398	181	231	5,685

Source: Summary Report on Agriculture and Forestry Activities in 2008-09 and Plan for 2009-10, Dept. of Agriculture and Forestry, Vientiane Capital

Note: (*) District: Chan.=Chanthabouly, Sikh.=Sikhottabong, Xays.=Xaysetha, Sisa.=Sisattanak, Naxi.=Naxaithong, Xayt.=Xaythany, Hadx.=Hatxaifong, Sang.=Sangthong, Park.=Mayparkngum

Table 1.1.15 shows that the vegetable farming is active in four districts of Sikhottabong, Naxaithong, Xaythany and Hatxaifong around the Vientiane Capital. However, according to the report of Department of Agriculture and Forestry (DAF) of Vientiane Capital, the vegetable cropped area in 2008-09 was 5,685 ha which is lower than the planned area of 9,569 ha and thus was able to utilize only 59% of the planned area. This area was less by 2,612 ha (31%) of 2007-08.

The reduction in cropped area is very important issues to be discussed in the agriculture development in Vientiane Capital. The following points are taken in account as the reason of the reduction of vegetable cropped area; i) the farmers consider that agriculture is not so much a profitable business, ii) it is easier to earn money by other works than agriculture such as employed labor, iii) imported agricultural products from Thailand, China and Vietnam are cheaper than those produced in Lao PDR and are of good quality, thus the Lao products cannot compete with such imported vegetables.

3) Organic Crops

Presently, a large volume of vegetables and fruits are flooding from Thailand, Vietnam and China to Vientiane Capital as well as other large cities in Lao PDR. Most of quality vegetables and fruits such as tomato, carrot, baby corn, onion, durian, mangosteen and mango are imported from Thailand. Recently, such new quality fruits such as apple, pear, persimmon and ruche are imported from China and Vietnam, and sold relatively cheap.

The government is now promoting “Clean Agriculture” by encouraging i) Lao traditional agriculture without use of chemical fertilizer and agro-chemicals, ii) agriculture based on GAP (Good Agriculture Practices) and/or introduction of IPM (Integrated Pest Management), iii) non agro-chemicals, and iv) organic farming, etc. The demand for organic products is increasing among the city dwellers particularly the well educated and/or foreign tourists and

residents. The technical level and knowledge of Lao farmers on production, processing and marketing of organic products are still low.

Under such a situation, the project of “Promotion of Organic Farming and Marketing in Lao PDR (PROFIL)” has been started since 2004 under the cooperation of DAF, Ministry of Agriculture and Forestry (MAF) and a SWISS NGO “Helvetas”. In 2006, the project established 7 organic farmer groups in 5 districts of Vientiane Capital with a total of 66 households, and they started producing organic vegetables in 31 ha of farm land in total. Presently, their activities have been extended to 8 organic farmer groups of 85 households and to a total production area of 45 ha. The names of the farmer group and their main crops are shown in Table 1.1.16.

Table 1.1.16: Organic Farmer Group in Vientiane Capital under PROFIL

Production Group (Village)	District	Main Crop
1. Koksay Vegetable Group	Hadxaifong	Cabbage, Tomato, Cauliflower, Longbean
2. Hadkeo Vegetable Group	Hadxaifong	Eggplant, Leak, Pumpkin, Herb
3. Senda Vegetable Group	Xaysetha	Chinese cabbage, Cucumber, Leak, Longbean
4. Na Sanphi Vegetable Group	Xaysetha	Cauliflower, Cucumber, Longbean, Broccoli
5. Nongte Vegetable & Fruit G.	Xaythany	Cauliflower, Lettuce, Mango, Papaya
6. Nongda Vegetable & Fruit G.	Sikhottabong	Sweet pepper, Chili, Tomato, Carrot
7. Hadonchane Vegetable Group	Sisattanak	Broccoli, Tomato, Cauliflower
8. Kengkhay Vegetable & Fruit G.	Xaythany	Cucumber, Eggplant, Lettuce, Papaya

Source: Interview with the staff of PROFIL (Promotion of Organic Farming and Marketing in Lao PDR) Project

The products by these farmer groups are sold at That Luang Organic Vegetable Market on every Saturday and Wednesday morning. For the first 2 years, 40% of the products were sold out at That Luang Market and the remaining 60% were sold at normal markets for the same prices with other non-organic products. As of March 2010, all the products are normally sold out by 11:00 a.m. in the Saturday Market and about 90% of the products are sold out in the Wednesday Market with an average weekly sales of LAK25 to 30 million (USD 3,000 to 3,500). Presently, new organic farmer groups are established in Champasack, Luangprabang and Xiengkhouang provinces in addition to Vientiane Capital.

4) Commercialized Industrial Crops

Harvested areas of commercialized industrial crops in 2008-09 by district are presented in Table 1.1.17.

Table 1.1.17: Harvested Areas of Industrial Cash Crops in Vientiane Capital (2008-09)

(Unit: ha)

Crops	District (*)									Total
	Chan.	Sikh.	Xays.	Sisat.	Naxa.	Xayt.	Hadx.	Sang.	Park.	
Feed Corn	-	-	-	-	2,040	38	46	80	35	2,239
Tobacco	-	-	-	-	-	-	56	3	100	159
Sugarcane	-	-	-	-	-	82	41	11	45	179
Soybean	-	15	-	-	-	20	-	13	5	53
Green bean	-	-	-	-	-	-	21	556	21	598
Ground nut	-	5	-	-	-	10	-	1	3	19
Black bean	-	-	-	-	-	-	-	6	-	6
Cassava	-	-	-	-	325	580	405	716	525	2,551
Taro	-	-	-	-	-	10	-	10	5	25
Other root crops	-	36	-	-	8	-	-	5	-	49
Job's tear	-	-	-	-	-	-	-	50	-	50
Sesame	-	-	-	-	-	-	-	35	30	65
Jatropha	-	-	-	-	-	226	-	-	-	226
Others	-	58	-	-	-	-	-	-	-	58
Total	0	114	0	0	2,373	966	569	1,486	769	6,277

Source: Summary Report on Agriculture and Forestry Activities in 2008-09 and Plan for 2009-10, Dept. of Agriculture and Forestry, Vientiane Capital

Note: (*) District: Chan.=Chanthabouly, Sikh.=Sikhottabong, Xays.=Xaysetha, Sisa.=Sisattanak, Naxi.=Naxaithong, Xayt.=Xaythany, Hadx.=Hadxaifong, Sang.=Sangthong, Park.=Mayparkngum

Among industrial cash crops, feed corn and cassava are to be paid attention, as the demand for these crops is increasing recently in the country as well as in surrounding countries.

The amount of production of feed corn has drastically increased by 540% in the past 5 years and reached 1,100,000 ton in 2008, most of which are grown in northern provinces and exported to Thailand, China and Vietnam. As for the domestic demand of feed corn, a Thai company (CP) started the management of the existing feed mill factory in Xaythany District with a new investment, and recently the business is becoming active year by year. It is projected that the demand for feed corn will increase for domestic consumption in accordance with the increase of the demand for livestock particularly in Vientiane Capital. The feed corn is grown in a total area of 2,040 ha in Naxaitong District in 2008-09.

Cassava has been grown for food consumption on a small scale so far. Recently, according to an increase in demand from the neighboring countries, some cassava processing factories have been built by domestic and foreign investors in Lao PDR. A cassava factory was established in July 2007 in Mayparkngum District by Lao investment and started the operation anticipating the expected rising demand. It is reported that in the 2009 wet season, cassava was grown in a total area of 2,500 ha in 5 districts of Naxaithong, Xaythany, Hadxaifong, Sangthong and Parknguem, respectively. Cassava is expected to be an important industrial cash crop in these areas in the future.

(3) Irrigation

Until now, irrigation has been playing an important role in ensuring the government policy of food security. Since 1997, the government has actively implemented pump irrigation projects in lowland paddy fields under National Pump Irrigation Management Project (NPIMP).

The changes in the irrigated rice area in the dry season from 1996 to 2008 in Vientiane Capital are presented in Table 1.1.18. The production of the dry season irrigated rice has increased from 40,000 ton in 1996 to 93,000 ton in 2000, and since then the irrigated rice production ranges from 90,000 to 100,000 ton per year.

Table 1.1.18: Irrigated Rice Area and Production in Recent 10 Years in Vientiane Capital

Irrigated Rice in Dry Season	Year										
	1996	-	2000	2001	2002	2003	2004	2005	2006	2007	2008
Area ('000 ha)	9.1	-	21.0	22.0	23.1	23.3	21.2	21.6	21.1	20.1	21.1
Production ('000 ton)	39.7	-	93.0	101.6	106.5	110.0	103.2	98.6	97.1	96.0	99.8

Source: Basic Statistics, DoS, MPI

Irrigation facilities are divided into 4 types by the irrigation method, namely i) reservoir, ii) gate, ii) pump and iv) weir. Most of the irrigation facilities in Vientiane Capital are categorized into “pump” irrigation due to topographical and water source conditions. Presently, there are 102 irrigation facilities under the management of Vientiane Capital, among which 9 are reservoir type, 5 are gate type, 2 are weir type and the remaining 86 are pump irrigation type. In addition to these governmental facilities, there are a number of small scale irrigation facilities owned by individuals or groups.

Major role of irrigation is in the dry season. In pump irrigation areas, pumps are basically operated only in the dry season. In the wet season crops are grown in rainfed condition, and the pumps are not operated except in drought years. Table 1.1.19 shows the irrigated areas by irrigation type in the 2008-09 dry season in Vientiane Capital.

Table 1.1.19: Irrigated Areas by Type of Irrigation in Vientiane Capital (2008-09 Dry Season)

Type of irrigation (target, actual irrigated area)	District (*)										Total
	Chan.	Sikh.	Xays.	Sisat.	Naxa.	Xayt.	Hadx.	Sang.	Park.		
1. Reservoir											
No. of reservoir system (no.)	0	0	0	0	4	4	0	1	0	9	
Irrigated Area in 08-09 dry s. (ha)	0	0	0	0	4,040	228	0	40	0	4,308	
- (for rice) (ha)	(0)	(0)	(0)	(0)	(3,740)	(210)	(0)	(30)	(0)	(3,980)	
- (for vegetable/upland crops) (ha)	(0)	(0)	(0)	(0)	(300)	(18)	(0)	(10)	(0)	(328)	
2. Gate											
No. of gate system (no.)	0	0	0	0	4	1	0	0	0	5	
Irrigated Area in 08-09 dry s. (ha)	0	0	0	0	85	u.c.	0	0	0	85	
- (for rice) (ha)	(0)	(0)	(0)	(0)	(65)	(u.c.)	(0)	(0)	(0)	(65)	
- (for vegetable/upland crops) (ha)	(0)	(0)	(0)	(0)	(20)	(u.c.)	(0)	(0)	(0)	(20)	
3. Pump											
No. of pump system (no.)	2	7	7	3	1	25	20	5	16	86	
Irrigated Area in 08-09 dry s. (ha)	22	795	730	522	170	4,978	4,592	559	5,495	17,863	
- (for rice) (ha)	(18)	(730)	(720)	(522)	(80)	(4,002)	(4,095)	(425)	(5,166)	(15,758)	
- (for vegetable/upland crops) (ha)	(4)	(65)	(10)	(0)	(90)	(976)	(497)	(134)	(329)	(2,105)	
4. Weir											
No. of weir (no.)	0	0	0	0	2	0	0	0	0	2	
Irrigated Area in 08-09 dry s. (ha)	0	0	0	0	118	0	0	0	0	118	
- (for rice) (ha)	(0)	(0)	(0)	(0)	(100)	(0)	(0)	(0)	(0)	(100)	
- (for vegetable/upland crops) (ha)	(0)	(0)	(0)	(0)	(18)	(0)	(0)	(0)	(0)	(18)	
5. Private/Community Owned											
Irrigated Area in 08-09 dry s. (ha)	0	110	380	(n.a.)	160	70	455	41	450	1,666	
- (for rice) (ha)	(0)	(110)	(330)	(n.a.)	(160)	(70)	(455)	(30)	(438)	(1,593)	
- (for vegetable/upland crops) (ha)	(0)	(0)	(50)	(n.a.)	(0)	(0)	(0)	(11)	(12)	(73)	
Total											
No. of irrigation system (no.), 1/	2	7	7	3	11	30	20	6	16	102	
Total irrigated area in 08-09 d. s. (ha)	22	905	1,110	522	4,573	5,276	5,047	640	5,945	24,040	
- (for rice) (ha)	(18)	(840)	(1,050)	(522)	(4,145)	(4,282)	(4,550)	(485)	(5,604)	(21,496)	
- (for vegetable/upland crops) (ha)	(4)	(65)	(60)	(0)	(428)	(994)	(497)	(155)	(341)	(2,544)	

Source: Report of Irrigation Section, Dept. of Agriculture and Forestry, Vientiane Capital

Note: (*) District: Chan.=Chanthabouly, Sikh.=Sikhottabong, Xays.=Xaysetha, Sisa.=Sisattanak,
Naxi.=Naxaithong, Xayt.=Xaythany, Hadx.=Hadxaifong, Sang.=Sangthong, Park.=Mayparkngum
1/ Excluding private/community owned irrigation systems.

The following is a summary of the above table and the information gathered from the staff of the irrigation section of the DAF, Vientiane Capital.

- The total irrigated area including small scale systems reached 24,000 ha, of which 21,496 ha (90%) used for irrigated rice and 2,544 ha (10%) for field crops.
- It is reported that some farmers were not satisfied with insufficient water distribution in their irrigation system which suggests the necessity of further improvement of water management.
- The dry season irrigated rice farming is active in more than 4,000 ha of area in 4 districts of Naxaithong, Xaythany, Hadxaifong and Mayparkngum.
- The dry season irrigated field crop farming is active in more than 300 ha of area in 3 districts of Xaythany, Hadxaifong and Mayparkngum.

As described above, irrigation plays an important role in terms of stable supply of agricultural products all through the year. In consideration of an increase of the demand for agricultural products in the future, further development of irrigation is indispensable. On the other hand, there exist various kinds of issues related to maintenance of existing irrigation facilities, which should be solved in collaboration with the government and the farmers.

As described before, the irrigation sub-sector has played an important role in the government policy of food security. However, according to the changes of social and economic situation in surrounding countries, it is the time to consider what should be the role of irrigation sub-sector for the promotion of commercialized agriculture. In other words, in the past, the irrigation sub-sector has constructed irrigation facilities in order to supply water for agricultural production. Presently, only “irrigation” cannot motivate the farmers for agricultural production. Agricultural production from now on will need the collaboration with the market. Namely, “a new irrigated agriculture” is needed with a strong collaboration of the government, farmers and market. Under such situation, it should be recognized that Vientiane Capital has a strong potential for the development of commercialized agriculture in consideration of the large demand from 1.7 million of population in 2030 as well as an export potential to the neighboring countries.

(4) Livestock

In the past, livestock were raised by small holders on a small scale and in an extensive manner. Livestock business has a high potential to extend valuable production through the improvement of health, nutrition and variety of animals. The number of modernized large scale pig and chicken farms (farmers and companies) are thus increasing in recent years in the suburbs of Vientiane Capital, where animals are fed intensively with compound feed in the house. Table 1.1.20 shows the changes in number of livestock in Vientiane Capital in the past 5 years i.e. from 2004 to 2008.

Table 1.1.20: Livestock Production in Vientiane Capital

Livestock	2004	2005	2006	2007	2008	Increase in 5 years
Buffalo	25,000	18,000	17,000	16,000	18,000	-28%
Cattle	64,000	65,000	66,000	77,000	83,000	30%
Pig	95,000	99,000	48,000	51,000	75,000	79%
Goat	8,000	14,000	15,000	15,000	18,000	125%
Poultry	1,899,000	263,000	950,000	808,000	1,157,000	-39%

Source: Basic Statistics, DoS, MPI

Further, a general view of the participation of livestock farms in livestock business in Vientiane Capital is presented in Table 1.1.21.

Table 1.1.21: Livestock Production by Farms in Vientiane Capital

(Unit: head)

Livestock	Total Production in 2008 (head)	Production in Farms (head)	Production in Farms (%)	No of Farms
Buffalo	18,000	0	0	0
Cattle	83,000	3,749	5%	22
Pig	75,000	58,127	78%	154
Goat	18,000	0	0	0
Poultry	1,157,000	683,930	59%	146
			(Total)	322

Source: Basic Statistics, DoS, MPI, and Summary Report on Agriculture and Forestry Activities in 2008-09 and Plan for 2009-10, DAF, Vientiane Capital

From the two tables above, the following points are noted as an important new trend in livestock sub-sector in Vientiane Capital.

- The number of buffaloes has declined by 28% in the past 5 years due to the replacement of buffaloes by tractors.
- Cattle are raised as beef cattle and the number has increased from 64,000 heads to 83,000 heads. The raising method of cattle is still traditional and in an extensive way. It is reported that 22 cattle farms produced 5% of the total cattle production in 2008-09 in Vientiane Capital.
- Pigs are mainly produced in pig farms and by companies. About 78% (58,000 heads) of the total production (75,000 heads) in Vientiane Capital were produced by 154 pig farms in 2008. It is projected that pig farming will be extended more and more in the future.
- Goats have increased in recent years from 8,000 heads in 2004 to 18,000 heads in 2008 with a 225% of increase. Goats are mainly raised in an extensive manner.
- The production of poultry has reached 1.9 million heads in 2004. However, due to bird flu, the population of poultry has drastically reduced after 2004. However, since 2008, it is gradually recovering.
- Poultry, particularly producing chicken eggs has been specialized by chicken farms. About 60% (700,000 heads) of the total production of poultry (1.2 million heads) in Vientiane Capital in 2008 was produced by 146 chicken farms.

Aquaculture is generally done in a traditional way on a small scale aiming for self-consumption and feeding local market, but the commercial base of aquaculture is recently increasing in the suburbs of Vientiane Capital.

(5) Commercialized Agriculture

1) Policy on Promotion of Commercialized Agriculture

Since of the accession to ASEAN in 1997 and in an effort to realize AFTA and join WTO, the government of Lao PDR has been addressing the issues such as i) open market, ii) increase of competitiveness in agriculture sector, iii) development of new markets, and iv) increase of export of value added products. In the 6th 5-year Development Plan of Agriculture Sector, the government aims at exporting USD one billion worth of agricultural products in 2010 and are promoting both domestic and foreign investments.

Due to the cost, safety, and promotion of Economic Partner Agreement (EPA) between countries, the production of crops, distribution, and trade in ASEAN and China are becoming

active including i) change of production and processing bases and areas, ii) distribution of materials across the countries, and iii) investment for import of products. The development policy of agriculture sector in Lao PDR should be determined firmly in consideration of strategic aspects of crop production and distribution in ASEAN.

2) Investments in Agriculture Sector

The government of Lao PDR has been promoting the investments by domestic and foreign private companies to agri-businesses of i) food crops, ii) industrial crops and trees, iii) livestock and aquaculture, and iv) other processing and trading businesses.

The government promotes “2 + 3” contract farming system in order to improve farmers technology and increase income of farmers. The “2 + 3” system means that the farmers provide their land and labor, and the investors provide capital (input materials), technology, and market. However, since the investors actually tend to focus on the economic efficiency of the business, the promoted “2 + 3” system is not always implemented as the government expects.

From 2003 to 2010, there are 89 agro-business companies registered at the DAF, Vientiane Capital. The businesses vary from crops and trees to livestock as shown in Table 1.1.22.

Table 1.1.22: No of Agro-Business Companies by Major Business Item

	Major Business Item	No of Company
1	Food crops, Industrial crops, Fruit trees, Flowers,	19
2	Crops and Small animals (pig, goat and poultry)	17
3	Small animals (pig, goat and poultry)	14
4	Industrial trees (teak, rubber, May Ketsana, Jatropha, Palm, etc.)	19
5	Cassava processing	4
6	Fish-culture (fish and prawn)	5
7	Agro-industry (planting, processing, trade and others)	11
	(Total)	89

Source: Planning Section, DAF, Vientiane Capital, No 028/PS

Table 1.1.23 shows that among 89 companies 24 are Lao companies with 100% domestic investment, 47 are foreign companies with 100% of foreign investment, and the other 18 are JV (joint-venture) companies. Among 47 of foreign companies, 19 companies are from Korea, 9 companies from China, and 7 companies are from Thailand. From the investment amount viewpoint, Thai companies are the biggest with an invested amount of USD 11.4 million, Korean companies are the second with an invested amount of USD 9.2 million, and Chinese companies are the third with an invested amount of USD 5.7 million. The average invested amount by the foreign companies is about USD 700,000 per company.

Table 1.1.23: Companies Invested by Foreign Country

	Country	No of Company	Registered Invest Amount (USD)	Average Investment Cost per Company (USD)
1	Korea	19	9,200,000	484,210
2	China	9	5,710,000	634,444
3	Thailand	7	11,480,000	1,640,000
4	Others	12	8,213,397	684,449
	Total	47	34,603,397	736,242

Source: Planning Section, DAF, Vientiane Capital, No 028/PS

(6) Technology and Extension, and Farmer's Group

1) Agricultural Technology and Extension

In accordance with the change of the farming system from self-sufficiency to a market-oriented, better quality of products, more productive varieties and higher farming technology that will ensure more productivity is necessary. The ultimate objective of agricultural extension is to encourage the farmers to produce crops by introducing a new technology. Thus, the effective extension support by the government to the farmers is vital and important issue these days.

The agricultural extension activities are basically done in the form of i) training of the farmer's group, and ii) demonstration activities at the demo-plots through a) periodical visits to the villages by provincial and district extension workers, and b) farmers' participatory trials and follow-up by the staff. However, there are actually various issues confronted such as lack of budget, limited staff, poor accessibility to the villages, and inefficiency of public service in remote areas.

2) Water User's Association (WUA)

Water User's Association (WUA) is an official corporate body of farmers which is legally independent like a community organization. WUA is managed by an operation committee composed of the representatives of all the villages within an irrigation project. WUA is responsible not only for operation, maintenance and management of the irrigation system but also for purchase of agricultural inputs, loan services related to agricultural production, and marketing. WUA has also a right to make business in collaboration with Agriculture Promotion Bank (APB) and/ or trading companies.

WUAs since its establishment, operated and followed the procedures developed by the government. However, WUA is still inexperienced as an operational organization and thus need to be further strengthened with the government assistance.

3) Farmer's Production Group and Association

The need for establishing farmer's production group and/or association is urgent and its need is increasing these years due to the occurrence of problems related to contract farming with private companies, which has been extended in the whole country. Presently, rubber plantation is expanding by private companies of China and Vietnam based on the contract farming with the local farmers, without establishing official farmer's groups or associations. It is reported that the contracted local farmers are not always protected properly. The government is in a hurry to establish farmer's production group/cooperative legally. ("Prime Minister Decree on Association in Lao PDR" was issued in December 2007. Decree on Cooperative in Lao PDR in now under drafting by MAF).

1.1.4 Commercial and Tourism Development

(1) Commercial and Tourism in Vientiane Capital

1) Market

Markets for wholesale and retail trade are important for the residents. The fresh market is particularly important to meet the daily needs of residents. There are 83 markets in Vientiane Capital at present, as Table 1.1.24 shows by district. There are a large number of markets as

many as 22 in Xaysetha District, while only a small number of markets operate in remote districts such as Sangthong and Mayparkngum.

Table 1.1.24: Distribution of Markets in Vientiane Capital

	District	No of Market
1	Chanthabouly	8
2	Sikhottabong	14
3	Xaysetha	10
4	Sisattanak	7
5	Naxaithong	8
6	Xaythany	22
7	Hadxaifong	10
8	Sangthong	1
9	Mayparkngum	3
	Total	83

Source: DOIC, Vientiane Capital Domestic Commerce Division (2009)

Traffic jam is often caused by delivery vehicles, which are mostly Tuku-Tuku, parked in the roads near some markets in the central part of Vientiane Capital, such as Ton Cam Can market, Tat Luan market, and Nongchan market.

2) Hotel and Guesthouse

The tourism industry is active in Vientiane Capital as well as in Luang Prabang. The number of foreign tourist to Vientiane Capital was approximately 200,000 in 2006- 2007. However, this number is less in comparison to the foreign tourist to Luang Prabang, which is a World Heritage Site, were approximately 240,000 foreign tourist visited. The Table 1.1.25 compares the numbers of hotels and guesthouses in Vientiane Capital with Luang Prabang.

Table 1.1.25: No. of Hotels and Guesthouses in Vientiane Capital in 2007, 2008 and 2009
(Unit: buildings)

	Hotel			Guesthouse		
	2007	2008	2009	2007	2008	2009
Vientiane Capital	79	114	175	169	185	187
Luang Prabang	21	31	41	203	161	201
Other provinces	111	120	141	748	774	956
Total Lao PDR	211	265	357	1,120	1,120	1344

Source: Lao National Tourism Administration

In 2009, the number of hotels were 175 (49% of Lao PDR) in Vientiane Capital, and 41 (11% of Lao PDR) in Luangpragang. For the guesthouses, the number was 187 (14% of Lao PDR) in Vientiane Capital, and 201 (15% of Lao PDR) in Luang Pragang in 2009.

Vientiane Capital is a gateway for foreign visitors and major destination for business. It has the largest number of hotels in Lao PDR.

(2) Commercial and Tourism Zone Development

Some of large commercial projects are implemented in Vientiane Capital with foreign investment. Table 1.1.26 shows major commercial projects in Vientiane Capital.

Table 1.1.26: Commercial Development Projects in Vientiane Capital

	Project Name	Location	Development Scale	Purpose	Status
1	Talatsao Mall Phase-2 Construction of Center Building (Block B): Talat Sao Shopping Mall Co., Ltd.	Lang Xang Avenue	8-storey building with total built-up area of 55,000 m2	Shopping and retail trade; car park; entertainment such as cinema, spa, fitness, amusement game, pubs, disco; hotel	Under construction
2	Nongchan Plaza Vietnam: Construction Installation and Building Material Company No.5 (70%) Lao PDR: Anachack Trading Import and Export Co.,Ltd	Nongchan after demolishing the existing market	1.1 ha		Receipt concession (40 years) in April 2007 Receipt license in September, 2009
3	Nongchan Lunar Town Korean Partner in Lao PDR Korea Industry Taekwondo Federation	Nongchan	5.5 ha	Lake improvement, car parking, IT center, IT school, showrooms, event space, indoor arena, apartment, rental office	MOU: August 2009 License: February 2010 (schedule) Concession: June 2010 (schedule)
4	Lao Stock Exchange	T4 road opposite to Lao ITECC		Stock exchange	Under construction
5	Green Villa Town Mailinh Mekong International Investment Corporation (Vietnam)	Km 16 Road 13, Xaythani Opposite side of SEA game main stadium	13 ha	Housing development	Under construction
6	Golf course by Lonteng Golf co., Ltd.	Dong Phosi	500 ha	Golf course Real estate development	Under construction (Construction started in January 2010.)
7.	Sea Game Golf Club by Booyoung Lao	Road 13 South, Xaythani		Golf course	Completed Commercial operation started from January 2010
8.	Special Economic Zone by Universal Pacific Ltd.	Dong Phosi	53 ha	Hotel, hospital, duty free shop, department store, park, etc.	Licensed in September 2009

Source: Prepared by JST from news paper articles and sign panel

1.2 Current Conditions of Urban Planning and Land Use

1.2.1 Legal and Regulatory Framework

(1) Legal and Institutional Framework

Followings are the laws, regulations and guidelines directly and/or indirectly relating to planning, development and management of urban areas in Vientiane Capital and in Lao PDR.

1) Land Law

Original Land Law had been enacted in April 1997. This law had been superseded in October 2003. Objectives of the Land Law are to determine the regime on the management, protection and use of land in Lao PDR.

Land is under the ownership of the national community and is allocated to individuals, families and economic organizations for use, lease or concession, to army units, State organizations, political organizations, the Lao Front for National Construction, and big organizations for use, and to aliens, foreign individuals and persons of organizations for lease or concession.

The State protects the legal interests of the holder of land use rights, and all individuals and organizations shall have the obligation to protect the land to ensure that it is in a good condition.

The land management organization in Lao PDR consists of:

- National Land Management Authority
- Provincial Land Management Authorities
- District Land Management Authorities, and
- Village Land Units

National Land Management Authority (NLMA) coordinates with concerned sectors and local administrations, and also assigns responsibility for the management of land use to concerned sectors such as the Ministry of Agriculture and Forestry (MAF), the Ministry of Industry and Handicrafts, the Ministry of Public Work and Transport (MPWT), the Ministry of Information and Culture (MIC), the Ministry of National Defense and the Ministry of Security.

The land management authorities have the following rights and duties:

Table 1.2.1: Main Rights and Duties of the Land Management Authorities

Main Rights and Duties
<ul style="list-style-type: none"> • To study and develop drafts of policies, laws, Presidential edicts, decrees, regulations, and rules and principles on land management • To undertake land survey, land classification and land use planning at the local, regional and national levels • To coordinate with concerned sectors and local administrations to plan the use of land, to protect [and] develop land, to classify land, to assess the quality of land, to define land areas for certain uses, and to monitor such land use • To allocate land use rights, to lease or grant concessions, and to withdraw the right to use land • To develop land registers, make land evaluations, conduct land registration, issue land titles, and collect land statistics • To collect land tax • To settle land disputes • To manage State land and protect the environment • To develop a data and information system on land

Source: Article 10 of Land Law

Land in Lao PDR is divided into the four regions and eight categories. Each categorized land is managed by a different organization.

Table 1.2.2: Regions and Categories of Land

Region	Category	Management Organization
<ul style="list-style-type: none"> • Urban regions • Rural regions • Specific economic regions, and • Special economic regions 	• Agricultural land	Ministry of Agriculture and Forest
	• Forest land	Ministry of Agriculture and Forest
	• Water area land	Ministry of Agriculture and Forest
	• Industrial land	Ministry of Industry and Handicrafts
	• Communication land	Ministry of Public Works and Transports
	• Cultural land	Ministry of Information and Culture
	• Land for national defense and security, and	Ministry of National Defense and Ministry of Security
	• Construction land	National Land Management Authority

Source: Article 11 Land Law in Lao

The State authorizes Lao citizens to lease land from the State for a maximum period not exceeding thirty years; and this period may be extended depending on each case.

The change of land use from one category to another category can be made only if it is considered to be necessary to use the land for another purpose and having no negative impact on the natural or social environment and having the prior approval of the concerned management authorities.

For land registration and certification of the land use rights to an individual or organization, the data such as names of person who has the rights of land use, the land category, land boundaries and area, method of acquisition, and land location are recorded. Such data avoids any falsification of land use rights, and facilitates the management and protection of land in a uniform manner throughout the whole country.

An individual or organization that uses the land or exercises land use rights in accordance with laws and regulations, protects and develops the land in an effective manner shall be rewarded and shall be facilitated in leasing land or receiving land concessions and other policies 51 as determined by the State. However, an individual or organization that violates the laws and regulations relating to land and causes damage to the public, the environment, property, health or life of others shall be fined or punished depending on the gravity of the case.

2) Law and Decree on Urban Planning, Development and Management

Law and Decree on urban planning, development and management for the nation are as follows.

- Ministerial Order on Urban Planning Regulations
- Law on Urban Plans
- Urban Planning Manual

a) Ministerial Order on Urban Planning Regulations

Law on Urban Plans has been approved by the National Assembly in April 1999 and had entered into force after 90 days from the date of the promulgation of decree. However, it to be noted that prior to preparation of Law on Urban Plans, more than 60 urban master plans were already been prepared based on Urban Planning Regulations.

This regulation had been used as guidance for urban planning and improvement of urban and community levels where the urban plan had or had not been prepared. In this regulation, the master plan was defined as “the policy plan in defining land use zoning in urban area including several expansion, improvement and construction projects as well as measure for control of city development, normally, to guide development and preservation of urban, communal and concerning areas in using of land for public utility and infrastructure to meet the 5-10 years national socio-economic growing level”.

This regulation was revised two times in year 1996 and year 2006. After development of the Law on Urban Plans, this regulation has been used to support and to complement the Law on Urban Plans.

This regulation states that an urban master plan consists of the report, the land use regulation and existing and proposed drawings/maps of land use, road network, storm water and solid waste disposal.

Articles on type of land use zone, process of urban planning, budgeting and implementation agencies for urban plan, road and infrastructure, and management and monitoring authorities had been included in the Urban Planning Regulations.

Land use zone are classified in an urban master plan. For the city under the control of central government and provincial authority, land use zones are classified in eight (8) zones. Whereas, for the city under the control of district authority, land use zones are classified in five (5) zones. Table 1.2.3 shows classification of land use zone.

Table 1.2.3: Classification of Land Use Zone

City under the control of central and provincial	City under the control of district
<ul style="list-style-type: none"> • Urban Central Zone (UA) • Urban Inner Zone (UB) • Urban Suburbs Zone (UC) • Future Development Zone (UD) • Industrial Zone (I) • Agricultural Zone (NA) • Historical and Cultural Preservation Zone (ZPP) • Forest and Natural Zone (NE) 	<ul style="list-style-type: none"> • Urban Central Zone (UA) • Future Development Zone (UD) • Industrial Zone (I) • Agricultural Zone (NA) • Forest and Natural Zone (NE)

Source: Ministerial Order on Urban Planning Regulations

In this regulation, process of urban planning is described as follows.

- Determine the scope of urban planning
- Collect and analyze the data in terms of technical, social and economic aspects
- Draft urban plan
- Propose the prepared plans to the public, stakeholders and technical official for comments (at least 2 times)
- Improve the draft urban plan
- Propose to urban plan management and inspection agencies for checking
- Propose to the concerned agencies for approval
- Hand over the approved urban plan

Regulation on right of way (ROW) of road, number of lane and width of pedestrian, width of lane, setback of building line, and building-to-land ratio, building height and floor area ratio by land use are also described as follows.

Table 1.2.4: ROW of Road

Road Classification	ROW of Road (m)		
	City under Central	City under Provincial	City under District
Main Road	≥40.40	≥33.40	≥26.40
Minor Road	≥30	≥23	≥13.50
Collector Road	≥20	≥11	≥11
Distribution Road	≥10	≥10	≥9.50

Source: Ministerial Order on Urban Planning Regulations

Table 1.2.5: Number of Lanes and Width of Pedestrian

Road Classification	Number of Lanes	Width of Pedestrian (m)
Main Road	≥4	≥4
Minor Road	≥2	≥3
Collector Road	≥2	≥2
Distribution Road	2	≥1.5

Source: Ministerial Order on Urban Planning Regulations

Table 1.2.6: Width of Lane

Road Classification	Width of Lane (m)	
	Standard	Minimum
Main Road	3.85	3.50
Minor Road	3.75	3.50
Collector Road	3.50	3.25
Distribution Road	3.50	3.25

Source: Ministerial Order on Urban Planning Regulations

Table 1.2.7: Building Setback

Road Classification	Minimum Distance from Edge of Road
Main Road	6 m
Minor Road	5 m
Collector Road	4 m
Distribution Road	3 m
Path	2 m

Source: Ministerial Order on Urban Planning Regulations

Table 1.2.8: Building-to-Land Ratio, Building Height and Floor Area Ratio by Land Use by City Level

Land Use	Building-to-Land Ratio			Building Height			Floor Area Ratio		
	City Level			City Level			City Level		
	Central	Provinc.	District	Central	Provinc.	District	Central	Provinc.	District
UA	75%	70%	60%	26 m	23 m	18 m	2.5	2.0	1.8
UB	60%	50%	-	20 m	15 m	-	1.5	1.2	-
UC	50%	40%	-	15 m	12 m	-	1.0	0.8	-
UD	70%	60%	50%	23 m	18 m	15 m	2.0	1.8	1.5
Conserve. Zone	Follow the regulation on conservation								
Special Economic Zone	Follow other regulation								
New Economic Zone									

Source: Ministerial Order on Urban Planning Regulations

b) Law on Urban Plans

Law on Urban Plans was approved by the National Assembly in April 1999 and had entered into force after 90 days from the date of the promulgation of decree.

Function of the Law on Urban Plans is stated in Article 1 as follows.

“The Law on Urban Plans determines principles, regulations and measures regarding the management, land use, construction and building of structures at national and local levels to ensure conformity with policies and laws, aiming at urban development to meet the direction of the national socio-economic development plan, ensuring that all social activities in the city maintain order, safety, discipline, hygiene, and civilization, as well as preserving ancient places, and the architectural work of cultural structures, meanwhile protecting the environment and natural scenery.”

Urban plans consist of graphical drawings, feasibility reports and regulations relating to the management of cities.

Under the Law, a city is defined as a place where the community lives, and having the following characteristics.

- It is the location of the capital city of the country, or of a municipal city, a provincial city, a special zone city, a district city, or an area of socio-economic concentration.
- It has a certain density of population, and
- It has a public infrastructure and supply system, such as: road networks, sewerage systems, hospitals, schools, stadiums, public parks, water supply, electricity, telephone, and others

As of October 2009, there are about 142 districts in Lao PDR. A place having above condition and characteristics is mostly a provincial and/or district center where urbanization was or is being progressed. These provincial and/or district centers are classified into three levels.

Table 1.2.9: Classification of Cities

Level	Classification	Name of Cities
1	Cities belonging to the central	Chanthabouly, Sikhodtabong, Saysettha, and Sisatanak in Vientiane Capital
2	Cities belonging to provinces, municipalities and special zones	15 provincial centers except Vientiane Capital and Attapeu Province
3	Cities belonging to districts	Other district centers except above level 1 and 2

Source: Article 3 of Law on Urban Plans in Lao, Urban Planning Manual

Urban planning in Lao PDR is concerned with plans at four levels, i.e. national, regional, provincial and district level. Table 1.2.10 shows contents of each urban plan and organization responsible for preparation.

Table 1.2.10: Contents of each Urban Plan by Level

Level	Contents of Urban Plan
National	The general medium and long-term planning provides the direction to the whole country in determining land demarcation and the future construction and expansion of cities, and in setting zones for socio-economic development, forests, conservation forests, natural resource areas, military and defense zones, road networks, and others, based on specific geographical character, population density, natural resources, economic activities, and connections with different parts of the country.
Regional	The major medium and long-term planning provides the direction to a particular region of the country in determining land demarcation and the future construction and expansion of cities, and in setting zones for socio-economic development, forests, conservation forests, natural resource areas, military and defense zones, road networks, and others, based on specific geographical character, population density, natural resources, and economic activities It has more details than urban plan of national level
Provincial	The primary medium and long-term planning provides the direction to a province of the country in determining land demarcation and the future construction and expansion of cities, and in setting zones for socio-economic development, forests, conservation forests, natural resource areas, military and defense zones, road networks, and others, based on specific geographical character, population density, natural resources, and economic activities It has more details than urban planning at the regional level
District	The determination of land demarcation for the construction and expansion of cities by the allocation of areas for residences, offices, agriculture, industry, trade and services, road networks, transport, culture, sports, public parks, military and defense zones, public utilities, and others

Source: Article 6, 7, 8, 9 and 10 of Law on Urban Plans in Lao

A national urban plan is studied and designed by MPWT and is submitted to the government, than is proposed to the National Assembly for consideration and adoption.

A regional and provincial urban plan is also studied and designed by MPWT and is submitted to the government for consideration and approval of the prime minister.

However, preparation and approval of a district urban plan is implemented by different organizations.

Table 1.2.11 shows organizations responsible for preparation and approval of an urban plan by level of district.

Table 1.2.11: Organizations of implementation and approval of an urban plan by level

Level	Implementation	Approval
1	MPWT	Prime Minister
2	Department of Public Works and Transport in a province (DPWT)	Minister of MPWT
3	Office of Public Works and Transport in a district (OPWT)	Governor of Province

Source: Article 10 of Law on Urban Plans in Lao

However, the urban plan at national, regional and provincial level has not yet been formulated. Only urban plans at a district level have been formulated by MPWT, DPWT and others. Table 1.2.12 shows No. of an urban master plan formulated at district level. Between 1997 and 2007, 115 cities formulated the urban master plan. Among these PTI formulated 81 plans. No. of an urban master plan provided or revised after year 2000 is less than 50. More than 60 urban master plans which were formulated more than 10 years back have not yet been revised. Moreover, some district centers still don't have any master plan yet.

Table 1.2.12: No. of Urban Master Plan by City Level and by Organization provided

Level	Provided by	No. of Cities	Remarks
1	PTI	4	Urban Master Plan of Vientiane Capital
2	PTI	15	
3	PTI	62	
	DPWT	27	Districts in mainly Luang Prabang, Huaphan, Savanakheth, Attapeu Province
	OPWT	3	
	Private Company	4	
	Sub-total	96	
Total		115	

Source: Urban Planning Manual

Land area in the urban plan is designated as an urban land. An urban land in the city that belongs to the either central level (level 1) or to provinces (level 2) is divided into four areas such as city center, area surrounding the city center, suburbs, and area for city expansion. The urban land that belongs to either cities, municipalities or districts (level 3) is divided into two areas such as city center, and area for city expansion.

Table 1.2.13: Area of Urban Land in the Urban Master Plan

Level	Area
1&2	City center
	Area surrounding the city center
	Suburbs
	Area for city expansion
3	City center
	Area for city expansion

Source: Article 13 of Law on Urban Plans in Lao

According to definition of urban land and its classification, an urban master plan in Lao PDR is a plan for future development of urbanized and/or urbanizing area in a district.

Classification of land use area in the Law on Urban Plans is relatively not very clear. There is no classification in the law for conservation and/or preservation of historical areas, culturally and environmentally sensitive areas, and other important and precious places/areas. Almost all buildings except factories can be constructed in any zone.

Following activities for construction or major repair that are consistent with the regulations of urban plan needs permission from the concerned urban plan administrative authorities.

- Building construction, repair and demolition
- Digging or filling of land
- Installation of electricity poles, telephone poles, water towers, fly-over bridges, and others in accordance with regulations on an urban plan

After completion of construction or repair, the concerned urban administrative authorities conduct a final inspection. If construction or repair of a building and a facility conform to the design and to regulations as stated in urban plan, the authorities issues a certificate of conformity to the owner. However, no prior inspection on a design of buildings and facilities is specified in the Law.

MPWT, DPWT, Urban Development Administration Authority (UDAA), OPWT, and Village administration are responsible for administration and inspection of an urban plan.

Administrative authorities can dispute on the issuance of permission for construction and repair, compensation, building construction or construction that does not conform to the regulations as stated in urban plan, and others. Residents can also dispute on the issues such as related to a building or facility construction or repair that does not conform to regulations of urban plan and causing damage to individuals and others.

Penal regulations against individuals and organizations violating the Law are stated in the Law.

c) Urban Planning Manual

Urban Planning Manual had been prepared by MPWT and NLMA with ODA support by Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ: German Technical Cooperation) in year 2007. This manual shows how to prepare urban plans in Lao PDR. It provides timely step-by-step guidance for the preparation of master plans and detailed plans following the Ministerial Order on Urban Planning Regulations. It is quite useful to understand urban planning process and to implement urban planning.

3) Law on Roads and Transport

Road network and parking directly affect urban planning and maintenance. There are three laws related to road and parking and one manual related to road design in Lao PDR.

- Law on Public Roads
- Land Transport Law
- Law on Land Traffic
- Road Design Manual

a) Law on Public Roads

Roads in Lao PDR are divided into six (6) classes in the Law on Public Roads.

Table 1.2.14: Road Classification in Lao PDR

Road Classification and Road Limits		
National Public Roads	<ul style="list-style-type: none"> • Roads connecting the capital to municipalities within provinces and special zone districts • Roads to international borders • Roads having socio-economic importance and importance with regard to national defense and security 	• 50 meters (25 meters on each side from the center line of the road)
Provincial Public Roads	<ul style="list-style-type: none"> • Roads between provinces or from a province to a special zone • Roads connecting municipalities within a province. Roads connecting special zone district to municipalities within districts. Roads connecting to ports, tourism places and important historic sites within the province or special zone. 	• 30 meters (15 meters on each side from the center line of the road)
District Public Roads	<ul style="list-style-type: none"> • Roads between districts • Roads connecting municipalities to villages, ports, tourism places, historic sites and special economic zones within the district. 	• 20 meters (10 meters on each side from the center line of the road)
Municipal Roads	• Municipal roads refers to a system of roads used for traffic within a municipal area	• In compliance with the urban master plan
Rural Roads	• Rural roads refers to roads connecting villages to villages and villages to various production and service centers within villages	• 10 meters (5 meters on each side from the center line of the road)
Specific Roads	• Specific roads refers to roads used specifically for the production and service of a sector, for national defense, security and for protected forest areas	• In compliance with technical standards specifically imposed

Source: Article 5, 6, 7, 8, 9, 10, 11, and 20 in the Law on Public Roads

Public roads are managed by MPWT, DPWT, OPWT and Village Administrative Authorities. Of which, OPWT and Village Administrative Authorities directly manage public roads within their jurisdiction. Their rights and duties are as follows.

Table 1.2.15: Rights and Duties of OPWT and Village Administrative Authorities

OPWT	Village Administrative Authorities
<ul style="list-style-type: none"> • To encourage and monitor the construction, maintenance and repair of public roads • To manage public roads within the district or municipality • To administer statistics and regularly report on the status of public roads to DPWT or special zone • To exercise other rights and perform other duties as assigned by DPWT or special zone office. 	<ul style="list-style-type: none"> • To manage and regularly report on the status of public roads within the village to OPWT or municipality • To encourage the population to contribute in the construction, maintenance and repair of public roads within the village • To coordinate with neighboring villages to share the responsibility of maintenance of public road • To exercise other rights and perform other duties as assigned by OPWT or municipality

Source: Article 33 and 34 in the Law on Public Roads

b) Land Transport Law & Law on Land Traffic

Article 20 of the Land Transport Law states the necessity for the development of parking places and terminals for good and passengers vehicles.

Prohibition of parking at a place with no-parking sign is stated in Article 13 of the Law on Land Traffic.

c) Road Design Manual

Road Design Manual had originally been set in 1981, and was revised 2 times in 1994 and 1996 as a basic design standard for roads in Lao PDR. This manual preparation was

sponsored by SIDA and had been formulated by Lao technicians in MPWT in cooperation with SweRoad Consultants. .

Road Design Manual consists of four (4) parts as described in Table 1.2.16.

Table 1.2.16: Contents of Road Design Manual

Part	Contents
I	Geometric design standards on roads and incidental facilities such as bridges, road signs and markings
II	Design process on a feasibility study, a preliminary study and a final design of roads (Plan and design standard on roads)
III	Materials and pavement design
IV	Hydraulic design (design of drainage facilities)

Source: Road Design Manual (Provisional Use), 1996

However, necessity of parking development for individuals and in public places and large-scale commercial facilities has not been mentioned in the laws. There are no specifications regarding plan and design of parking in the manual.

4) Law on Heritage on Culture, History and Nature

Law on National Heritage exists in Lao PDR. National Heritage in Lao PDR consists of Cultural, Historical, and Natural Heritage. Among these national heritages, especially cultural and historical heritage sites such archaeological, anthropological and historical sites and national natural conservation sites such as forests, biodiversity conservation areas, lakes and marshes of natural heritage plays an important role and affects urban plan.

National cultural and historical heritage is divided into three levels - local, national, and world level. And national natural heritage is divided into four levels - local, national, regional and world level. These national heritages are either registered at the local level or at the central level of the MIC or at the international level.

Articles on protection and conservation of national heritage exist in the Law. The law mentions about the preparation of measures for prevention and/or protection of heritages from damages. Such measures will be taken up by individuals or organizations responsible for the national heritage or by the individuals or organizations intending to pursue socio-economic development.

However, article about the government role and its active participation in preventing and/or protecting national heritage such as preparation of plans on prevention and/or protection of national heritage does not exist in the Law.

There are some national heritages such as That Luang in Vientiane Capital.

5) Law on Environment

There are two laws that may also affect urban planning.

- Environmental Protection Law
- Law on Hygiene, Disease Prevention and Health Promotion

a) *Environmental Protection Law*

Article 15 mentions about the protection of biodiversity in Environmental Protection Law. As per this, allocated and designated areas as biodiversity protection area should be protected to increase the population of the species.

Article 16 refers to protection of cultural, heritage and natural conservation sites such as archaeological, traditional, historical, tourism, and natural panorama sites or forest conservation areas, shall strictly comply with the regulations and measures issued by the relevant sectoral agencies and local administrative authorities.

Article 23 mentions about the measures for the prevention and control of pollution. It also describes the necessity of allocation of waste disposal sites.

b) *Law on Hygiene, Disease Prevention and Health Promotion*

Article 35 of Law on Hygiene, Disease Prevention and Health Promotion states the necessity of development of public parks, green spaces and resting areas in villages, districts, provinces, densely populated areas to ensure and promote healthy living.

6) Law on Tourism

Article 4 of The Law on Tourism states “the State considers tourism to be a component of the national economy and promotes production and services that enhance the export reputation, create employment, generate income and improve the livelihood of the multi-ethnic Lao people.”

In the line of the above, Article 51 mentions about the preparation of tourism development plan at five levels and each detailing out the short-term, medium-term and long-term plans for tourism promotion.

- National Strategic Tourism Development Plan;
- Regional Tourism Development Plan;
- Provincial Tourism Development Plan;
- District Tourism Development Plan; and
- Development Plans for Tourism Sites.

The primary contents of typical tourism development plans consists of purposes, objectives, development goals, assessments and analysis of potential resources, conditions of the tourism market, the outcomes, impacts on the economy, society, culture and the environment, including determination of methods, regulations and measures for implementation. (Article 53)

7) Draft of Building Control (Building Code)

The formulation of Draft of Building Control (Building Code) has been started by DHUP in MPWT in 2007 and is currently under preparation. It is expected to finish by the end of 2010. During the formulation, the Draft referred to the law on building control or code of many countries such as Thailand, Philippine, Malaysia and Japan. Japanese team from Ministry of Land, Infrastructure and Transport supported in preparation of the Draft two times in August 2009 and the beginning of 2010.

The Draft consists of ten (10) chapters and 47 articles. Table 1.2.17 shows contents of the Draft.

Table 1.2.17: Contents of the Draft of Building Control

Chapter	Main Articles
1. General Provisions	5 articles (Objectives, Scope of application, etc.)
2. Building	3 articles (Building Classification, Building types, etc.)
3. Design of Buildings	4 articles (Principals, Construction drawings, etc.)
4. Structural Calculation of Building	2 articles (Resistance to load and external force, etc)
5. Fire Protection	11 articles (Fire resistance performance, Fire evacuation way, No. of fire exits required, Structure and construction material for fire escape, etc.)
6. Lighting and Ventilation	5 articles (Natural and emergency lighting and ventilation, Room height and size)
7. Health and Aesthetics	5 articles (Supporting facilities for the disable, Hearing augmentation, Tactile indicators, etc.)
8. Building Projection Over Public Streets	4 articles (Projection of balconies and appendages over streets, Door and window, Corner of buildings, etc.)
9. Monitoring and Inspection of Buildings	5 articles (Monitoring and inspection body, Right and duties of DHUP, DPWT and OPWT, etc.)
10. Policies towards Persons Who perform Well and Measures Against Violations	2 articles (Policies towards persons who perform well, Measures against violations)
11. Final Provisions	2 articles (Implementation, Effectiveness)

Source: Draft of Building Control of Lao PDR

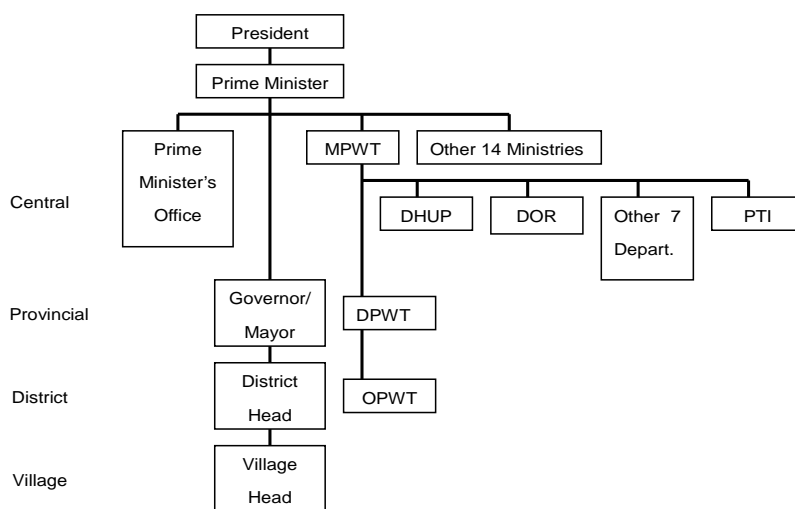
However, it is to be noted that ‘Standard for Structure Design of Buildings or Guide to Structure Design of Buildings’ that complements the building control code has not yet been formulated in Lao PDR. DHUP have an idea to develop such Standard and/or the Guide.

(2) Organizations

Figure 1.2.1 shows the structure of the Government of Lao PDR.

There are 16 ministries including Prime Minister’s Office and MPWT in the central government. Each ministry has their own agencies at local level (Provinces and Districts).

MPWT has DPWT at provinces including Vientiane Capital and OPWT at districts. MPWT and its line agencies is the main player for urban planning and urban management.

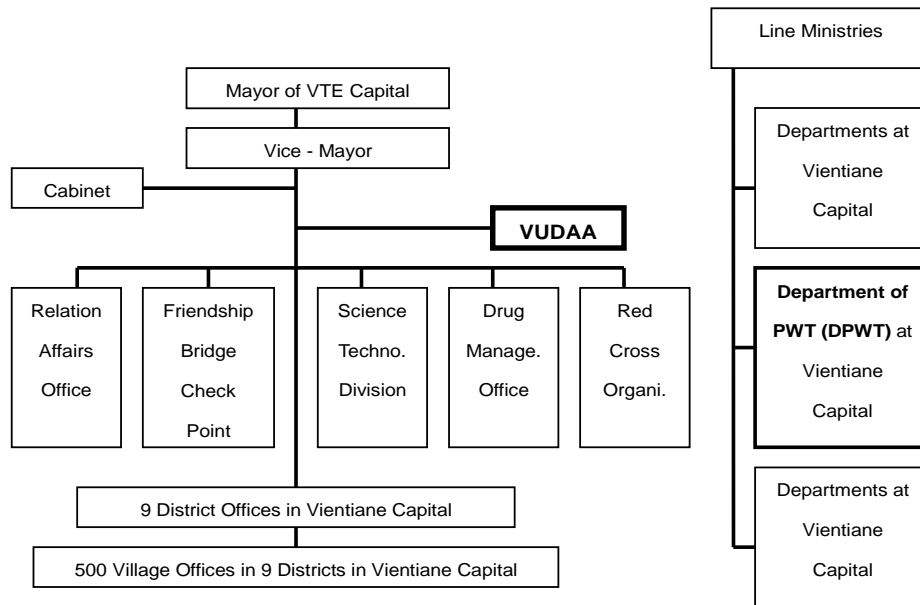


Source: JST

Figure 1.2.1: Structure of the Government of Lao PDR

Figure 1.2.2 shows the structure of the Mayor’s Office of Vientiane Capital and line agencies of ministries at Vientiane Capital.

There are 9 districts in Vientiane Capital, namely Chanthabouly, Sikhottabong, Xaysetha, Sisattanak, Naxaithong, Xaythany, Hadxaifong, Sangthong, and Mayparkngum District. Urban planning and management of 9 districts in Vientiane Capital are implemented by DPWT and OPWT. In addition, VUDAA is responsible for the managing and providing services in the urbanized area of the Capital. Districts that are officially covered by VUDAA are four (4) – Chanthabouly, Sikhottabong, Xaysetha and Sisattanak District.



Source: JST

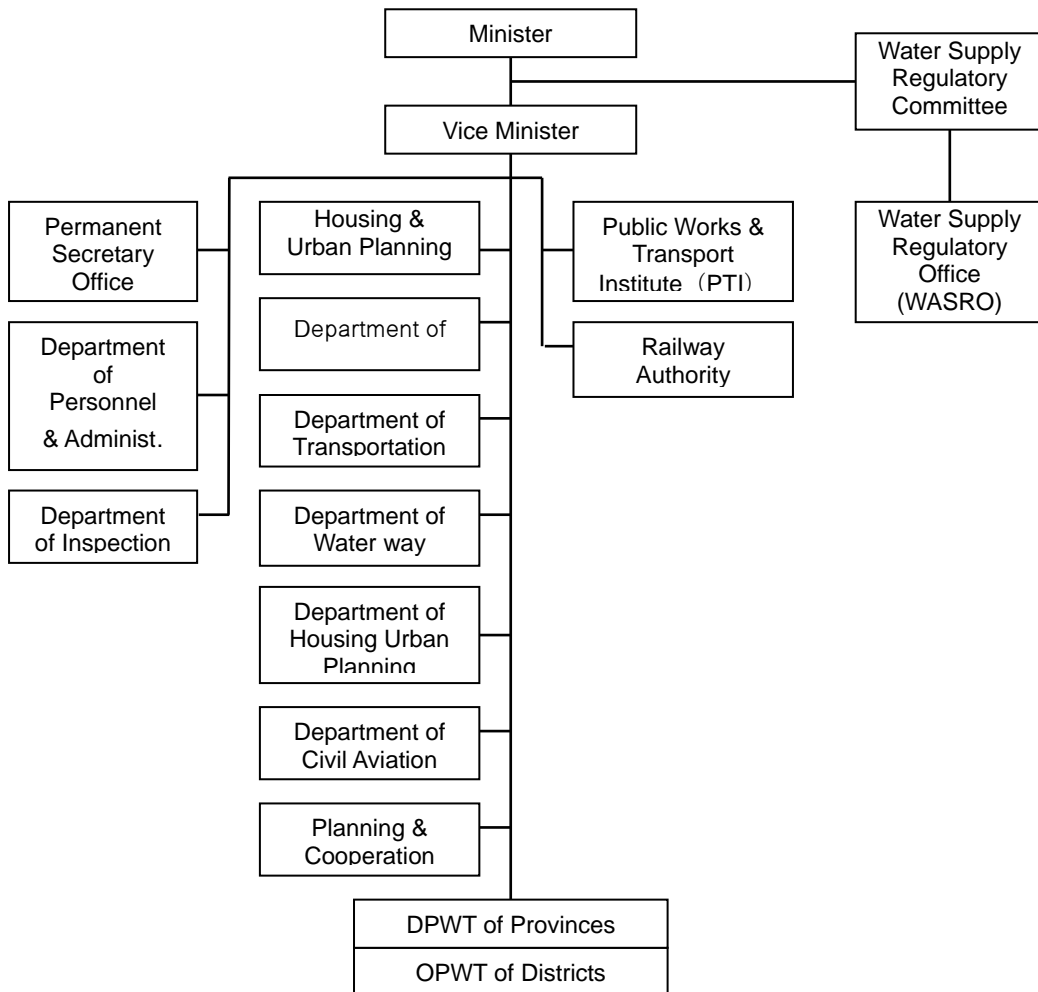
Figure 1.2.2: Structure of the Mayor’s Office of Vientiane Capital

1) Ministry of Public Works and Transport (MPWT)

MPWT has responsibility for macro-management of land, water, and air transport, housing, urban and rural housing in Lao PDR.

MPWT consists of ten (10) departments including Department of Housing and Urban Planning and Department of Roads, one authority (Railway Authority), and one Institute (PTI). There is Water Supply Regulatory Office (WASRO) under management of Minister of MPWT through Water Supply Regulatory Committee (WSRC)

Figure 1.2.3 shows the structure of MPWT.



Source: JST

Figure 1.2.3: Structure of MPWT

2) Department of Housing and Urban Planning (DHUP)

DHUP's main roles are to conduct research on decree, law and technical standard, manage budget, manage and monitor planning and construction activities, and train staff.

Main roles of divisions related to urban planning and development are shown in Table 1.2.18.

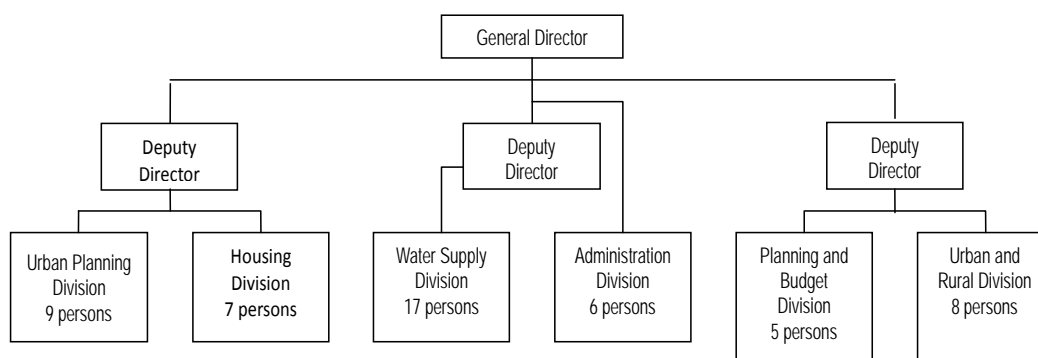
Table 1.2.18: Main Role of Divisions related to urban planning and development

Division	Main Roles
Urban Planning	<ul style="list-style-type: none"> • Research on decree and law related to urban planning, strategy, method and implementation of urban plan, etc • Research on technical standard for urban planning • Monitoring and evaluation of implementation and management of urban planning
Housing	<ul style="list-style-type: none"> • Research on decree and law related to housing, technical standard of architecture • Presentation of new technology for design and construction of housing • Monitoring of housing construction
Water Supply	<ul style="list-style-type: none"> • Research on decree and law related to water supply, technical standard for design of water supply for urban area and community • Research on planning, construction and management of water supply • Research on improvement and expansion of water supply in urban areas and communities • Support of technical staff for water supply service • Monitoring of construction budget including investment projects to water system
Urban & Rural	<ul style="list-style-type: none"> • Research on decree and law related to urban and rural development • Management of construction and improvement of basic infrastructures, green area and public park in urban area following the urban planning system • Management of construction and improvement of basic infrastructures in rural areas • Monitoring of urban development investment projects • Support to technical staff for urban environmental management (solid waste, etc)

Source: Hearing from DHUP by the JST

DHUP consists of six divisions. Of which, divisions related to urban planning and development are four, namely Urban Planning, Housing, Water Supply, and Urban and Rural Division.

DHUP has a total 56 staffs including one general director and 3 deputy directors. Number of staff related to urban planning and development are 41 i.e. 9 officials in Urban Planning, 7 officials in Housing, 17 officials in Water Supply, and 8 officials in Urban and Rural Division. Figure 1.2.4 shows the structure of DHUP.



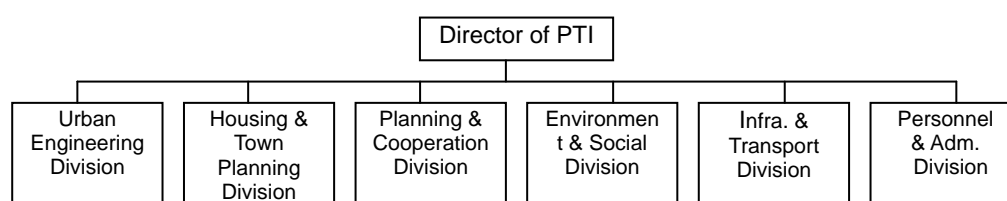
Source: JST

Figure 1.2.4: Structure of DHUP

3) Public Works and Transport Institute (PTI)

PTI is the main institute responsible for the preparation of urban plans in Lao PDR. About 115 urban master plans have been prepared between 1991 and 2007 in Lao PDR. Of which, more than 70% (81 urban master plans) had been formulated by PTI

PTI consists of six (6) divisions and has a total of 57 staffs. Figure 1.2.5 shows organizational structure and Table 1.2.19 shows major function and number of staff by Division in PTI.



Source: JST

Figure 1.2.5: Structure of PTI

Table 1.2.19: Major Functions and No. of Staffs of PTI

Division	Major Function	No of Staff	Note
Urban Engineering	Subcontract Management Administrative Support Land Survey	16	The division supports Town Planning Division for subcontracting land surveyors and temporary workers for plan preparation.
Housing & Town Planning	Master Planning Support for Districts	11	The major task of the division is to prepare master plans for districts and provinces. Since 1991, PTI has prepared more than 100 master plans. The list of the plans is included in the appendix of the Master Plan Manual. The capacity of preparation of a master plan utilizing the internal resources reported is about four plan per year.
Planning and Cooperation	Budgeting Project planning and evaluation Training Meeting and conference coordination	6 (two are on-leave for training)	The major functions of the division is to plan activities and budgeting for the institute. The other activities include proposal writing, providing training, conference coordination, and conducting research related to urban environmental management. The division newly established in April 2009 and has still seeking ways to manage its division. The areas to be capacitated are budgeting and annual activity planning, evaluation of projects conducted by other divisions. The division keeps all the records of activities conducted by other department including the Town Planning Division.
Environment & Social	Environmental monitoring of urban and rural roads Resettlement	8	The division became independent from Department of Road in MPWT to monitor environmental conditions related to road development in both urban and rural areas. Another important work is to deal with resettlement stipulated in PM192.
Infrastructure and Transport	Road Management System	7	The division recently installed the pavement management system which can monitor roads conditions for cost effective repair.
Personnel & Administration	Administration of PTI	9	The division handles all the administrative matters related to personnel and procurement.

Source: JST

4) Department of Public Works and Transport (DPWT) in Vientiane Capital

Vientiane Capital consists of nine districts – Chanthabouly, Sikhottabong, Xaysetha, Sisattanak, Naxaithong, Xaythany, Hadxaifong, Sangthong and Mayparkngum District. There are two management organizations in the Capital i.e. DPWT and VUDAA. VUDAA covers highly urbanized village areas of the districts in the Capital based on Decree on the Implementation and Activities of VUDAA. DPWT manages other area (villages in districts). Table 1.2.20 shows number of villages managed by DPWT and VUDAA.

Table 1.2.20: Number of Villages managed by DPWT & VUDAA

Year	District in Vientiane Capital									Total
	Chant.	Xayse.	Sysat.	Sikhot.	Naxay.	Pakng.	Xayth.	Sangt.	Hatsai.	
DPWT	13	36	3	38	56	53	104	37	60	400
VUDAA	24	16	37	23	0	0	0	0	0	100
Total	37	52	40	61	56	53	104	37	60	500

Source: Public Administration and Civil Service Authority (PACSA)

There are 500 villages in 9 districts in the Capital. Of which, 400 villages in 9 districts are managed by DPWT. Other 100 villages in four districts are covered by VUDAA.

DPWT in Vientiane Capital belong to MPWT. DPWT in Vientiane Capital consists of five (5) offices. Of which, three (3) offices are related to public works and transport services in the Capital, namely Housing Urban Planning, Transport, and Road and Water Way Office.

DPWT is responsible for studying, managing, planning, and organizing of public works and transport in the Capital. Table 1.2.21 and 2.3.22 show main duties of DPWT and three offices.

Table 1.2.21: Main Duties of DPWT

Main Duties of DPWT	
<ul style="list-style-type: none"> • Preparation of short, medium, and long term development plan of public works and transport in the capital in line with the agreement between the governor of the Capital and provinces • Maintenance of roads, water ways, airport, and river side protection • Management of transportation belonging to the Capital and provinces • Management of construction of housings/buildings, urban planning, water supply • Management of public places • Implementation of resolutions, decrees, decisions, declarations, technical-economic notice and regulation issued by the Government and Ministries • Management and training of staffs 	

Source: Decision on DPWT, No: 9555/PWT, 16th/07/2009

Table 1.2.22: Main Duties of Three Offices

Office	Main Duties
Housing Urban Planning	<ul style="list-style-type: none"> • Management of urban planning such as inspection of survey, design and construction of buildings, supervision of building construction, water supply, cleaning of public places • Management of environment
Transport	<ul style="list-style-type: none"> • Management of land and water transport system • Management of transportation vehicles, equipment, driving license, driving schools and technical inspection center • Management of safety system, traffic system and traffic signs, repair garages • Management of companies related to transport business
Road & Water Way	<ul style="list-style-type: none"> • Management of construction of roads, bridges and water way • Management of the companies for survey , design and construction of roads, bridges and water way

Source: Decision on DPWT, No: 9555/PWT, 16th/07/2009

There are nine (9) districts in Vientiane Capital. OPWT exists in each district to manage public works and transport under control of DPWT.

DPWT has around 100 persons including one director and three deputy directors working at a head office. There are about 50 staffs working at nine OPWTs.

Housing Urban Planning Office handles management of urban planning including confirmation of application forms for construction of building having a floor area more than 200 m² and inspection of buildings after completion.

Table 1.2.23 shows number of buildings with a floor area of more than 200m² constructed in the Capital. Around 250 to 350 buildings with a floor area of more than 200m² are constructed per year in the Capital. The districts such as Chanthabouly, Sikhottabong, Xaysetha and Sisattanak are highly urbanized and managed by VUDAA. Xaythany District has the largest number of villages among the Capital.

Table 1.2.23: Number of Buildings handled by DPWT

Year	District in Vientiane Capital									Total
	Chant.	Xayse.	Sysat.	Sikhot.	Naxay.	Pakng.	Xayth.	Sangt.	Hatsai.	
2006	66	68	29	59	13	0	87	1	26	349
2007	31	40	18	36	6	6	95	0	21	253
2008	55	57	22	63	23	13	80	0	5	318

Figure 1.2.6 shows structure of DPWT in Vientiane Capital.

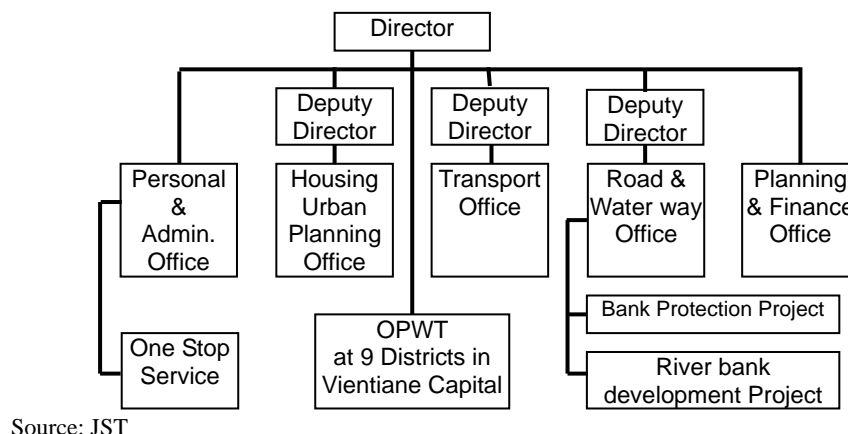


Figure 1.2.6: Structure of DPWT in Vientiane Capital

5) Office of Public Works and Transport (OPWT) in Districts

OPWT exists in all 9 districts (Chanthabouly, Sikhottabong, Xaysetha, Sisattanak, Naxaithong, Xaythany, Hadxaifong, Sangthong and Mayparkngum) in the Capital and is responsible for management of public works and transport in the district under control of DPWT in the Capital.

The 9 districts in the Capital are divided into two groups. First group consist 5 districts i.e. Naxaithong, Xaythany, Hadxaifong, Sangthong, and Mayparkngum District and the public works and transport in these district are managed by OPWT. Second group consist of 4 districts i.e. Chanthabouly, Sikhottabong, Xaysetha and Sisattanak and are managed by OPWT and VUDAA.

OPWT has four units i.e. Personnel and Administration, Bridge and Road, Transport and Urban Management, and Housing Urban Planning Unit. OPWT is entirely responsible and management of these units in 5 districts. Table 1.2.24 shows main duties of each unit except administration unit.

Table 1.2.24: Main Duties of Units in OPWT

Unit	Main Duties
Bride & Road	<ul style="list-style-type: none"> • Collection of data on road (pavement condition, length, drainage, facilities) • Monitoring the construction and repair of road • Consultation on construction and repair of road
Housing Urban Planning	<ul style="list-style-type: none"> • Monitoring and data collection related to housing permission, information signboard, and production of construction material by companies • Consulting and Inspection of application form of building construction (floor area less than 200m²), information signboard, production of construction material by companies, land preparation
Transport & Urban Management	<ul style="list-style-type: none"> • Collection of number of vehicles • Management of river ports and repair shops • Consultation on management of vehicles and transport

Source: Hearing to OPWTs

In the 4 districts which are managed by OPWT and VUDAA, OPWT has a district office of VUDAA in OPWT's organization. A VUDAA in a district has almost same duties to perform as of each unit of OPWT.

OPWT handles application and permission of buildings with a floor area of less than 200m². In case if the building with a floor area of more than 200m², than OPWT receives an application form of a building and sends it to DPWT with OPWT's comment. DPWT gives permission for a building having floor area of more than 200m². At districts level, it is managed by OPWT and VUDAA. OPWT handles buildings with floor area of less than 200m² and VUDAA handles buildings with a floor area of more than 200m². VUDAA district office receives an application form of a building and sends it to a head office with VUDAA's comments.

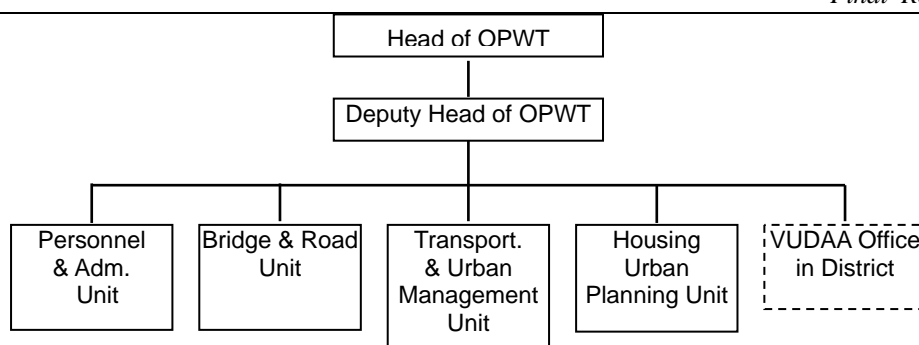
Table 1.2.25 shows number of staffs in OPWT and VUDAA and number of buildings handled by OPWT in each district in the Capital. OPWT has 6 to 12 staffs in 4 to 5 units. One unit has only 2 to 3 staffs. A staff in Housing Urban Planning Unit at Chanthabouly, Xaysetha, Sisattanak, and Sikhottabong, District handles around 30 to 40 building application forms per year.

Table 1.2.25: Number of Staffs in OPWT & VUDAA, Building handled by OPWT

Year	District in Vientiane Capital									Total
	Chant.	Xayse.	Sysat.	Sikhot.	Naxay.	Pakng.	Xayth.	Sangt.	Hatsai.	
OPWT Staff	6	12	11	6	7	6	8	6	7	69
VUDAA Staff	2	1	2	2						7
Buil. Permit	60	120	100	50	30	5	40	30	50	485

Source: Hearing to OPWTs

Figure 1.2.7 shows structure of OPWT in districts in the Capital.



Source: Hearing at OPWTs

Figure 1.2.7: Structure of OPWT in District

VUDAA has a unit of solid waste and urban beautification in the organization and collects solid waste from households who have a contract with VUDAA and hauls it to a dumping site. Such unit exists only in VUDAA. DPWT and OPWT do not have such unit in their organization. Therefore, a head of a village in districts directly contract the work of solid waste collection to a private company. Each household pays a collection fee of LAK 24,000 for 4 baskets per month.

6) Vientiane Urban Development Administration Authority (VUDAA)

VUDAA has been established for management (planning and implementation) of highly urbanized area in the districts in Vientiane Capital by Decree on the Implementation and Activities of VUDAA of Vientiane Capital promulgated in February 1997.

VUDAA covers four districts, namely Sikhottabong, Chanthabouly, Xaysetha and Sisattanak District, where the infrastructure facilities are highly developed.

Followings are main duties and rights of VUDAA.

Table 1.2.26: Main Duties and Rights of VUDAA

Duties	<ul style="list-style-type: none"> • Planning, implementation, management and monitoring of development in districts • Construction, improvement and repair of infrastructures and the service in the urban that will include: <ul style="list-style-type: none"> - Road, Drainage - Keep and eliminate the garbage - Protect the landslide of bank and protect the flooding - Clean and Keep the environment - Lighting for public - Park • Management and control of the implementation of construction work and other developments within the scope of AUDAA • Supply information and necessary technical document that are relevant to urban development and are within the scope of VUDAA. This will facilitate the Vientiane public administration in organizing and mobilizing repair work in line with the urban development plan of Vientiane • To have the duty to create income that is defined in Article 7 and using the fund with the target that is defined in article 3 of this decree
Rights	<ul style="list-style-type: none"> • Holding an account, collect income as defined in Article 7 of the agreement and using the fund received from domestic and foreign with an approval from the government • Cooperation and collaboration with all concerned sectors for implementation of their duties to be achieved

Source: Decree on the Implementation and Activities of Urban Development Administration Authority of Vientiane Capital

VUDAA has following income sources.

Table 1.2.27: Income Sources of VUDAA

Income Sources	
<ul style="list-style-type: none"> · Collection of the fee for infrastructure services in districts, income from real estate and property as define in the scope · Some part from tax and other fee as per the agreement with Ministry of Finance · Loan, grant assistant, and service from domestic and foreign, and · Budget of government 	

Source: Decree on the Implementation and Activities of Urban Development Administration Authority of Vientiane Capital

VUDAA consists of five sections i.e. Personnel and Administration, Social and Urban Management, Planning and Finance, Bridge and Road, Housing and Urban Planning Section, and two units i.e. Solid Waste and Urban Beautification, and Project Implementation Unit.

VUDAA head office has more than 70 staffs. The section or unit having the largest number of staffs is Solid Waste and Urban Beautification Unit having 27 officials. This unit consists of three groups i.e. Solid Waste and Urban Collection and Haulage, Urban Beautification and Cleaning, and Solid Waste Disposal Site with 10 staffs, 12 staffs and 5 staffs respectively. Solid Waste and Urban Beautification Unit is responsible for solid waste management in management area of VUDAA. To overcome the constraint of human resources and other resources such as vehicle and equipment, VUDAA shares the work by having contracts with 6 private companies for garbage collection and its haulage.

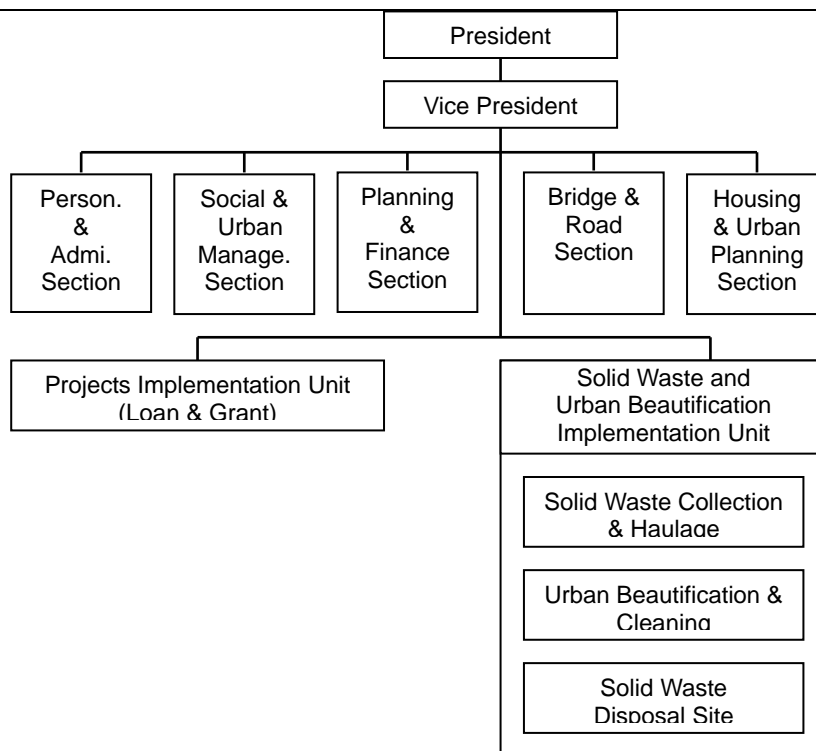
Bridge and Road Section and Housing Urban Planning Section have 18 and 10 staffs respectively.

Table 1.2.28 shows number of buildings handled by VUDAA. VUDAA had awarded about 360 to 370 building permissions per year between 2004 and 2006. However, number of permission granted was around 250 in 2007 and 2008.

Table 1.2.28: Number of Building handled by VUDAA

Year	2004	2005	2006	2007	2008
No. of Buildings permitted	359	375	373	248	277

Source: VUDAA



Source: VUDAA

Figure 1.2.8: Structure of VUDAA

(3) Preparation for Establishment of Vientiane Municipality

1) Definition of Municipality

Municipality is defined in the Law on Local Administration as follows.

“A municipality is a local administrative territory which is in an urban area. It is the place where the offices of the provincial or city administration are located, or some other urban area that meets the criteria provided in this Law, such as high population density and socio-economic, political, cultural and public service development. A municipality comprises several villages.”

A municipal administration is a local administration at the same level as of a district administration and is under the supervision of the Chief of Municipality.

The role and functions of a municipal administration are to manage political, economic, and socio-cultural affairs and human resources; to protect, preserve and utilize natural resources, the environment and other resources; to plan and implement urban development and public services; to ensure the peace, security and cleanliness of the municipality; and to engage in foreign affairs activities as assigned by the province or city.

2) Criteria for Creation of Municipality

Criteria for creation of a municipality are mentioned in the Law on Local Administration as follows.

The place where the provincial or city administration offices are located shall be considered as a municipality. The urban centers of other districts can be established as a municipality if they meet the following criteria:

- Population of at least 10,000 people, (however, when deemed necessary, the government can decide to make an exception to this criterion)
- A developed economic, social, and cultural area and a developed infrastructure system; and]
- An ability to generate revenue to respond to necessary expenditures.

3) Purpose of Establishment of Municipality

Establishment of Municipality is necessary for improvement of administrative services in an urban area which could not be fulfilled or provided by the current authority. This will also facilitate in promotion of economic development.

4) Progress of Establishment of Municipality

Progress of establishment of municipality is as follows:

Table 1.2.29: Progress of Establishment of Municipality

Year	Progress
2003	• Amendment of Constitution and promulgation of the Law on Local Administration on 2003
Dec. 2005	• Appointment of Committee for Establishment of Municipality by Prime Minister
Apr. 2006	• Submission of Proposal for the Preparation of Establishment of Municipality in Vientiane Capital by Public Administration and Civil Service Authority (PACSA)
March 2007	• Preparation of the Plan on Establishment of Municipality in Vientiane Capital by PACSA
June 2007	• First Workshop for understanding among the people concerned
March 2008	• Preparation of the Progress Report on Establishment of Municipality in Vientiane Capital by PACSA

Source: PACSA

5) Present Situation

First workshop for mutual understanding among the people concerned had been held on June 2007. However, because of different understanding between PACSA and a former mayor of the Vientiane Capital on the definition of Municipality in the Law on Local Administration, a former mayor of the Vientiane Capital was against the plan. Since then the talk about the establishment of municipality has not progressed.

Main difference between PACSA and a former mayor is as follows:

(PACSA)

Consolidate 4 districts which are targeted for Municipality and establish one Municipality.

(Former Mayer)

Establish 4 Municipalities in 4 districts which are targeted for Municipality

1.2.2 Urban Planning and Urban Landscape

(1) History of Urban Planning

1) Brief History of Vientiane Capital

Despite there were some legendary stories about the establishment of Vientiane, many historians agree that the history of Vientiane that leads up to today traces back to the Lane Xang Kingdom. In 1354, Fa Ngum founded the kingdom of Lane Xang, and Vientiane became its important administrative center, though it was not made the capital until King Setthathirath officially established Vientiane as the capital of Lane Xang in 1560. The year 2010 is celebrated for 450 years commemoration from this establishment.

Kingdom of Lane Xang fell in 1707, and Vientiane became an independent kingdom, but in 1779, it was conquered by the Siamese and made a vassal of Siam. When King Anouvong made a rebellion in vein, it was obliterated and burned by Siamese armies in 1827.

When the French arrived, they only found a depopulated region and the great city of Vientiane was disappearing into the forest. It eventually passed to French rule in 1893. It became the capital of the French protectorate of Laos in 1899. The French reconstructed the city and rebuilt or repaired important Buddhist temples such as Pha That Luang, Haw Phra Keo, and built a number of colonial buildings for administrative use.

Laos entered into the Vietnam War, and experienced a something of a boom until about 1975, when the war ended. The nation was faced with a financial crunch, and the royal family was overthrown. The government that followed was highly influenced by the former Soviet Union until it collapsed in 1991. The Lao government then decided to open the nation which led to quick expansion of the economy. Vientiane served as the capital city of the quickly expanding Laotian economy.

2) Historical Context for Urban Planning

Urban planning is said to have introduced to Laos by the French colonial authorities in the late 19th century. The following is a brief overview of the historical perspectives of urban planning as applied to Vientiane Capital¹.

a) Vientiane Expansion Plan 1920

In this period, the city of Vientiane was a small township with the population of about 7,000 in 1912 – 1917. This expansion plan which is claimed to be the first urban plan for Vientiane was formulated in 1920 and established six zones within the central part of Vientiane. The plan covers the area along the Mekong in the city center, which is today's historical quarter, and belts along the Mekong within the city's old wall.

¹ Reference was made to 1) CHayaphet Sayarath, "Vientiane, portrait d'une ville en mutation", Ambassade de France, 2005, and 2) Paul Rabé, Thenekham Thongbonh and Vongdeuane Vongsiharath, "Study on Urban Land Management and Planning in Lao PDR Land Policy Study No. 5 under LLTP II", GTZ, 2007.



Figure 1.2.9: Urban Planning for Vientiane in 1920

b) Vientiane Urban Plan 1934

Later during the French Protectorate era, there was an urban plan for Vientiane, formulated in 1931 or in 1934. The plan documented water courses and the main roads, and partial footprints of buildings. It looks that new expansion of the Vientiane city was intended towards the west across the small river called Nam Pasak, which runs winding through the western end of the old city quarter.



Figure 1.2.10: Urban Planning for Vientiane in 1934

c) *Vientiane Urban Plan 1952*

In 1945, Vientiane was a city with the population of 23,000, and was growing fast. In 1952 a new urban plan was formulated for Vientiane by the French High Commission in Indochina at a scale of 1:5,000, and this could be considered as the second Master Plan of Vientiane. The plan incorporated the 1st and 2nd Zones in the old city quarter and 3rd and 4th along the Mekong River to the west and to the south for apparent expansion of the city, and seemingly established 5th Zone beyond the city wall for future expansion. The plan also distinguished different types of building categories, including the federal building, national buildings, community and religious buildings, etc.



Source: Vientiane, portrait d'une ville en mutation

Figure 1.2.11: Urban Planning for Vientiane in 1952

d) *Previous Urban Plan: Vientiane Urban Plan 1994 - 2002*

In the period between 1986 - 1991, a new urban plan was formulated for Vientiane with a technical and financial assistance from the United Nations Center for Housing and Human Settlements (UNCHS; now know as UN-Habitat) which was entitled as 'Master Plan project for Vientiane' (*Schéma Directeur et d'Aménagement Urbain de Vientiane*). This plan covered the period from 1994 to 2002. This plan contained analytical report on three sets of trends in Vientiane Capital; 1) demographic trends (including population forecasts and their implications for land consumption in the Capital Area), 2) socio-economic trends (covering employment, income, housing and migration); and 3) physical growth trends in the city (covering the evolution of spatial development patterns, the land market, roads and bulk infrastructure and public facilities).

The new plan took into consideration the suburban expansion of Vientiane which was taking place mainly due to the rapid expansion of the urban population and increasing economic activities in the capital city. The plan set three phases of urban expansion; urbanization in 100 villages up to the year 1994, 160 villages up to 1995 and 189 villages up to 1999. Also a few sub-centers were indicated in the plan in the proximity of the urban center.

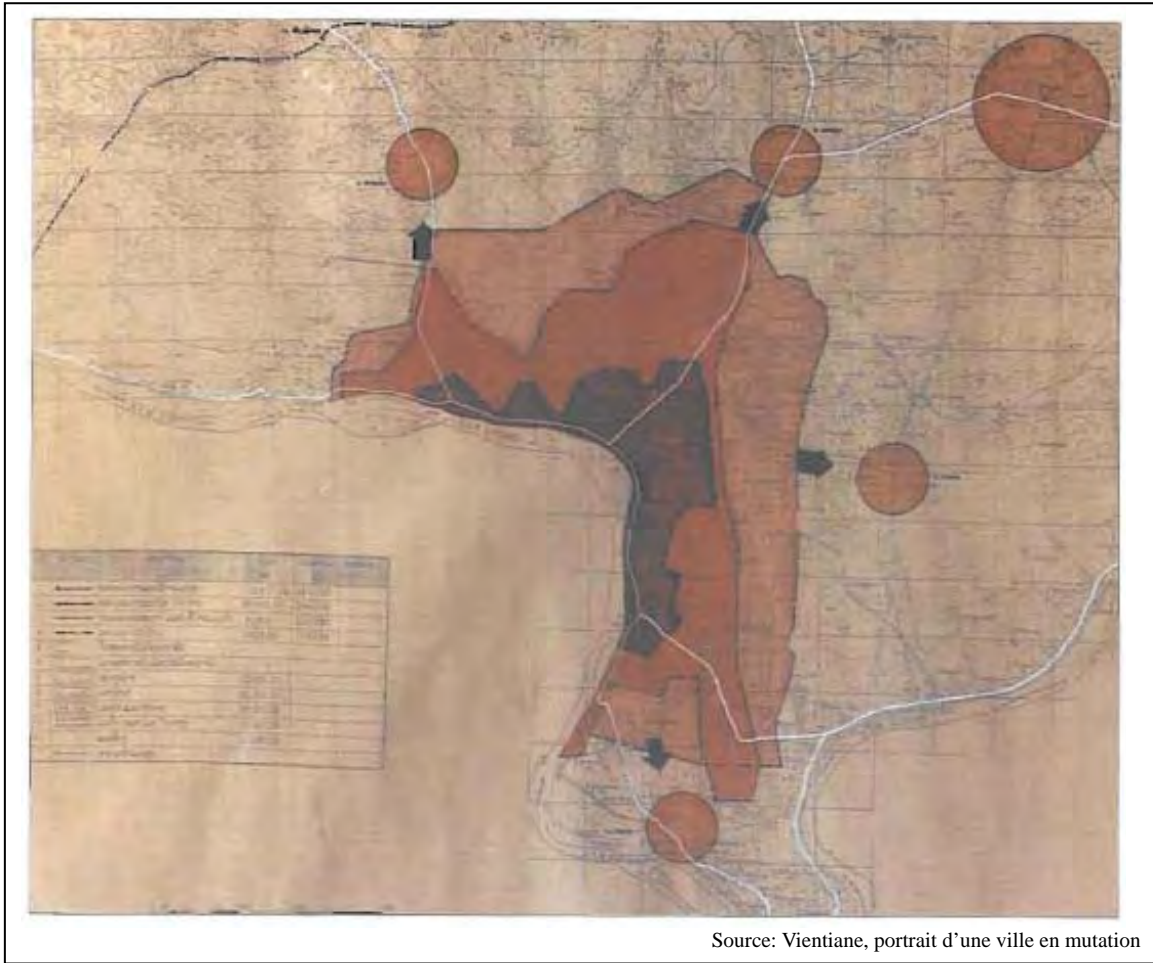


Figure 1.2.12: Urban Planning for Vientiane 1994 – 2002

(2) Present Urban Planning

Vientiane Capital has a large area of about 3,920 km² with the total population of 691,000 in 2005. In the Vientiane 2010 plan, the functional distributions were proposed within Vientiane Capital. The plan commanded two layers of planning; one for Vientiane Capital and the other for the central part of Vientiane.

1) Planning Context

a) Planning Context for Vientiane Capital

Figure 1.2.13 shows the location and function of urban centers in Vientiane Capital. This figure illustrates a clear need of dis-concentrating the urban functions from the Vientiane city center towards the District centers, and need for industrial development in the suburbs of Vientiane city.

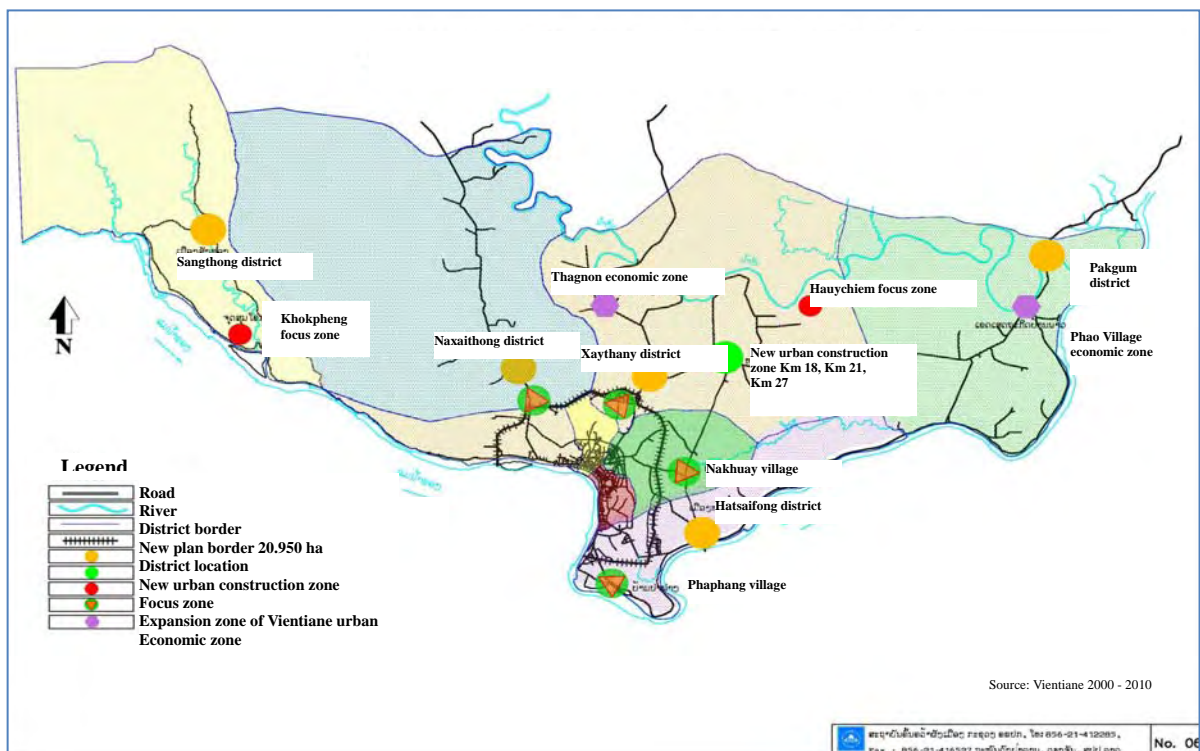
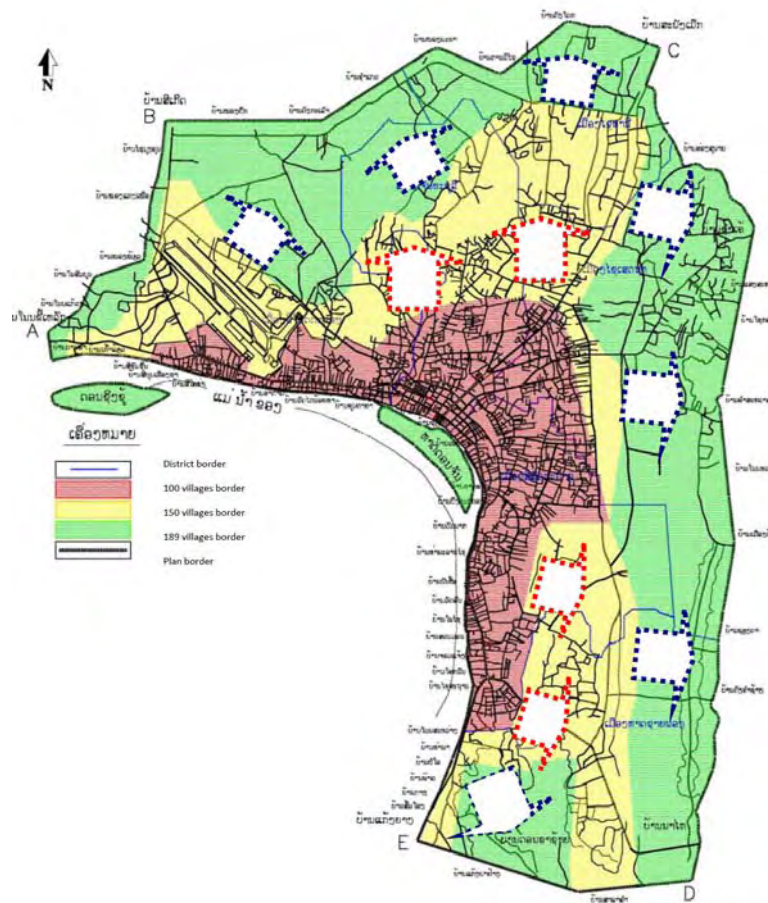


Figure 1.2.13: Location and Function of Urban Centers in Vientiane Capital

b) Planning Context for Vientiane City

In the Vientiane 2010 plan, three boundaries are proposed. First boundary is for the existing urban area (100 villages); second one for new urban area (150 village); and third one for future urban areas (189 villages). The total urban area of three categories is 20,950 ha (or 209 km²). Since the future urban population of Vientiane is projected to be 1,515,000 by the year 2030, the total urban area of 209 km² would be able to accommodate the urban population at the density of 7,250 persons / km².

Figure 1.2.14 shows the planned areas for the existing, new and future urban areas, with arrows indicating the direction of urbanization.



Source: Vientiane 2000 – 2010 modified.

Figure 1.2.14: Existing, New and Future Urban Areas for Vientiane, 2010

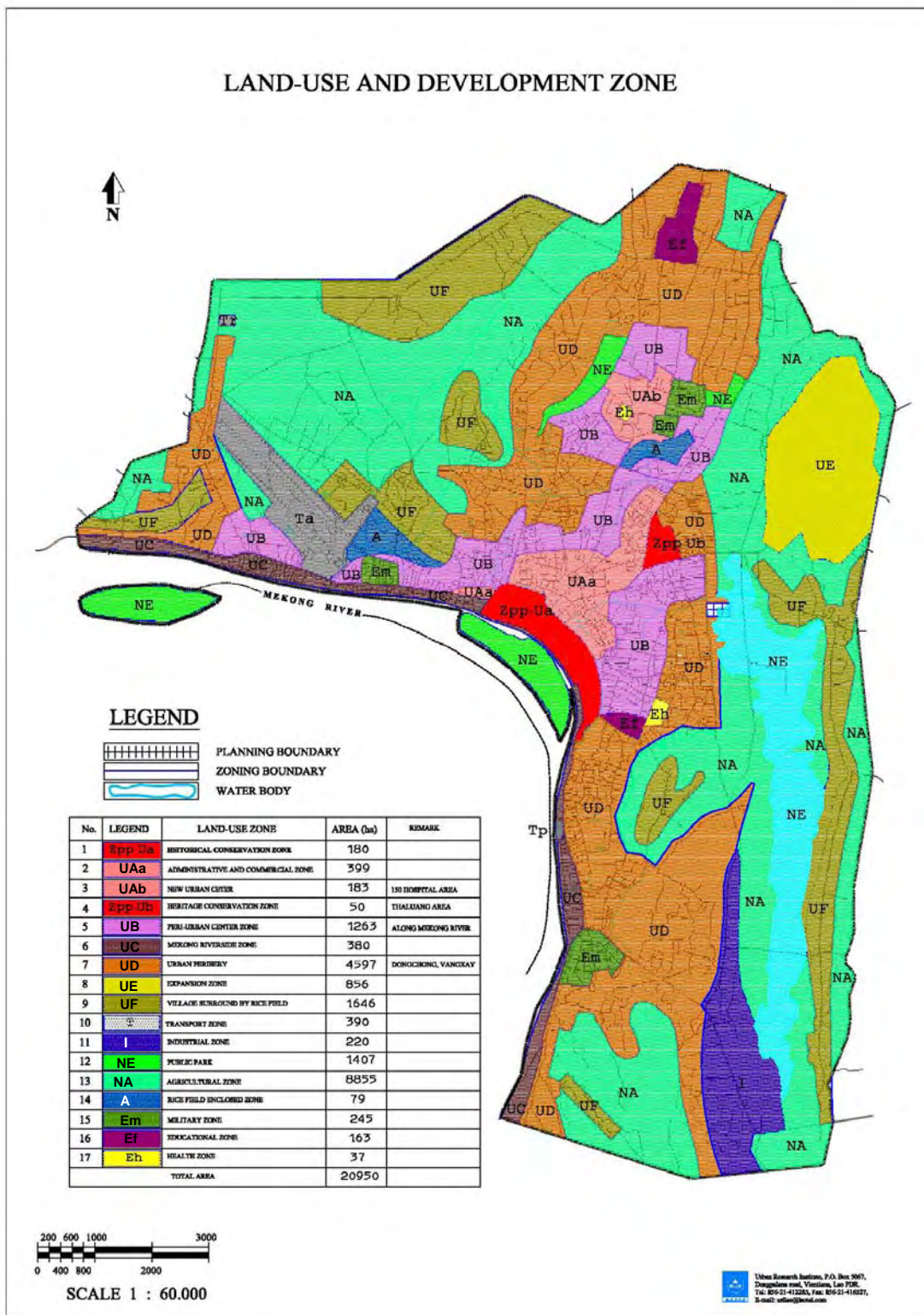
2) Present Land Use Categories and Regulations

The on-going urban master plan for Vientiane Capital is “Urban Development Master Plan 2000 – 2010”. As this plan is already in enforcement, the present study on urban master plan formulation will basically try to follow the basic scheme of 2000-2010 plan as much as possible. This will avoid or will minimize the necessity for coordination for newly introduced ideas/concepts.

a) Present Land Use Scheme

PTI prepared a land use regulation zoning map for the target year of 2010. In total, 17 zoning categories were established and applied to the urban planning area in 2010. The present zoning scheme for Vientiane Capital is shown in Figure 1.2.15. The basic scheme for the zoning seems to be straight forward and rational.

The categories for urban controlled land are classified into the following 14 land use zones/categories as shown in Table 1.2.30.



Source: Urban Development Master Plan Vientiane Capital 2000 – 2010

Figure 1.2.15: Present Land Use Zoning Scheme

Table 1.2.30: Present Land Use Categories for Urban Area

1	ZPP-Ua	(Old Urban Heritage Conservation Zone) This zone includes ancient temples, old buildings and offices that has an importance as architectural heritage such as traditional house, mixed house, colonial house, row-house and communal house. The condition of infrastructure is adequate. To this zone a strict regulation must be applied, aiming to conserve old town including: cultural historical heritage, urban architecture and natural view. This zone must be complemented with guideline of heritage conservation plan.
2	ZPP-Ub	(Historical Heritage Conservation Zone) This zone covers That Luang great stupa and its compound, National Assembly, Memorial for Military who died in war, and children garden. It also includes ancient temples, old building such as traditional house, modern house, and row-house. The condition of infrastructure is adequate. To this zone a strict regulation must be applied. This zone must be complemented with specific heritage conservation regulation.
3	UAa	(Administrative and Commercial Center Zone) This zone covers government office, commercial and service center, and high density residential area. The infrastructure condition is good.
4	UAb	(New Center Zone) This zone is an expansion area with trends of increasing density. Infrastructure is under improvement to meet the future need of development. This zone is growing in economic and commercial activities. Ground level is rather high leading to less chance of flooding.
5	UB	(Peri-Urban Center Zone) This zone is located around the Urban Center and is classified into two sub-zones, UBa for areas under airplane flying route and UBb for other areas. UBa must follow specific regulation of the concerned organization. UBb is of medium density with moderate quality infrastructure. Some area is low land and affected by flooding, thus population density in this area is between 50 and 80 persons/ha.
6	UC	(Mekong River Bank Zone) This zone is located along the Mekong River Bank, including levee and road network. For the development in this zone, inappropriate construction work must be controlled.
7	UD	(Peri-Urban Zone) This zone is divided into three sub-zones, UDa for areas under airplane flying route, UDb for agriculture activities, and UDe for urban growth. UDa is located in the west of the City, relating to the agriculture and is in the airplane flying route, therefore it needs to have a detail plan and follow to the specific regulation of air transport. UDb extends mainly to the north of the City and some parts to the south and to the west. It is a zone related to the agriculture and it can increase to the medium density. UDe is located in the south of the City, near to the Industrial Zone (I). In this zone big activities can be developed such as the new urban center, hospital, school, market and utility, trade and services.
8	UE	(Urban Expansion Zone) This zone is located at the north-east of the City, for new expansion of urbanized areas, population growth and socio-economic activities. In this zone, some construction is already proceeding. It is needed to provide the road network to connect villages near by and increase to the appropriate density. It covers some villages within Saysettha District (Zones 304 and 305).
9	UF	(Rice Field Village Zone) This is the group of isolate villages surrounded by rice field. This zone should be preserved as the existing situation (low density, low facility and utility).
10	I	(Industrial Zone) This zone refers to the existing industrial area along both sides of Thaduea Road. The zone is aimed to receive the industry of category 3, but it has to follow to the specific regulation and infrastructure systems. All new industries must be located in the industrial zone located at a distance of 18 Km to 21 Km from the National Route 13. It is a national industrial zone with an area of 3,000 hectares. It is necessary to invest for basic infrastructure such as road, electricity, water supply and telecommunication and thereafter to invite new industrial activities in the future.
11	T	(Transportation Zone) This zone is preserved for transportation activities, including air transport (Tr), train transport (Tf), water transport (Tp) and land transport (Tr). At present, only Tr is designated for the international airport located within Sikhothabong District.
12	E	(Services Zone) This zone is preserved for services, including military (Em), vocational (Ef), public health (Eh), sport (Es), graduate education (Ee) and commercial (Ec). At present, Em, Ef and Eh are designated.
13	NA	(Agricultural Rice Field Zone) Within this a special zone, a zone named 'Zone A' is included. Zone A is the rice field surrounded A2 – 3 by constructed areas or villages. In Zone A, there is some construction, but it is prohibited to extend the construction or implement new construction. The rice field is maintained as green space. Zone NA must be free from new construction. In the irrigated rice field there is illegal land fill and building construction. Extension of construction in these areas is also prohibited.
14	NE	(Conservation Zone) This zone has harmonized landscape in the City. There are some special areas such as; memorial museum, islands, ponds and natural marsh. All construction is prohibited unless it relates to recreation or relaxation activities. However, detail plan is yet to be prepared.

Source: JICA, The Study Master Plan on Comprehensive Urban Transport in Vientiane Capital in Lao PDR, Final Report, 2008.

b) Guideline for Regulation

Attached to the above-mentioned urban plan of Vientiane Capital, there is document entitled “Guideline for Implementation on the Regulation of the Management of Vientiane Urban Area”, which forms part of the urban plan by a ministerial decision.

The main part of the Guideline stipulates the following items.

Table 1.2.31: The Main Part of the Guideline

Item	Contents
1	General
2	Prohibited and Permitted Activities: Prohibited activities are those that may create a problem or tends to become a future problem in both direct and indirect way.
3	Special Cases that can be permitted.
4	Road Access: Plot used for construction must have an access to the main road to ensure that vehicles (garbage collection truck, fire fighting truck etc.) can get into the plot.
5	Infrastructure Network; Plot used for construction must have an access to public infrastructure such as water supply, drainage system, telecommunication and solid waste collection.
6	Physical Characteristic and Size of Plot; Frontage width (F) and length (L) of the plot must be lager than 4 m x 18 m for terrace buildings and 10 m x 14 m for detached buildings.
7	Location of Building Line from Front Boundary; This stipulates the distance of set-back from the building line.
8	Location of Building in Relation to the Side Boundaries.
9	Location of Building on a Plot; This specifies the space between buildings within a plot.
10	Coverage Ration: Coverage ration is used to control building density.
11	Height of Building: Height of building depends on zoning regulation and character of zone.
12	Plot Ratio: Prote ration relates to the size of plot and total rare of building.
13	Façade/Frontage of building.
14	Fence and Wall.
15	Parking.

Source: JST

Among others, the actual regulation of the land use is primarily conducted with a system that focuses more on a few of the selected land use parameters, namely, the Coverage Ratio (E), Height of Building (H) and Plot Ratio (COS). Table 1.2.32 summarizes the present regulation system for the three parameters for different land use zones.

Table 1.2.32: Summary of Present Coverage Ration, Height of Building and Plot Ratio for Vientiane Capital

No.	Zones	Description of Zone	Coverage ratio (E) %	Height of Building (H) m	Plot Ratio (COS)
A		Urban Central Zone			
1	ZPP-Ua	- Historical town conservation zone	75%	12	2.5
2	ZPP-Ub	- Ancient site conservation zone	50%	7	0.7
3	UAa	- Administration and trade central zone	75%	26	2.5
4	UAb	- New central zone	75%	26	2.5
B		Urban Inner Zone			
5	UBa	- Urban inner zone within aircraft flying zone	60%	Referring to relevant org.	1.5
	UBb	- Urban inner zone	60%	20	1.5
6	UCa	- Mekong River bank zone with aircraft flying zone	50%	10	1.0
	UCb	- Mekong River bank zone	50%	10	1.0
C		Urban Surrounding Zone			
	UDa	- Urban Surrounding Zone with aircraft flying zone	40%	7	0.7
	UDb	- Urban Surrounding Zone relevant to agricultural activities	50%	15	1.0
7	UDc	- Urban Surrounding Zone and suburb	50%	15	1.0
9	UF	- Village surrounded by rice field	40%	10	1.0
D		Urban Expansion Zone			
8	UE	- Urban expansion zone	50%	23	1.0
E		Subdivide zones or specific land use zone			
10	I	- Industrial zone	30%	15	2.0
11	T	- Transport zone	-	-	-
	Ef	- Education zone	-	-	-
12	Em	- Military zone	-	-	-
	Eh	- Public health zone	-	-	-
	NA	- Agricultural zone	-	-	-
13	A	- Rice field has been surrounded by build up area	-	-	-
14	NE	- Public preservation zone	-	-	-

Source: JST

3) Review of Present Land Use Categories and Regulations

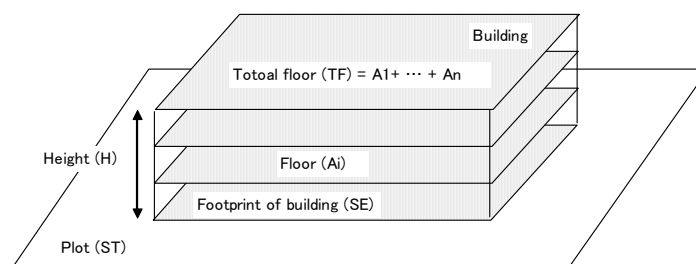
a) Evaluation of Regulation Parameters

Among the three land use regulating parameters, there are some known relationship that come from the physical interpretation of the building, floor and land plot. By definition,

$$CR = SE / ST$$

SE = Footprint of the building,
ST = plot area, CR = ?

When the maximum height is set at H, the maximum number of stories could be determined by assuming the



average floor height, say 3.5 meters.

$$N = H / H_f$$

N = maximum number of stories; H = maximum height of building; H_f; average height of floor (assumed to be 3.5 m)

When a building is built in a uniform style, such as illustrated, the total floor area of the building could be calculated as the footprint of the building (SE) times the number of stories.

$$PR = FT / ST$$

PR = plot ratio; FT = total floor area of a building; SE = plot area

Thus the maximum Plot Ratio could be approximated by

$$PR_{max} = N * SE / ST = N * CR$$

Therefore, by comparing the values of PR and PR_{max}, a gap in the three parameters could be found. For the present scheme, the following discrepancies were found.

Table 1.2.33: Comparison of Present and Maxim Plot Ratio

Zone	Present PR	PR _{max}	Possible Maximum PR	Possible change of parameters
ZPP-Ua	2.5	2.0	2.0	Decrease PR
UAa	2.5	5.0	5.0	Increase PR
UAb	2.5	5.0	5.0	Increase PR
UBb	1.5	3.0	3.0	Increase PR
UDb	1.0	2.0	2.0	Increase PR
UDc	1.0	2.0	2.0	Increase PR
UE	1.0	3.0	3.0	Increase PR
I	2.0	1.2	1.2	Decrease PR

Source: JST

(3) Urban Landscape

Most of national capitals in Southeast Asian countries in the tropical rainforest/monsoon zones have lost their original rich green feature of urban landscape through rapid urbanization and motorization, high density urban development and so on. On the other hand, urban landscape in Vientiane Capital is still characterized by their traditional green feature with surrounding wetland and fertile agricultural land. Distinctive urban landscape elements are composed of rich green trees around low-rise public and private building and light-brown color high roofs of temples in urbanized area. Agricultural scenery of rice fields with palm trees, farm with dispersed villages and wet-land are dominant in suburbs.

However, newly constructed major roads are inducing and enhancing ribbon or corridor type commercial and urban development, which has started to dominate the prevailing agricultural scenery. On the remaining agricultural land along the new road, families may lose a positive and active mind on their agricultural activities. This may be caused by land purchase for development in the suburbs especially in the east of Vientiane Capital, outside the present Urban Development Master Plan Area. At the moment, high-rise buildings sometimes with miller walls are starting to come up in urbanized area and agricultural land. Wet lands are changing and with the rapid development of urban area especially in the suburbs and economic development are generating a transitional period of landscape and scenery in Vientiane Capital.

At the present, urban landscape conservation and improvement are taken by measures of National Historical and Cultural Heritage Preservation Law and its related action, Land Use Zoning System on the Urban Development Master Plan Vientiane, and Building Permit System as follows,

- **Existing land use zoning** of the Master Plan 2000 – 2010 clearly define and designate the important areas, where there are historical heritages (ZPP Ua/Ub) in urban area, and traditional cultural scenery and life styles in agricultural and natural areas (NE/NA/A) to be conserved /or improved in Vientiane.
- **Building Permit system** is enforced to control building height (H), building coverage area ratio (E), building total floor area/area ratio (COS) and building set-back by VUDAA, DPWT, OPWT and other related agencies.
- **Law on National Heritage** defines four levels of heritages, namely at the world, regional, nation and local levels. Two world heritages and fourteen nation level heritages structures have been investigated, registered and protected by UNESCO and the Ministry of Information and Culture (MOIC). At present, national heritage at local level are not yet registered in Vientiane by the Department of Information and Culture (DOIC).
- On the other hand, **urban heritages** in the designated Historical Conservation Zone (ZPP-Ua) have been investigated, defined 233 Lao traditional and French colonial and other arch type buildings with important trees. And its database has been compiled by the joint survey team of PTI, related government agency in Lao DPR and French expert team (financed by AFD). Newly identified urban heritages are planning to be registered at local levels as National Heritages by DOIC under the direction of MOIC.

Based on the existing plans and activities to conserve /or improve characterized urban landscape in Vientiane Capital, history and traditional culture with life style can clearly be identified. This will set an unique identity of Lao society with conserved national historical and traditional culture..

Under the condition, traditional Garden City, which is composed of low rise, low density urban land use with rich green set-back area; conserved historical setting, and a calm and rich traditional rural environment with water surface and wetland, will be the concept for future urban landscape for the newly formulating Master Plan.

How to absorb high pressures of rapid urbanization, high social in-migration demand, and high motorization trends will be some of the important issues to realize Garden City Concept.

1) Land Use Plan of Urban Development Master Plan Vientiane 2000 – 2010

Improvement and conservation zones for urban and rural scenery had been defined and designated on the land use plan of Vientiane Urban Development Master Plan 2000 – 2010.

The land use plan was formulated based on the compiled data and information of historical heritages, high productive farmland and water source, and so forces as mentioned in Figure 1.2.15. And it clearly define and set Historical Conservation Zone, Heritage Conservation Zone, Public Park (greenification) Zone, and Agricultural Zone as follows,

- **Historical Conservation Zone (Zpp Ua) 180 ha:** Original part of Old Vientiane within the Inner City Wall is designated as the historical conservation zone. At present, the following 5 among the 7 registered national heritages in Vientiane Capital are located in the zone.
 1. Inpaeng Temple, 2. Onteu Temple, 3. Sisaket Temple, 4. Ho Pakeo Temple, 5. Si Muang Temple

- **Heritage Conservation Zone (Zpp Ub) 50 ha:** That Luang National Icon and Heritage, which is a registered national level of heritage, and its surroundings is also designated to the heritage conservation zone. To ensure the vision and vista of Stupa from the surrounding areas, building height in this area is specifically regulated to be lower than 7m.
- **Public Park Zone (NE: Greenification Area) 1,407 ha (6.7%):** most of the identified water surface, wetland and island in the Mekong River were designated as a future public parks to establish Garden City in Vientiane Capital. The major islands in the Mekong River are designated as public park zone for conservation of natural green areas and leisure activity. However Done Chan Island has been changed and developed as a tourism area with a high-rise hotel.
- **Agricultural Zone (NA) 8,855 ha (42.3%):** most of highly productive rice field and farmland are designated as Agricultural Zone, which are also expected to be a part of open space and green space of Vientiane Capital. However at the present, farmers and their families in the designated area may lose an appetite for active farming and may be keen to sell their farmland to a developer for residential or other development. This will be one of the constraints to realize Garden City Concept in Vientiane Capital.

2) Law on National Heritage

The promulgation on “Law on National Heritage” was designed to clarify the principles, regulations and measures for the administration, use, protection, conservation, restoration, and rehabilitation of the national heritage and was enacted by the National Assembly on December 9th 2005. The promulgated law covers cultural, historical and natural heritages, existing tangible objects and intangible items, movable or immovable properties, and living or non-living organs as follows,

- Cultural Heritage in Tangible Objects by world, national and local levels
- Cultural Heritage in Intangible Item by world, national and local levels
- Historical Heritage in Tangible Objects by world, national and local levels
- Historical Heritage in intangible items by world, national and local levels
- Natural heritage having scenic value by world, regional, national and local levels
- Natural heritage having scientific and ecological value by world, regional, national and local levels
- National icons (That Luang Vientiane and Haw Pha Keo in Vientiane)]

Roles and functions to register, manage, monitor, and control the above are defined as follows,

- World/Regional/National levels of heritages: Ministry of Information and Culture
- Local level of heritage: Department of Information and Culture and Office of Information and Culture (DOIC Vientiane has to take main roles with assistance of district OIC)
- The identified tasks to protect national and local level of heritage itself have to be taken by the demarcated government agencies as mentioned above. However, the following zoning system for the protected area of heritage sites is proposed to be taken by the unified single agency with monthly coordination meeting with the execution

agency of zoning/building permit system and other related government agencies. Considering the organization structure, experiences and knowledge of Department of Heritage Luang Prabang, it could be utilized to set-up effective single agency and coordination system.

Zoning system for protected area of heritage sites is defined as follows,

Zone-1: Core or Sanctuary Zone to protect heritage itself

Zone-2: Buffer Zone to conserve and increase value of zone-1 and permit some activities

Zone-3: Facility Development Zone to serve zone-1/2

Five temples, one national icon, and ancient outer city wall of national monument have been investigated, registered and preserved as national level of cultural and historical heritages in Vientiane Capital by MOIC.

- Five Temples: Inpaeng, Onteu, Sisaket, How Pakeo, Si Muang
- 1 National Icon: That Luang
- 1 Ancient Outer City Wall: two part of Outer City Wall areas of Northern end near NR-13 and Southern end near the junction of inner ring road and Thadeua Road

The registered five temples are located in the designated Historical Conservation Zone (ZPP-Ua) in the present land use plan. And the national icon: That Luang is located in the designated Heritage Conservation Zone (ZPP-Ub) of the present land use plan. The other ruins of Ancient Outer City Wall are located along Inner Ring Road.

Restoration of old approach road to the monument and landscape rehabilitation of the area surroundings That Luang National icon was studied by PTI and implemented by DPWT Vientiane Capital. The formulated project plan not only includes the landscape of the area surrounded by foundation of Stupa but also includes the redevelopment and relocation of housing by DPWT which is planned to be handover to MOIC.

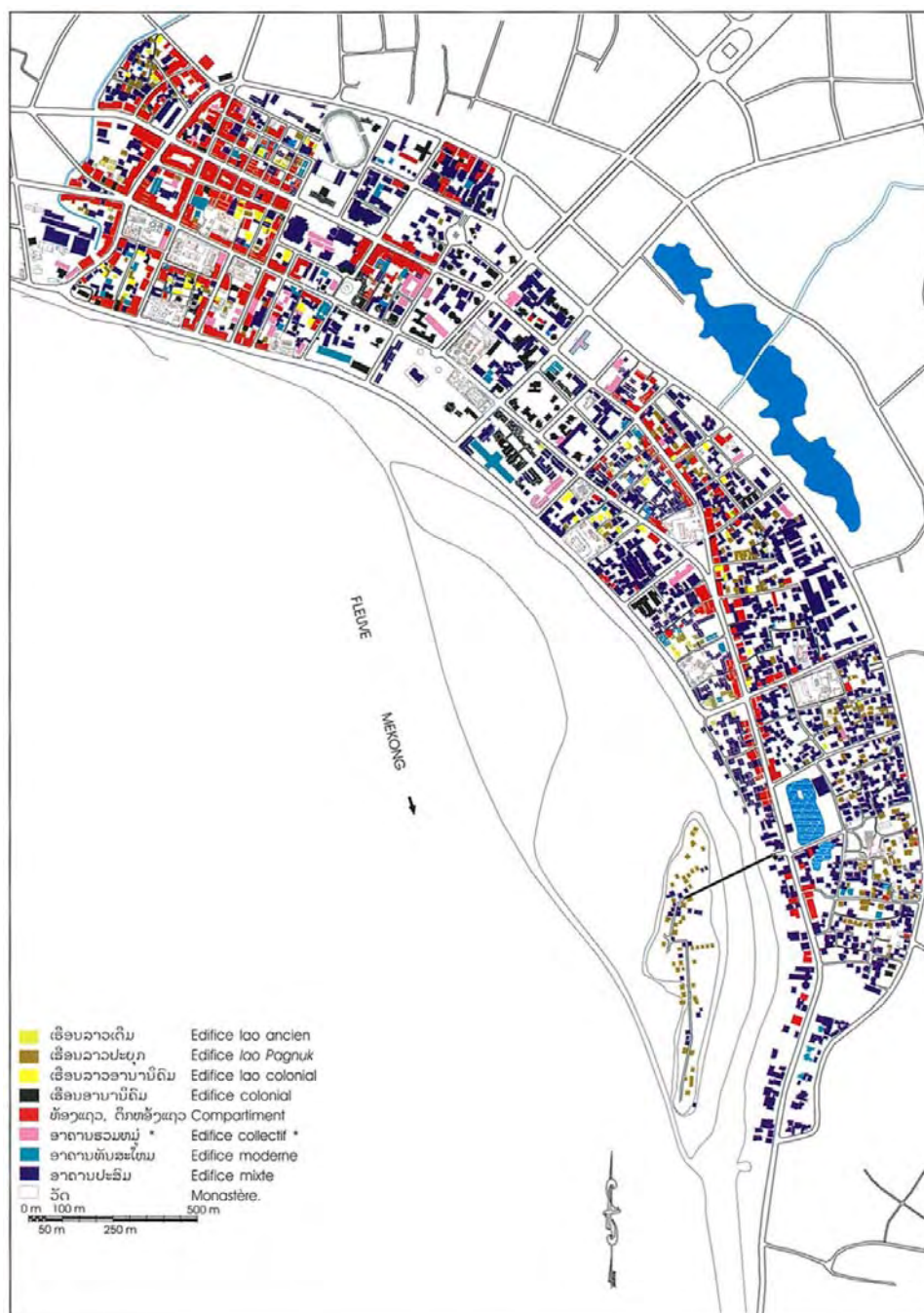


Source: Ministry of Information and Culture 2010

Figure 1.2.16: Location Map of Registered National Level of National Heritage in Vientiane Capital

3) Identified Urban Heritages

In all 233 architectures are defined as urban heritages in the designated Historical Conservation Zone as the result of the study of Historical and Traditional Urban Climate, which was conducted by the joint team of PTI and related agencies of Lao PDR and French experts team in 2008. Through the study, important trees are also identified as an element of historical and traditional urban landscape in the designated Historical Conservation Zone and need to be protected. And also, natural wetlands and marsh are identified and proposed to be protected area within the Urban Area of Vientiane Capital. The defined urban heritages are categorized by types as follows,



Source: Vientiane, portrait d'une ville en mutation

Figure 1.2.17: Location Map of Identified Urban Heritages in Historical Conservation Zone

4) Building Permit System

Building Permit System, which is composed of controls of building height, building coverage of land area ratio, ratio between building total floor area and land area, and building set-back from frontage road, is recognized as a strong tool or measure for improvement and conservation of urban scenery in Vientiane Capital. At present, the system is managed mainly by three government authorities as follows,

- VUDAA: - bigger than 200 sqm floor area development in 100 Village Zone
- DPWT: - less than 200 sqm floor area development in 100 Village Zone and
- bigger than 200 sqm floor area development outside 100 Village Zone
- OPWT: - less than 200 sqm floor area development outside 100 Village Zone

The 100 village zone (red color) and outside 100 village zone (yellow and light green color) are shown in the Figure 1.2.18.

Development control in the non urban oriented land use zone such as transportation (T), industrial zone (I), public park (NE), agriculture zone (NA), rice field enclosed zone (A), educational zone (Ef), health zone (Eh) are enforced by each related ministries.

At present, the management system for land development and building construction has been demarcated to many ministries and responsible local government agencies. Such multi-control system is causing difficulties in consistent enforcement of unified regulation.

Table 1.2.34: The applied regulations for Land Use Zone in Vientiane Capital

category of land use zone	Building Height (H)	Building Coverage Ratio (E)	Floor/Area Ratio(COS)	(estimated no of floor and height = $COS/E*3.5m$)
ZPP-Ua: Historical Conservation Zone	12	75%	200%	2.7 floor/9.3m
ZPP-Ub: Heritage Conservation Zone	7	50%	70%	1.4 floor/4.9m
UA: Urban Center Zone	26	75%	250%	3.3 floor/11.7 m
UB: Urban Inner Zone	20	60%	150%	2.5 floor/8.8 m
UC: Suburb Zone	15	50%	120%	2.4 floor/8.4 m
UD: Future Development Zone	23	70%	200%	2.9 floor/10 m

Source: Building permit in Lao DPR

Building set-back regulation is set to apply for road hierarchy. However, unified urban road hierarchy map is not yet clear.

Table 1.2.35: Building set-back Regulation

road hierarchy	Building Set-back
urban arterial	6m
sub-arterial	5m
collector road	4m
Distributor	3m
access road	2m

Source: Building permit in Lao DPR

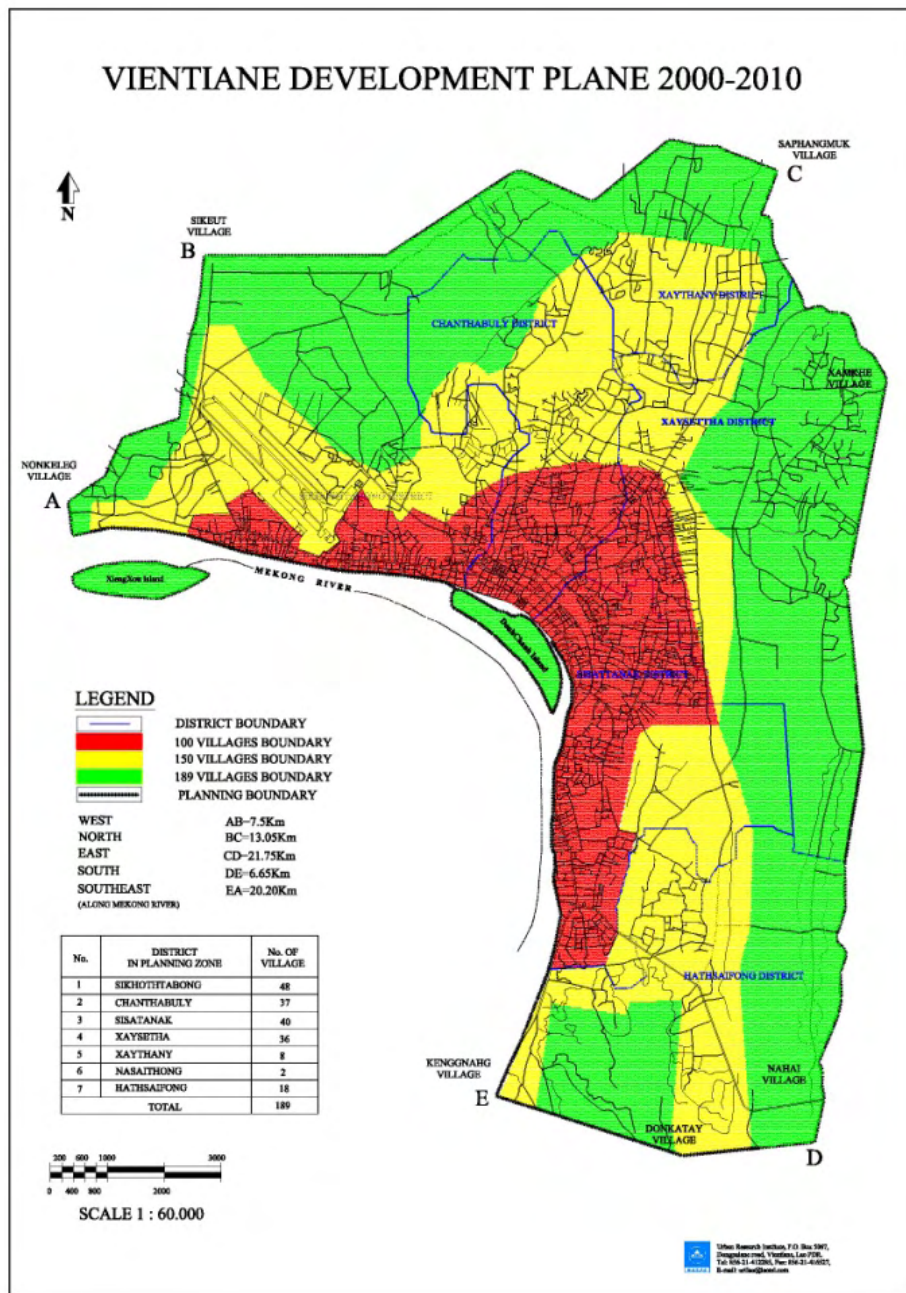


Figure 1.2.18: Area Demarcation of Building Permit by VUDAA, DPWT and OPWT

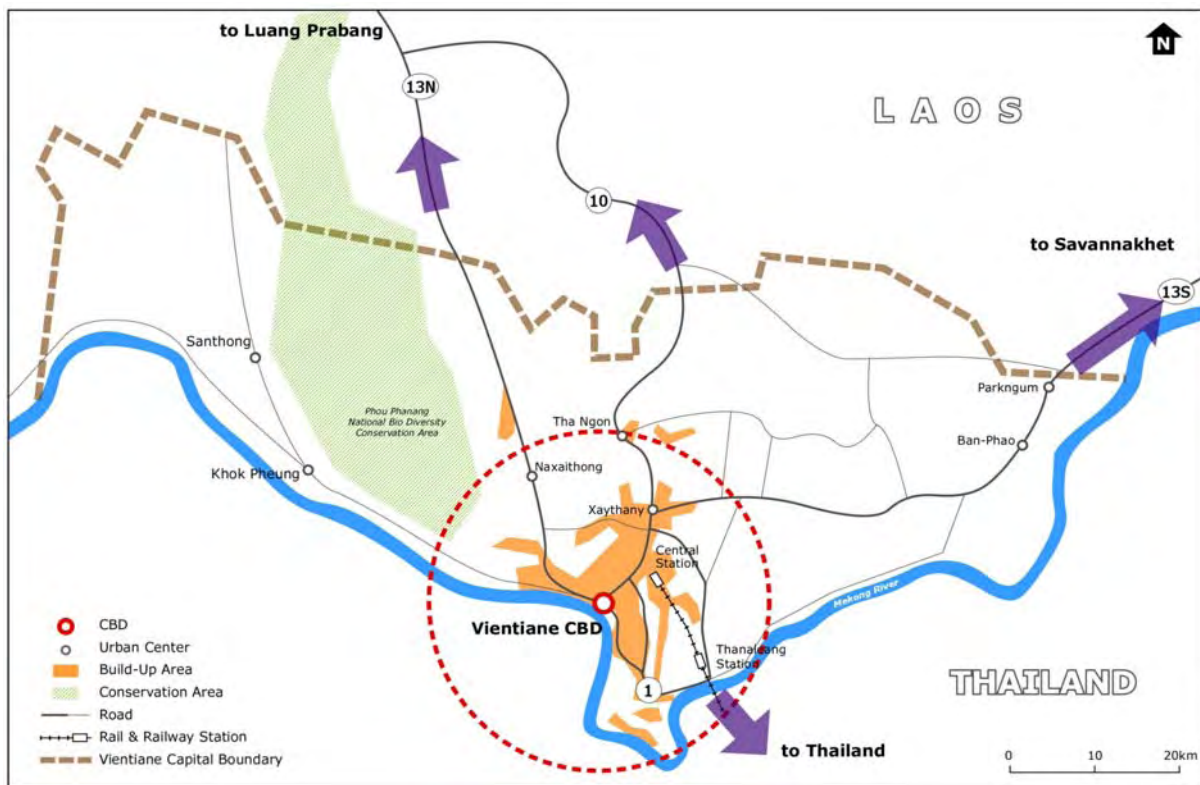
1.2.3 Present Land Use

(1) Overview

1) Urban Structure

Vientiane is historically developed along the Mekong River with a large and fertile plain as its hinterland. The origin of township of Vientiane is on a river bank of the Mekong in front of Don Chan Island, which still performs as the downtown and city center of Vientiane with the concentration of business and commercial activities. Urban central functions including administration, banking, business and commerce are located in the areas along Settha Thirath Road and Lane Xang Avenue. Urbanization occurred in the old town (the downtown) and expanded to the areas along the main roads. Currently, approximately the area in the radius of 5 Km from Patu Xay has been urbanized. The area along the major roads has expanded especially along the Kampengmouang and Kaison Phmvihan Roads. The suburban areas expanded and urbanized covering an area upto 10 km of radius in three directions i.e. northeast and west and south along National Road such as No.13N, and NR.13S.

Overall spatial structure of Vientiane Capital is shown in Figure 1.2.19.



Source: JST

Figure 1.2.19: Current Spatial Structure of Vientiane Capital

Peri-urban areas are still kept in traditional rural landscape except for the areas along major national roads where ribbon type development occurred. Small local settlements are scattered all over the rural areas, in the forest and along the rivers. Some isolated urban agglomerations are also emerged as a local commercial center along the major roads and

rivers such as Tha Ngon and Ban Pao. However, such development are still in very limited in terms of size, population and economic activities.

2) Transport Network

Urban road network in Vientiane Capital is developed to form a ring and radius systems. The radius system is formed with National Road No.13N, NR.13S, NR.10 and Vientiane Road No.1, while the ring system is formed with inner ring road (Kampengmouang Road and Kaison Phomvihhan Road) and outer ring road (450 Years Road and Naxaithong-Dongdock Road). The inner ring road is in approximately 5 km radius area, while the outer ring road is in approximately 15 km radius area.

(2) Land Use

Land use pattern in 1995 and 2005 is developed based on the analysis of Land-sat imagery with land use category of 1) built-up area, paddy area, 2) upland crop area, 3) forest area, 4) vacant land area and 5) water body area, which are shown in Figure 1.2.20 and Figure 1.2.21.

Looking at land use composition of Vientiane Capital in 1995, a dominant land use type is forest area, which occupied about 70% of total area, followed by 17% of paddy area. Built-up area or urbanized area is only approximately 3 % of the total land as shown in Table 1.2.36.

Rapid economic development and population growth may have largely affected the land use pattern in Vientiane Capital. The built-up area doubled from approximately 3% of total area in 1995 to 6% in 2005. In other word, the built-up area increased by 87 km² between 1995 and 2005. Instead, forest area and vacant area decreased by 65 km² and 108 km², respectively.

The net population density was estimated as 33.9 person/ha in 2005, calculated with the built-up area from Land-sat analysis and census population in 2005.

Table 1.2.36: Land Use Changes

	1995		2005		Difference (2005-1995)
	Area (Km2)	(%)	Area (km2)	(%)	
Built-up Area	132.84	3.4%	220.66	5.6%	87.82
Paddy Area	655.11	16.7%	659.93	16.8%	4.81
Upland Crop Area	52.86	1.3%	65.17	1.7%	12.31
Forest Area	2,710.88	69.2%	2,645.56	67.5%	-65.32
Vacant Land Area	221.08	5.6%	113.01	2.9%	-108.06
Water Body Area	147.23	3.8%	215.67	5.5%	68.44
Total	3,920.00		3,920.00		0.00

Source: GIS Analysis of JST

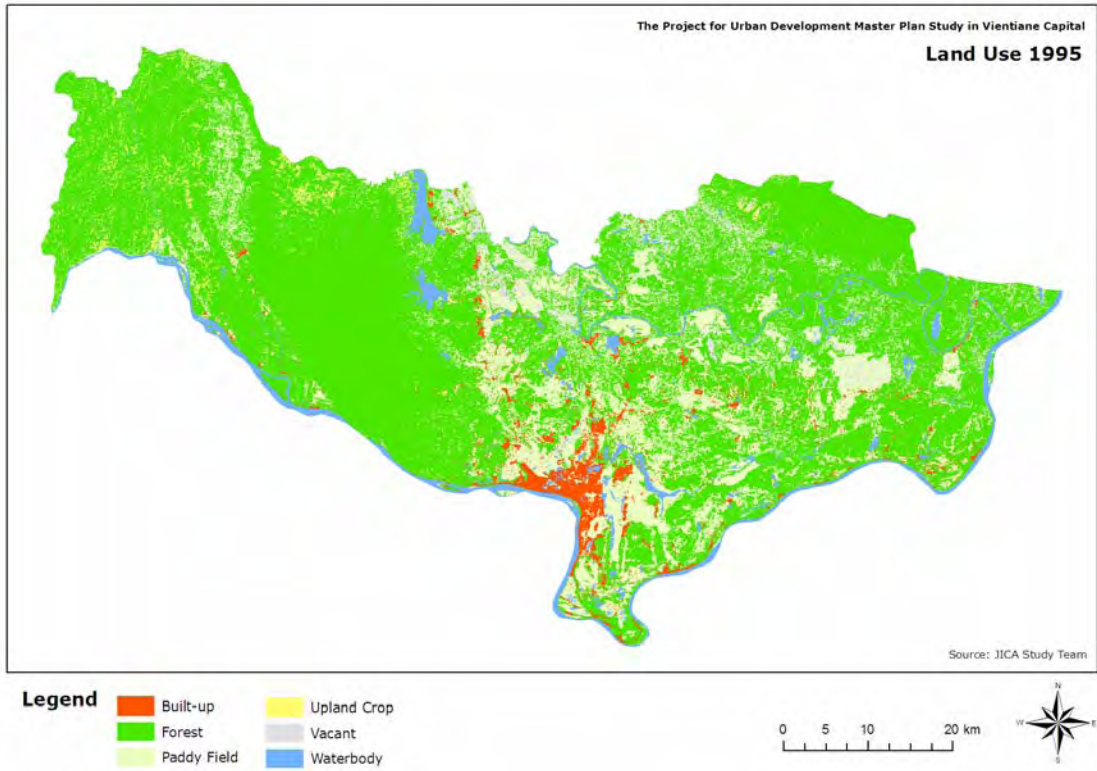


Figure 1.2.20: Land use 1995

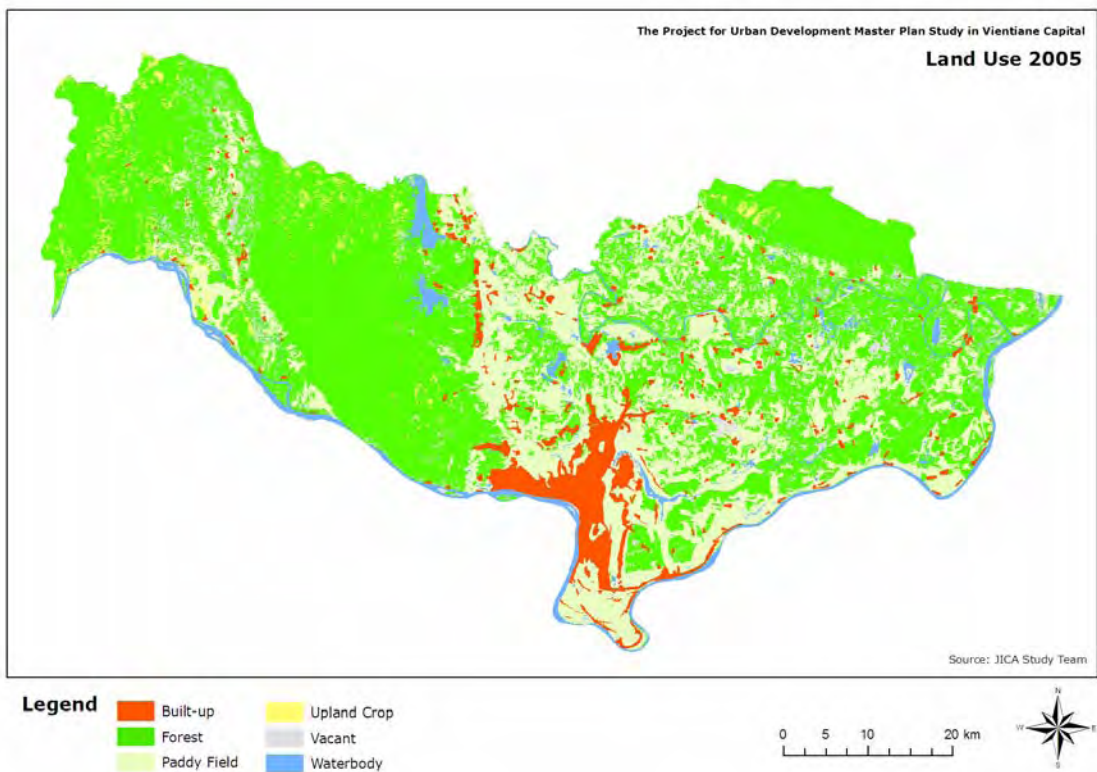
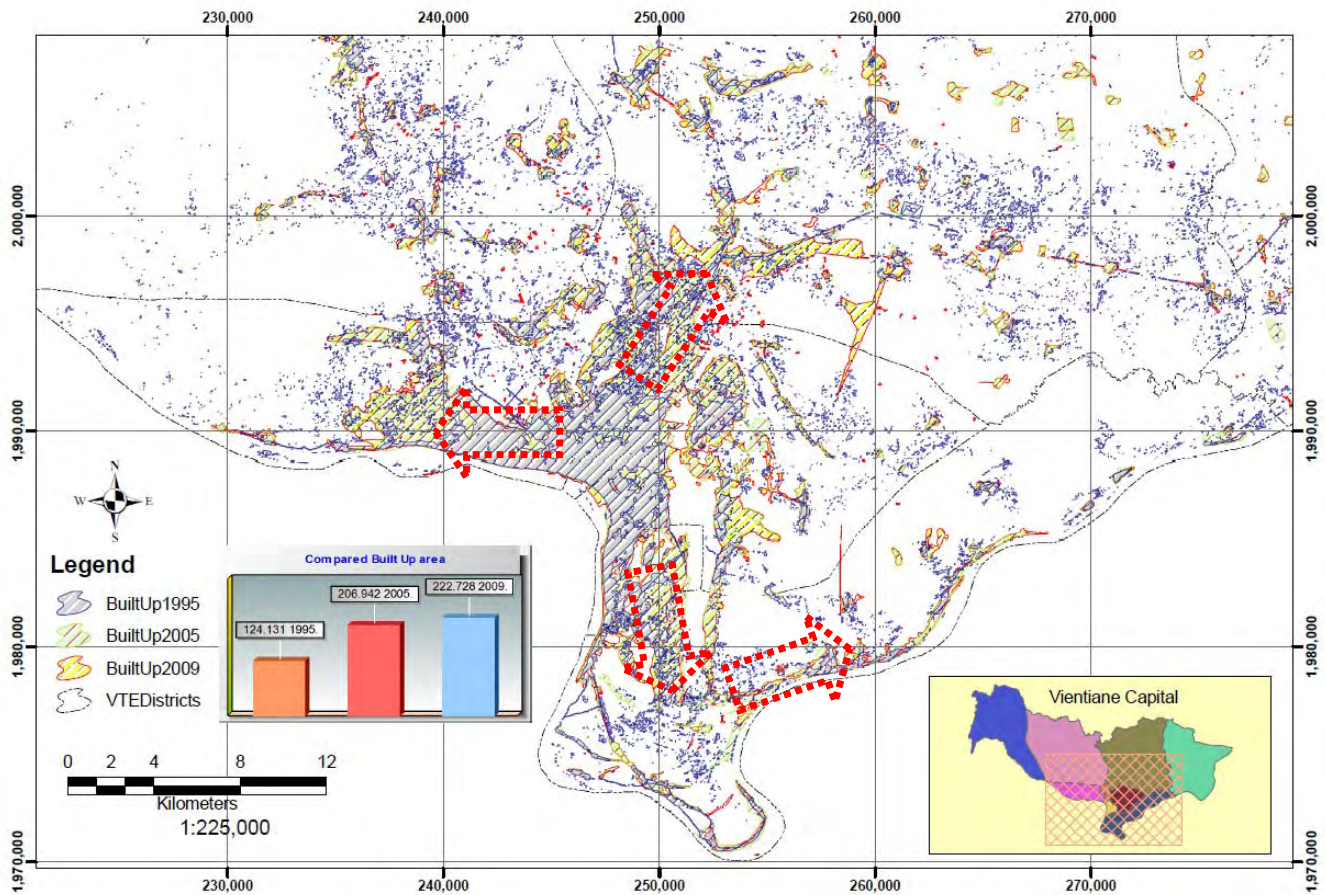


Figure 1.2.21: Land use 2005

(3) Urbanization

Urbanization in Vientiane Capital occurred mainly along the major national roads such as National Road No.1, NR.13N, NR.13S and NR.10. As shown in the Figure 2.3.22 the current urban area spreads over the western, northeastern and southern directions. The area of marsh, swamp and paddy field are not urbanized such as That Luang marsh.



Source: JST

Figure 1.2.22: Urban Expansion of Central Area

This spatial expansion of urban area (or built-up area) can be interpreted from the population data. Urban central district consisting of Chantabouly and Sisattanak Districts has very limited population growth due to limited expansion space anymore, while suburban districts show high population growth, in particular, Sikhottabong, Xaythany Districts.

Table 1.2.37: Population and Urban Villages by District

	Area (km ²)	Population		Household		No. of Person in HH		Percentage of Urban Population (%)		Population Growth Rate 1995-2005
		1995	2005	1995	2005	1995	2005	1995	2005	
Urban Center District										
Chanthabuly	29	58,855	68,858	10,203	12,433	5.77	5.54	98.1%	100.0%	1.58%
Sysattanak	31	58,178	68,686	9,850	11,357	5.91	6.05	95.8%	100.0%	1.67%
Total	60	117,033	137,544	20,053	23,790	5.84	5.78	97.0%	100.0%	1.63%
Suburban District										
Sikhottabong	140	74,251	99,908	12,612	17,999	5.89	5.55	87.1%	84.7%	3.01%
Xaysettha	147	75,255	97,514	12,932	18,293	5.82	5.33	73.5%	100.0%	2.62%
Xaythany	916	97,829	150,793	16,512	26,259	5.92	5.74	39.3%	83.0%	4.42%
Hatxayfong	258	64,962	78,338	11,933	15,591	5.44	5.02	50.7%	77.8%	1.89%
Total	1,461	312,297	426,553	53,989	78,142	5.78	5.46	61.3%	86.3%	3.17%
Rural District										
Naxaythong	1,131	44,104	58,368	7,600	10,815	5.80	5.40	39.3%	83.0%	2.84%
Sangthong	622	16,728	24,215	2,928	4,862	5.71	4.98	10.6%	7.4%	3.77%
Paknguem	646	33,945	45,041	5,933	8,311	5.72	5.42	14.4%	13.2%	2.87%
Total	2,399	94,777	127,624	16,461	23,988	5.76	5.32	27.4%	50.1%	3.02%
Vientiane Capital	7,780	524,107	691,721	90,503	125,920	5.79	5.49	63.1%	82.4%	2.81%

Source: Results of Census in 1995 and 2005

This observation becomes clearer if looking into the population growth by distance from the center. The area within 5 km radius has very limited population increase with an annual population growth rate of 0.9% during 1995 and 2005. The area within 10 km radius has the highest population growth, which is approximately 4.5%/year. The area outside 10 km radius has population growth rate of 3.4 %/year.

Table 1.2.38: Population and Density by Distance

	Area (ha)	Population		Density (person/ha)		Growth Rate (%)
		1995	2005	1995	2005	
5Km	4,960	172,411	188,040	34.8	37.9	0.9%
10km	15,421	83,044	129,077	5.4	8.4	4.5%
Outer than 10 Km	371,618	268,652	374,604	0.7	1.0	3.4%
Total	392,000	524,107	691,721	1.3	1.8	2.8%

Source: Results of Census in 1995 and 2005

(4) Land Use and Population Distribution Pattern

Vientiane Capital has the population of approximately 700 thousands persons in 2005. Approximately 350 thousand persons or 50 % of the total population concentrates in the urban area of Vientiane Capital. Out of it, the urban center has only 203 thousands persons, while the suburban area has 145 thousands persons. As mentioned in the previous section, the urban center has very limited population growth rate due to no more space for development, while the suburban area has high population growth rate with plenty of space available for further urbanization. The population density of the urban center is 36.7 person/ha on an average, whilst some areas may be more densely inhabited with more than 80 persons/ha.

There are other local settlements scattered all over the Vientiane Capital. The village with certain facility and accessibility is defined as “urban village”. Such local settlements in particular the urban village, where the population increased with the annual growth rate of 3.1 %. (Table 1.2.39 indicates that 13.4% and -4.5 % of annual population growth rate in other urban villages and rural villages,

respectively. However, many “rural village” upgrade to “urban village during the same period, resulted in showing much higher population growth rate.) Average population density is 0.6 person/ha.

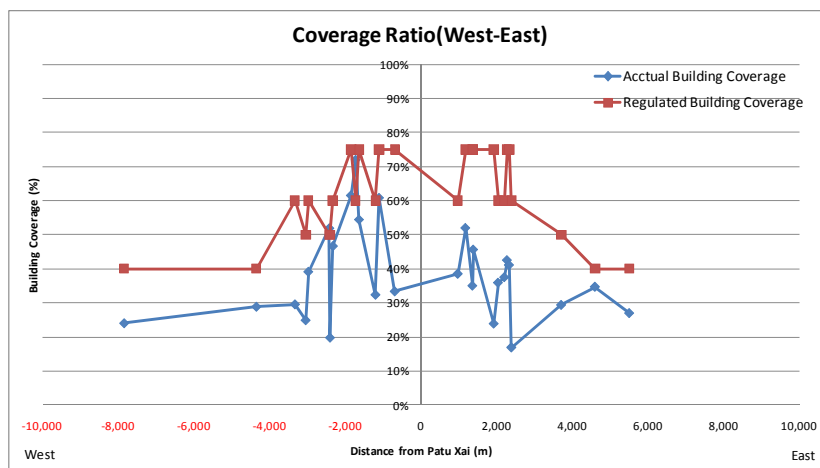
Table 1.2.39: Population Distribution Pattern (2005)

	Area (ha)	Population			Population Density (persons/km ²)		Household			Persons/HH	
		1995	2005	Growth Rate (%)	1995	2005	1995	2005	Growth Rate (%)	1995	2005
Urban Center	5,549	185,453	203,660	0.9%	3,342.1	3,670.2	31,174	34,994	1.2%	5.9	5.8
Suburban Area	18,964	88,197	145,375	5.1%	465.1	766.6	15,008	26,557	5.9%	5.9	5.5
Total	24,513	273,650	349,035	2.5%	1,116.3	1,423.9	46,182	61,551	2.9%	5.9	5.7
Other Urban Villages	367,487	62,543	220,694	13.4%			11,604	42,954	14.0%	5.4	5.1
Rural Villages		193,309	121,992	-4.5%	69.6	93.3	33,705	23,124	-3.7%	5.7	5.3
Total	392,000	529,502	691,721	2.7%	135.1	176.5	91,491	127,629	3.4%	5.8	5.4

Source: Results of Census in 1995 and 2005

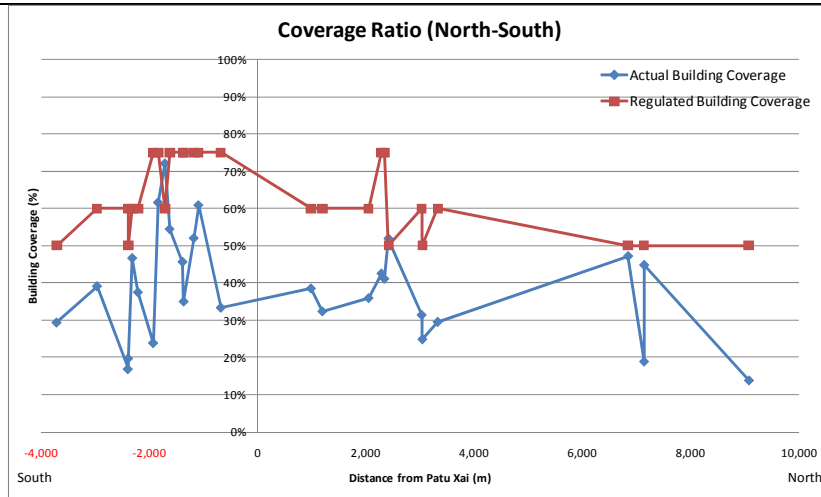
(5) Current Building Capacity

Figure 1.2.23 to 2.3.28 shows current fulfillment of building capacity against building capacity regulation regarding coverage ratio, plot ratio and building height by distance. In comparison to maximum permissible limits as stated in regulations, the samples of all buildings indicated much lower figures in terms average ratio, plot ratio and building height. However, as this data covers only houses or residents buildings, there is large possibility that some commercial buildings might have exceeded the maximum permissible limits. With this analysis, atleast it can be concluded there are still large un-utilized areas or vacant spaces exists in each zone which can be utilized to reach the permissible limits or maximum allowed building capacity limits. In other words, this means that necessary density and capacity of office space in future can be accommodated without releasing capacity control measurements in Vientiane Capital. Considering this and to avoid any negative impacts on traffic around the building, negative impact to utility and infrastructure as well as to keep better landscape in business area of Vientiane Capital in particular the area along Lane Xang Avenue, capacity control parameters should be restricted with minimal amendment at this moment.



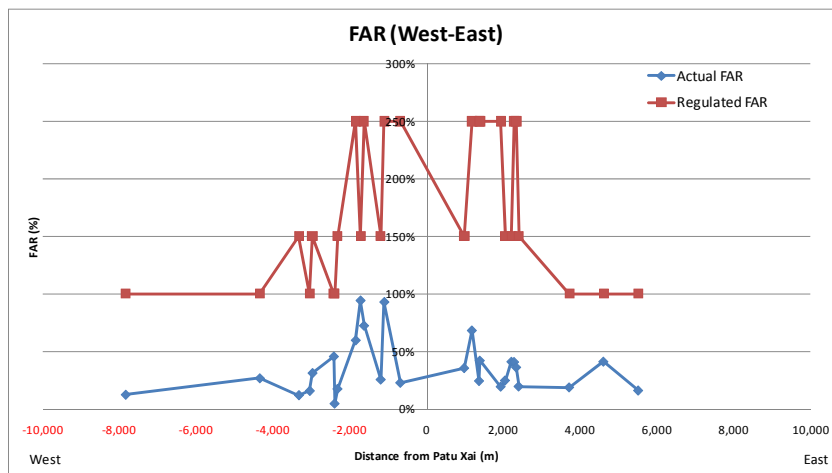
Source: JST

Figure 1.2.23: Current Coverage Ratio of West-East (Private House)



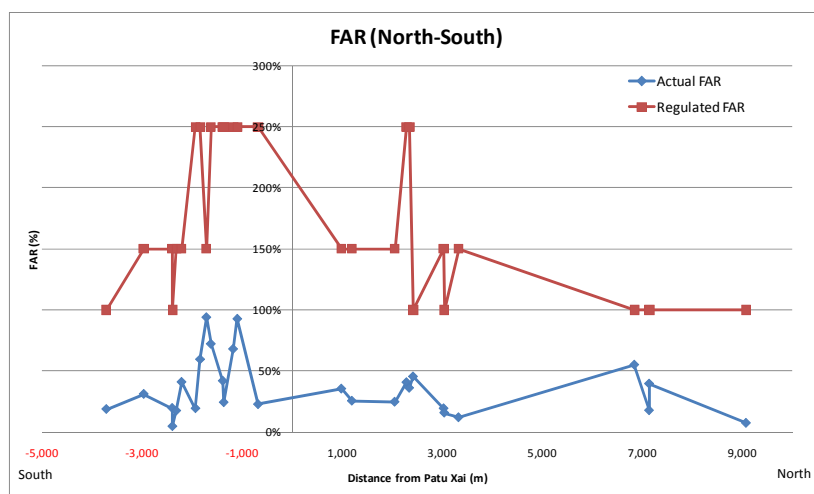
Source: JST

Figure 1.2.24: Current Coverage Ratio of North-South (Private House)



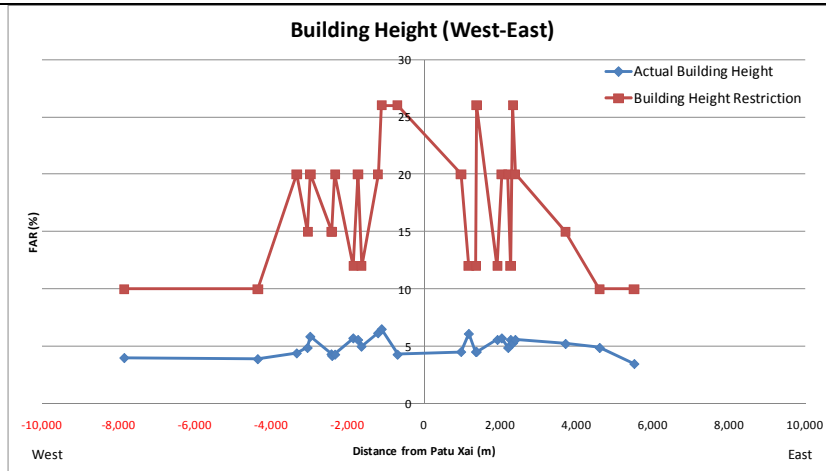
Source: JST

Figure 1.2.25: Current Plot Ratio of West-East (Private House)



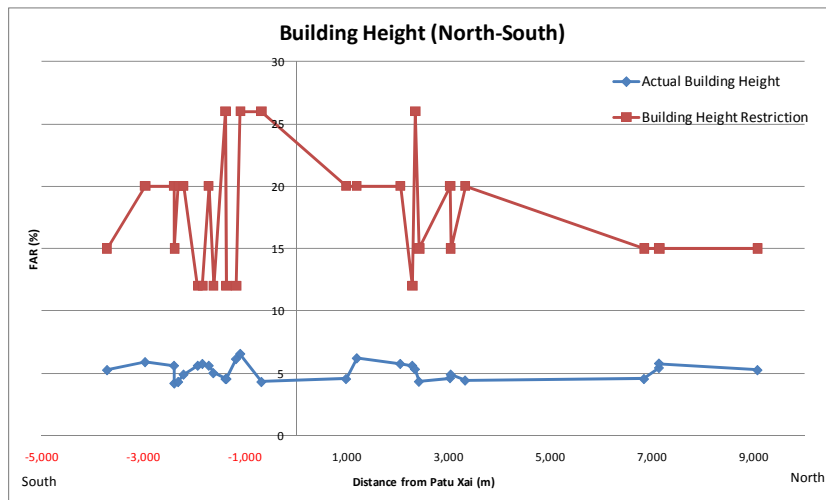
Source: JST

Figure 1.2.26: Current Plot Ratio of North-South (Private House)



Source: JST

Figure 1.2.27: Current Building Height of West-East(Private House)



Source: JST

Figure 1.2.28: Current Building Height of North-South (Private House)

(6) Typical Land Use Pattern

1) Urban Center

The urban center area has been densely built-up with medium height shop and houses in downtown area and low height detached houses in the surrounding areas of the downtown. In general, there is hardly any vacant space is available for any new development.



Source: Quickbird satellite image

Figure 1.2.29: Urban Center of Vientiane Capital (the area around Settha Thirath Road)



Source: Quickbird satellite image

Figure 1.2.30: Urban Center of Vientiane Capital (the area within Kampengmoung Road)

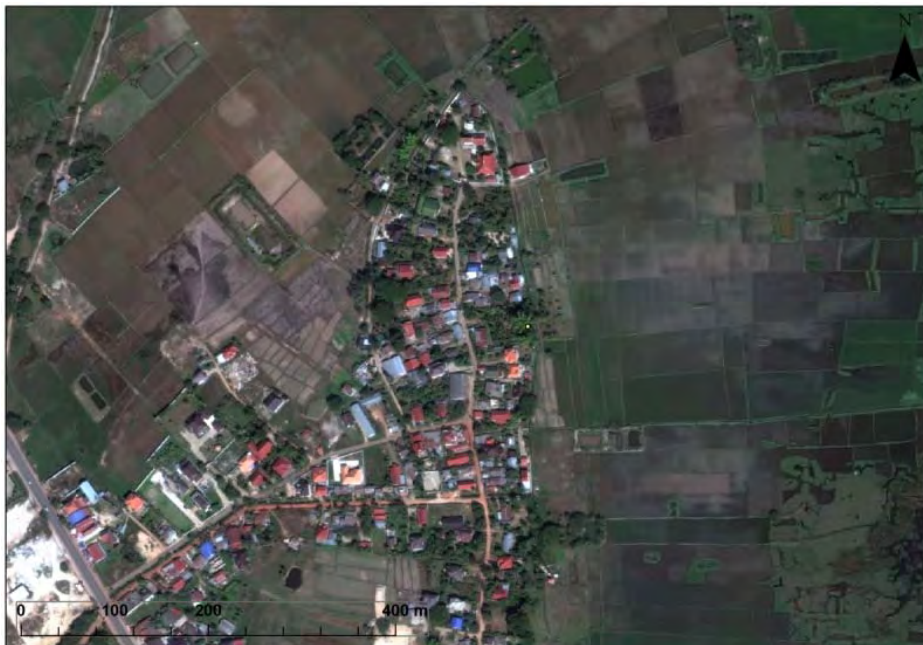
2) Suburban Area

Currently, suburban areas are the frontage of urbanization, where a number of housing developments are occurring. The entire area may be summed up as mixed development where some areas are developed (or built-up area, urbanized area) while others are still undeveloped. Population density is not yet so high in the suburban area. The area outside the developing area follows the traditional style of rural settlement as shown in the figure below.



Source: Quickbird satellite image

Figure 1.2.31: Urban Center of Vientiane Capital (the area around Dongdock)



Source: Quickbird satellite image

Figure 1.2.32: Urban Center of Vientiane Capital (the area around Ban Muang Noi)

3) Existing Urban Clusters in Outskirt Area

Existing urban clusters are developed with a function of local commercial center for local settlements. However, the size of urban area is limited and built-up area is not so densely developed.



Source: image of ALOS

Figure 1.2.33: Urban Center of Vientiane Capital (the area around Tha Ngon)