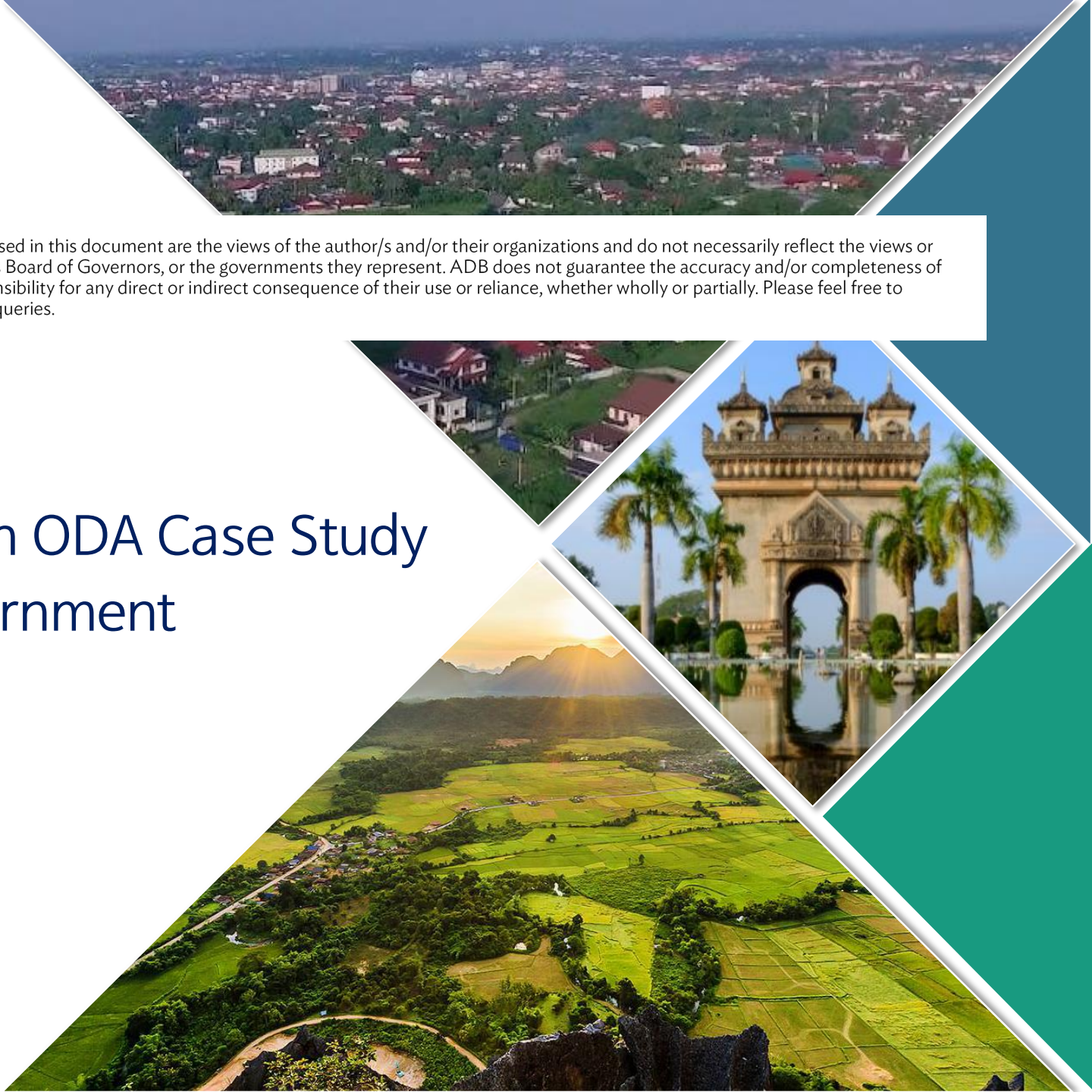


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ADB workshop

Spatial information ODA Case Study from Korean Government [Lao PDR]

7 November, 2024



Contents



- I** Project Overview
- II** Project Implementation
- III** Future Plan

1. Project Overview

Project Title

- The project for the strengthening capability on the establishment and utilization of land information infrastructure in Lao PDR

Beneficiary Department

- Department of Land under the Ministry of Natural Resource and Environment

Project Budget

- 4.48 billion won (3.45 million USD)

Project Period

- 2020. 06. 26. ~ 2024. 06. 15. (38 months)

Project Components

① Policy and Regulations Development

- Land registration regulation and management guidelines
- Regulation and working manuals related to land survey
- Land tax and commission regulation
- Basis of land information sharing system

② Land Database Construction

- Collect and compile existing land-related analog data to digital form
- Digital cadastral mapping based on high resolution aerial image
- Input each parcel information and attributes into LaoLandReg

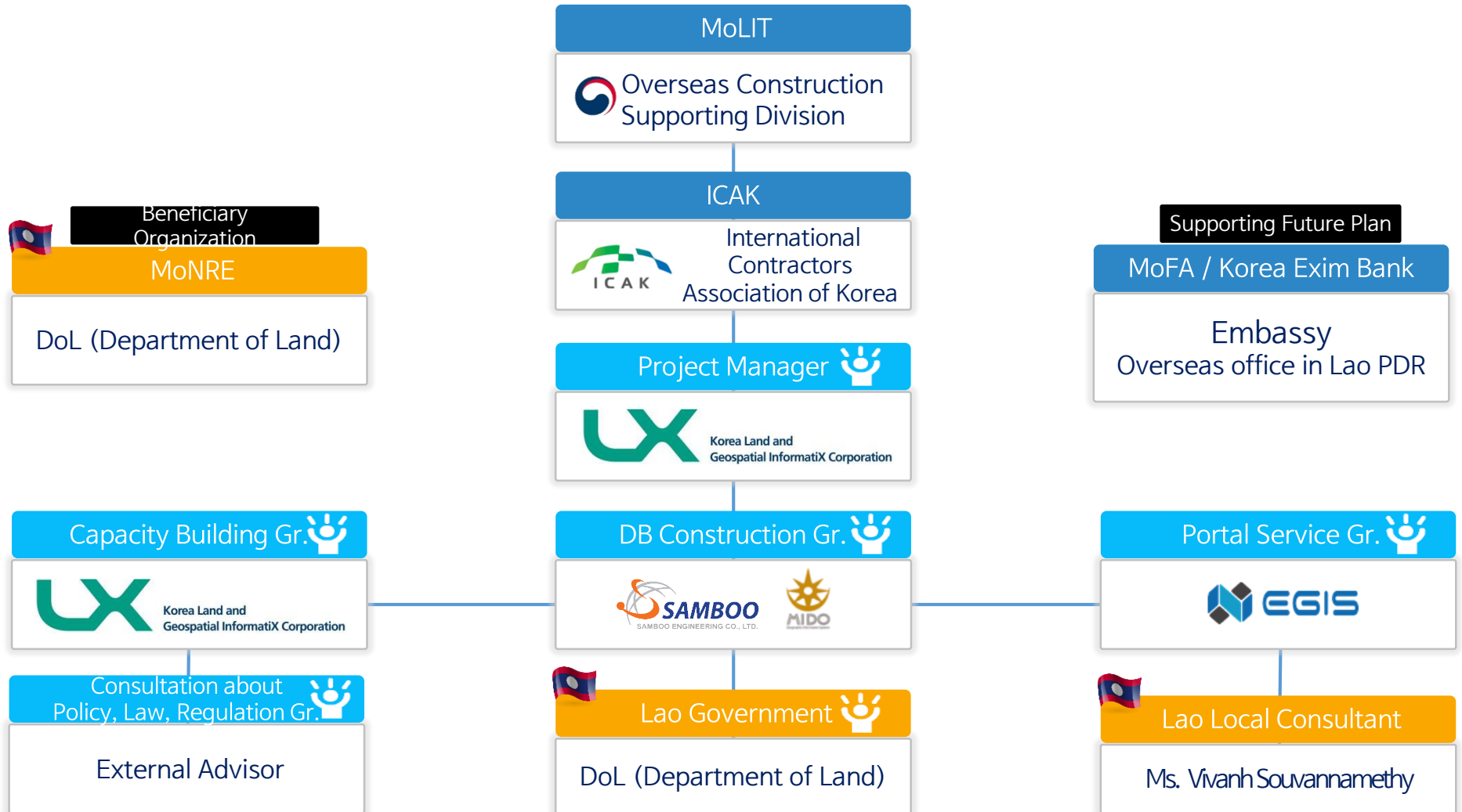
③ Land Information Integration and Portal Service Construction

- Integrate land information database
- Collect and update land information
- Construct land information portal service for sharing and utilization

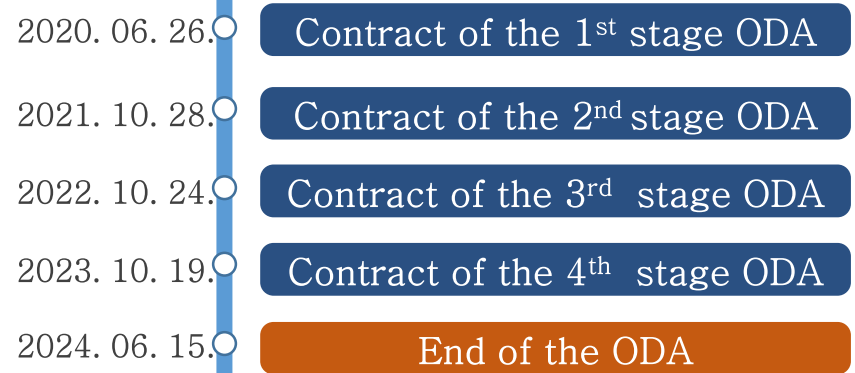
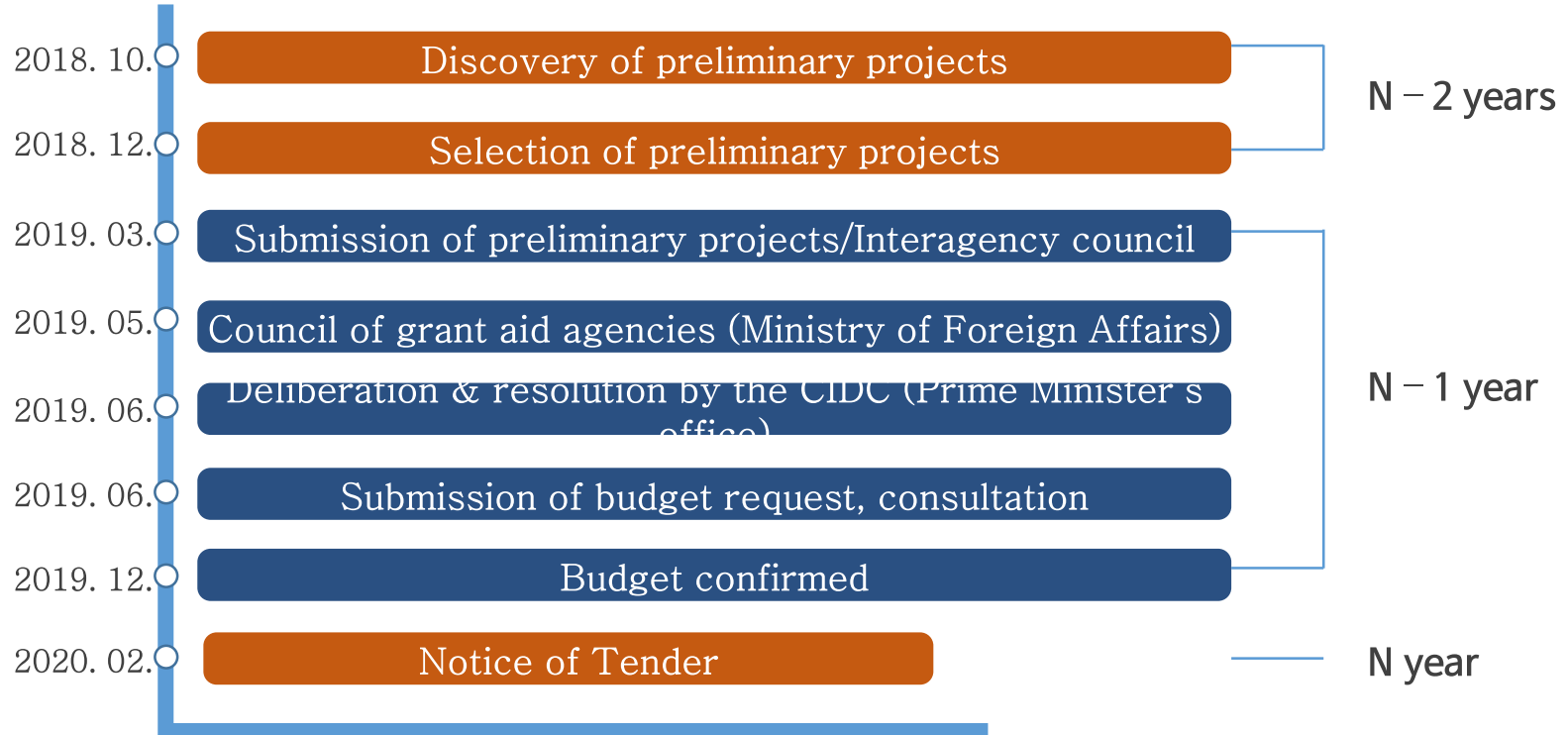
④ Capacity building

- Conduct ToT (Training of trainer) program to enhance the capability of land information management up to district level
- Conduct capacity-building training (invitation training) to Korea for managing and working level of government officials

2. Project implementation team



1. ODA Procedure & Milestones



2. Policy and Regulations Development



Sub-Components

1. Land registration & management work guidelines

- ① Investigation and analysis of laws related to land registration
- ② Establishment of a simplification plan for land registration and ownership issuance procedures
- ③ Establishment of standards and guidelines for land registration and management
- ④ Land registration and management work guide

2. Guidelines related to land surveying

- ① Analysis of land survey-related legal systems and work manuals
- ② Improve the tolerance level considering the observation equipment
- ③ Establishment of standard work guidelines
- ④ Preparation of detailed guidelines for land boundary determination

3. Regulations related to land tax & fees

- ① Assess the adequacy of land taxes and fees and prepare improvements
- ② Evaluate registration tax adequacy and suggest improvement
- ③ Establishment of regulations related to land tax and fee

4. Basis of land information sharing system

- ① Review of linkage between government departments and joint utilization of land information
- ② Securing a legal basis for sharing land information
- ③ Preparation of guidelines for land information sharing system

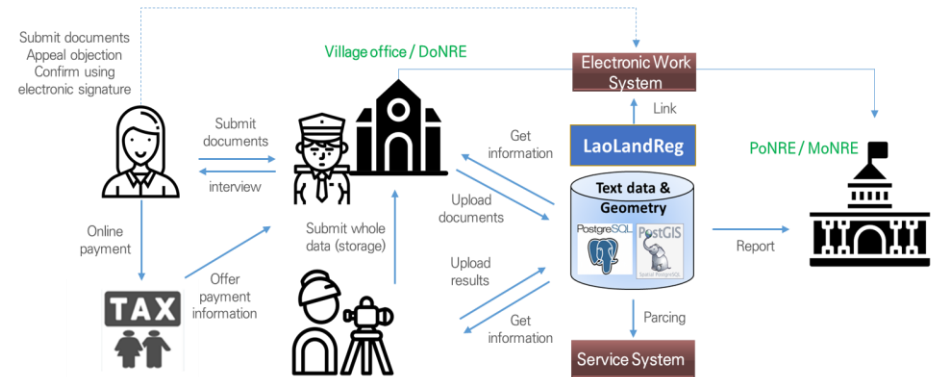
2. Policy and Regulations Development

Land registration & management work guideline

Strategy for Accelerating Land Registration & Management

- Improve work efficiency through digitalization of all land-related information
- Perform all land registration procedures using systems that are linked with LaoLandReg
- [Future plan] Add public service, surveying data verification, and calculation to the system

Revisions



Div.	Key points of revisions	Expected improvement of work efficiency
Adjudication	<ul style="list-style-type: none"> - Enter all obtained land-related information into LaoLandReg - Check information using LaoLandReg and prepare a status report - If information that differs from what was previously registered in LanLandReg, specify history of revisions and corrections for systematic management 	<ul style="list-style-type: none"> - If land-related information is registered in LaoLandReg, land officials can check the current status. Thus, adjudication can be completed within 10 days
Surveying	<ul style="list-style-type: none"> - Store all raw data and processing results, and submit them to village office - Enter final surveying results as well as processing report into LanLandReg 	<ul style="list-style-type: none"> - Make a surveying plan using the information in LaoLandReg - Through GNSS or total station surveying, measurement and processing can be completed within 5 days
Administrative tasks	<ul style="list-style-type: none"> - Report and approve all land registration work through the online work system - Assign permission to land officials to enhance the management of land information and its security - Adopt electronic signature to confirm land registration work in the online work system 	<ul style="list-style-type: none"> - Improve overall work speed through online work system

The project for the strengthening capability on the firm and utilization of land information infrastructure

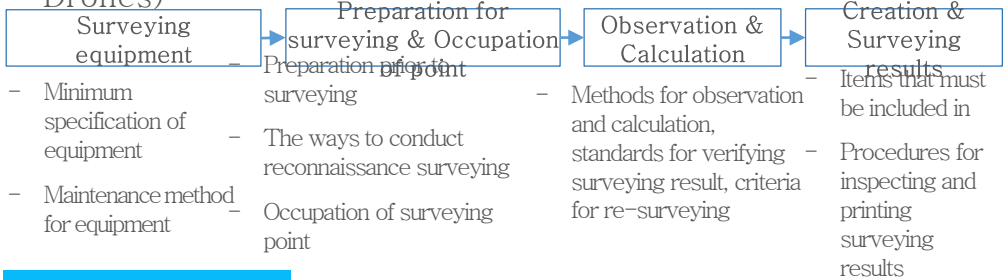
established in Lao PDR
 - Submit requested land-related documents for land registration and appeal opinion

2. Policy and Regulations Development

Guidelines related to land surveying

Strategy for Improving Land Surveying

- Surveying procedures (Total station, GNSS, Drones)



- Suggestion of adjustment of error criteria
 - If considering only surveying equipment applied in Lao PDR, the error criteria could be quite satisfied
 - However, surveying infrastructure is still under construction (not enough compared to Korea, Japan, USA, etc.), therefore, additional conditions to improve reliability of surveying are necessary
- Suggestion of detailed land boundary determination standards considering architecture, road, and natural features in Lao PDR
- Suggestion of detailed procedures including resolving entity, deadline, and reporting resolved results by benchmarking Vietnam

Revisions

Div.	Key points of revisions
Detailed procedures for each surveying method	<ul style="list-style-type: none"> - Refine detailed procedures for each surveying method (total station, GNSS, drone) in order of equipment, preparation, observation and calculation, and creation and check of surveying results - Improve reliability of surveying by expressing compliance in observation, calculation, and re-surveying
Improvement of error criteria	<ul style="list-style-type: none"> - Refine surveying error criteria for each surveying method (in the case of drone surveying, error criteria were newly suggested) - Considering current infrastructure, add the way to improve the reliability of surveying such as the number of observation
Management of surveying results	<ul style="list-style-type: none"> - To ensure consistency to the strategy for land registration, all surveying data (raw, calculated results and reports) should be stored in digitalized form
Standards for determination of land boundary	<ul style="list-style-type: none"> - Following the land law, include the basic principle to determine land boundary - Suggest detailed standards for land boundary determination considering artificial features (architecture, road, etc.) and natural features
The way to resolve land boundary disputes	<ul style="list-style-type: none"> - Suggest detailed procedures with the roles of entity to resolve land boundary disputes

2. Policy and Regulations Development

Regulations related to land tax & fees

Strategy for Improving Land Tax System

<h4>Land Possession Tax Act</h4>	<ul style="list-style-type: none"> • Purpose : This Act aims to promote equity in tax burdens and contribute to the efficient generation of financial income by appropriately taxing land possession and usage. This Act stipulates the conditions for taxation, imposition, collection, and other necessary aspects of the land possession tax. • Contents : taxation subject, object of taxation and the basic date of taxation, tax payment obligor, non-taxation, statutory standard price of fair market value of land, etc., assessment standard tax base, tax rate and amount, etc.
<h4>Land Transfer Income Tax</h4>	<ul style="list-style-type: none"> • Purpose : This Act aims to promote equity in tax burdens and contribute to the smooth procurement of financial income by appropriately taxing income from the transfer of land. This Act prescribes the tax requisition, reporting, payment, and other necessary matters for land capital gains tax. • Contents : taxation subject, scope of capital gains, tax payment obligor, transfer value, amount of capital gains, basic deduction on capital gains, assessment standard tax base on capital gains, tax amount calculated on capital gains, etc.
<h4>Land Acquisition Tax</h4>	<ul style="list-style-type: none"> • Purpose : This Act aims to promote equity in tax burdens and contribute to the smooth procurement of financial income by appropriately taxing income from the transfer of land. This Act prescribes the tax requisition, reporting, payment, and other necessary matters for land capital gains tax. • Contents : taxation subject, scope of capital gains, tax payment obligor, transfer value, amount of capital gains, basic deduction on capital gains, assessment standard tax base on capital gains, tax amount calculated on capital gains, etc.

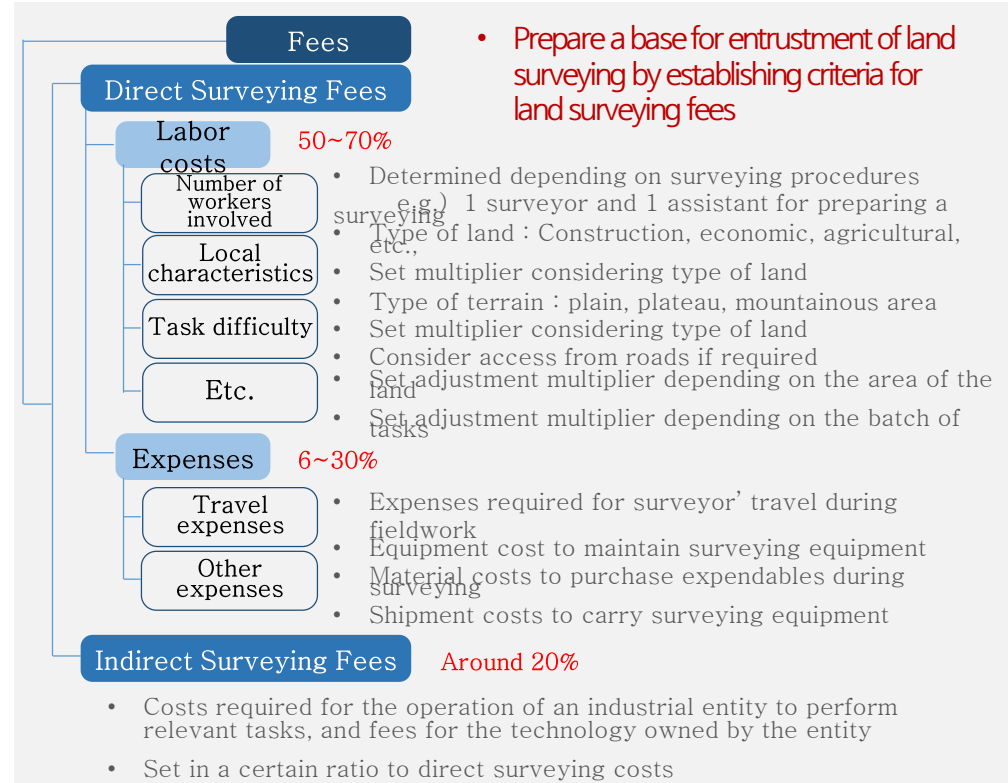
Task Entrustment System

- Select a company by qualified bidding method, Standard to evaluate the quality

Land Evaluation System

- Evaluate the price of land for imposition land tax
- Considering the characteristics of land, the relative worth of land is allocated in terms of price

The project for the strengthening capability on the establishment and utilization of land information infrastructure in Loo PDP



Technical Qualification System

- Evaluate the personal skills of engineers who perform entrusted surveying
- Adopt qualification exams and categorize engineers into different levels

2. Policy and Regulations Development

✓ Basis of land information sharing system

Strategy for Sharing of Land Information

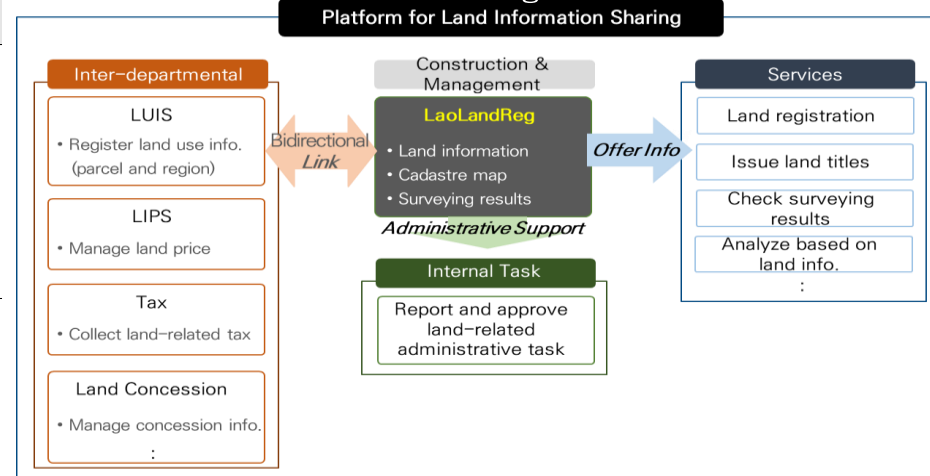
- Share land information centered on LaoLandReg developed by MoNRE, and the practical task of managing and combining land information is performed by DoL



Operation of the National Land Information Commission

Div.	Composition and Operation
National Land Information Committee	<ul style="list-style-type: none"> Role : Discuss and Determine land information and expand its use through inter-ministerial cooperation Composition : Minister of NRE (Chairman), director in charge of land information-related use for each ministry (ex officio member) Operation of the committee : [Regular meeting] 1~2 times/year [Irregular meeting] when urgent decision is needed
Working Council	<ul style="list-style-type: none"> Role : Discuss matters to be reviewed in the execution of practical work by the person in charge of each department that builds and utilizes land information, promptly. Composition: Director of Land of MoNRE (Chairman), manager of each department (ex officio member)

Management and Service Platform for Land Information Sharing

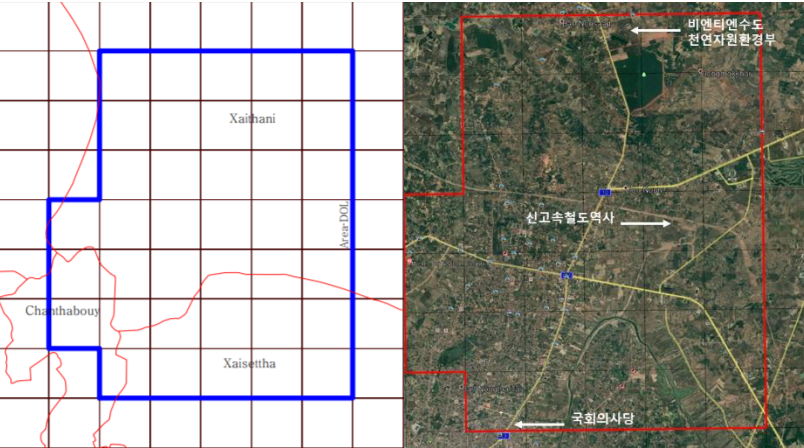


3. Land Database Construction

Project target area & sub-components

Project Area

Sub-components of Land Database



Land data collection & Cadastral archive creation

- Creation of cadastral map based on structuralized land information data

Seamless Land-spatial information map construction for land information digitization

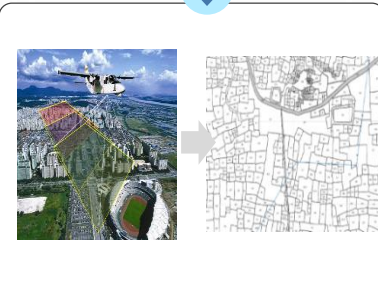
- Creation of seamless land-spatial map based on aerial photos for Land Information Portal System
- Creation of parcel information

Input of individual parcel information

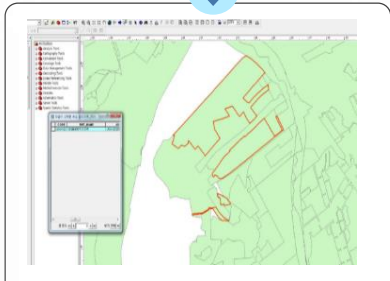
- Input of created land parcel data to LaoLandReg
 - parcel number and attribute information



Analog Cadastral Map Digitization



Creation of Seamless Land-spatial Map with Aerial Imagery



Input of Land Attribute Information

Project Area – Vientiane City

- Xaithani, Xaisettha , Chanthabouy

Project Area

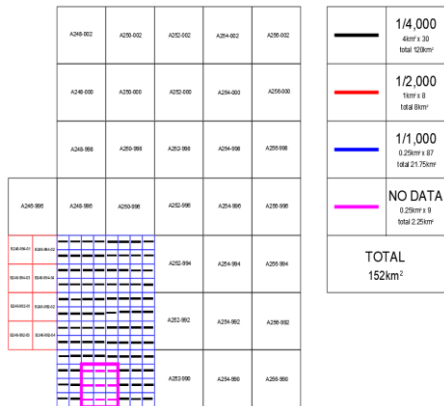
- about 152km²

3. Land Database Construction

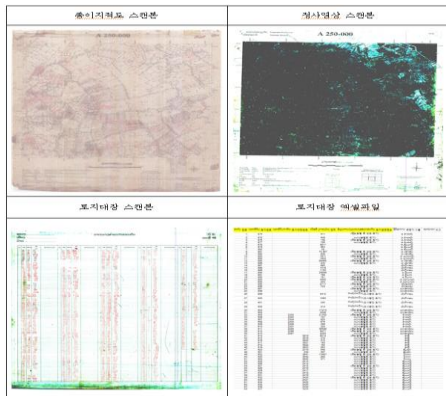
✓ Land data collection & Cadastral archive creation, Input of individual parcel information

Cadastral data from DoL

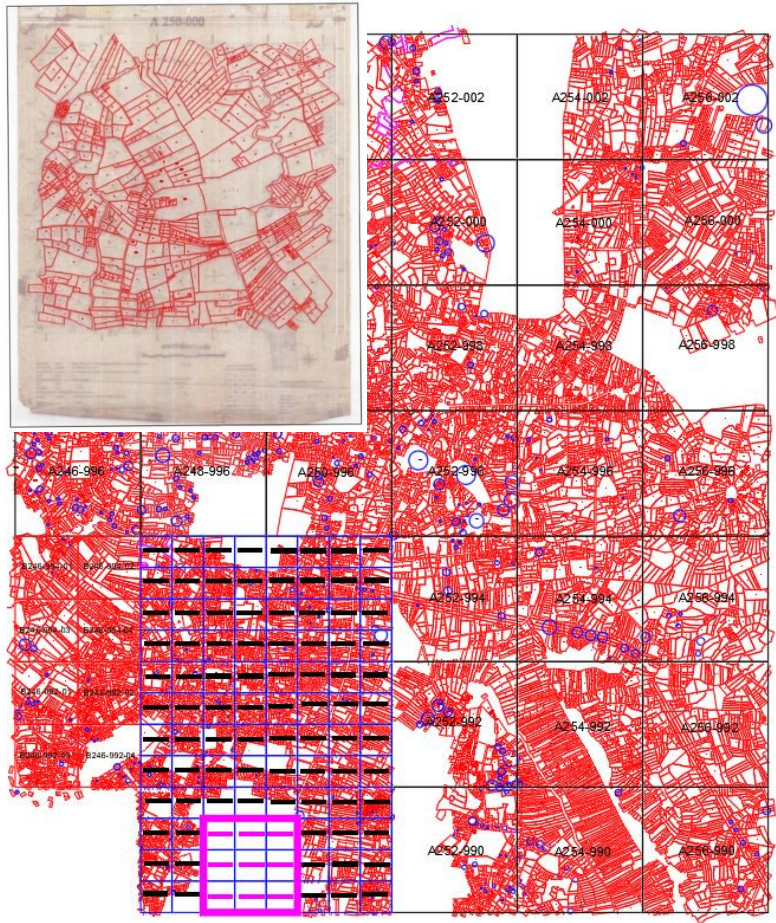
Cadastral map Index



Cadastral Data

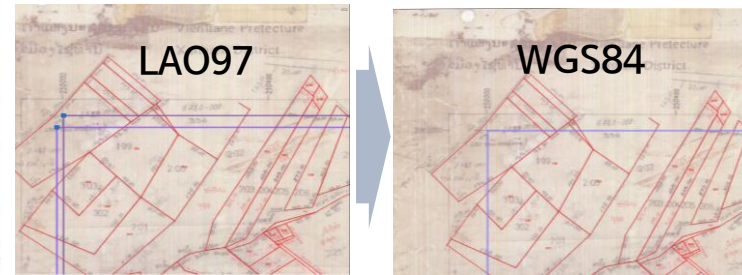


Digitizing

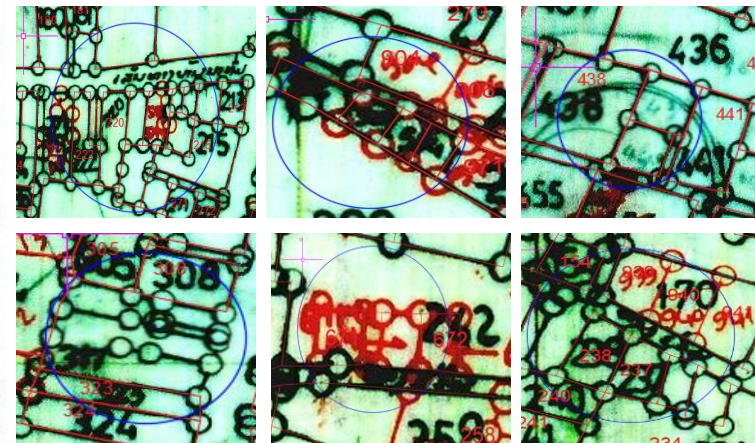


Coordinate Transformation

Lao97 – WGS4



Various errors in paper cadastral maps



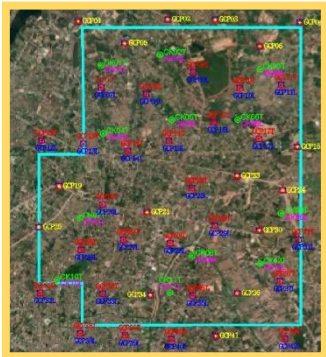
- Missing parcel number, Duplicate parcel number
- Impossible to visually determine, Adjacency mismatch

3. Land Database Construction

Seamless Land-spatial information map construction for land information digitization

Ground Control Point (GCP) survey

Planning



GCP Installation

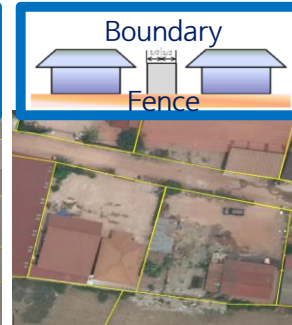
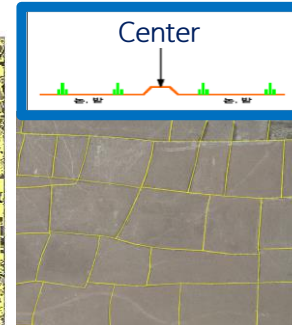


Orthophoto Digitizing

Digitizing result



Digitizing parcel boundaries



Using a stereo plotter

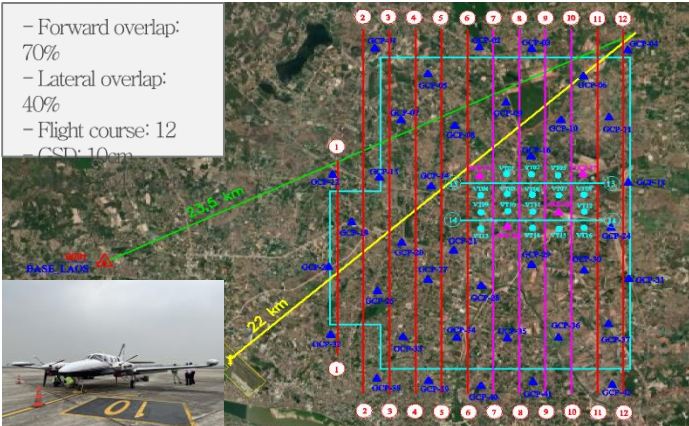


Field survey



Aerial Photography

- Forward overlap: 70%
- Lateral overlap: 40%
- Flight course: 12
- GSD: 10cm



3. Land Database Construction

✓ Seamless Land-spatial information map construction for land information digitization

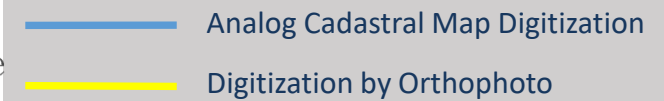
Comparison between existing cadastral archive and cadastral maps constructed from aerial photographs

Location difference

Topographical change



- Location difference: Location difference occurs with existing cadastral map
- Topographic changes: New buildings and roads are created, changes because construction

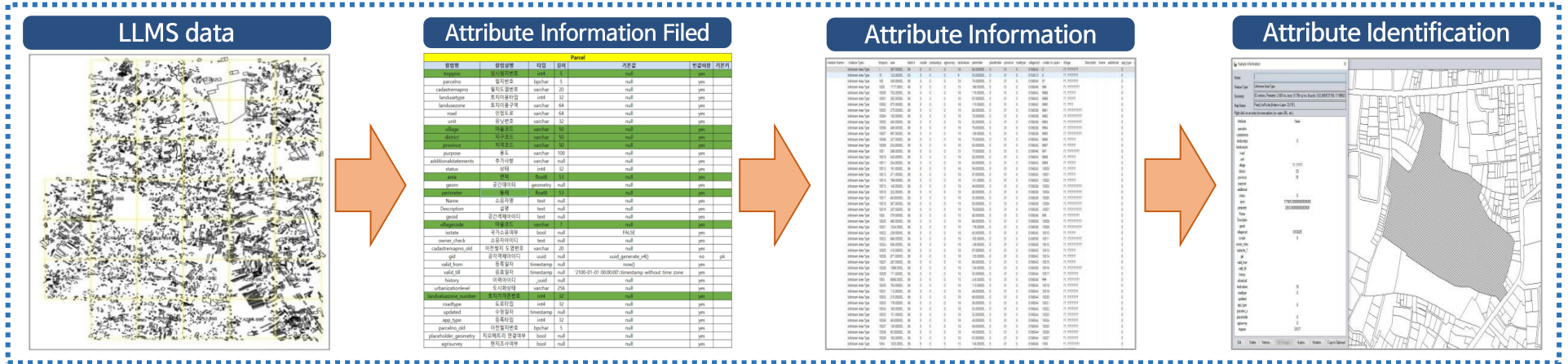


3. Land Database Construction

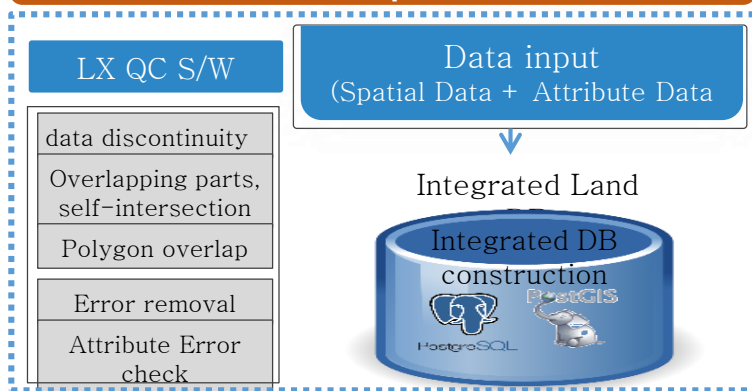


Input of individual parcel information

LaoLandReg attribute input



Data inspection



Delivery & Completion

Filed information input & saving

- Quality control software inspection and quality assurance
 - Parcels created from continuous digital spatial information maps
- Register for land information portal service
- Data registration in LaoLandReg

4. Integrated Land Information Management and Portal Service

Sub-components

Construction of Integrated Land Information Database

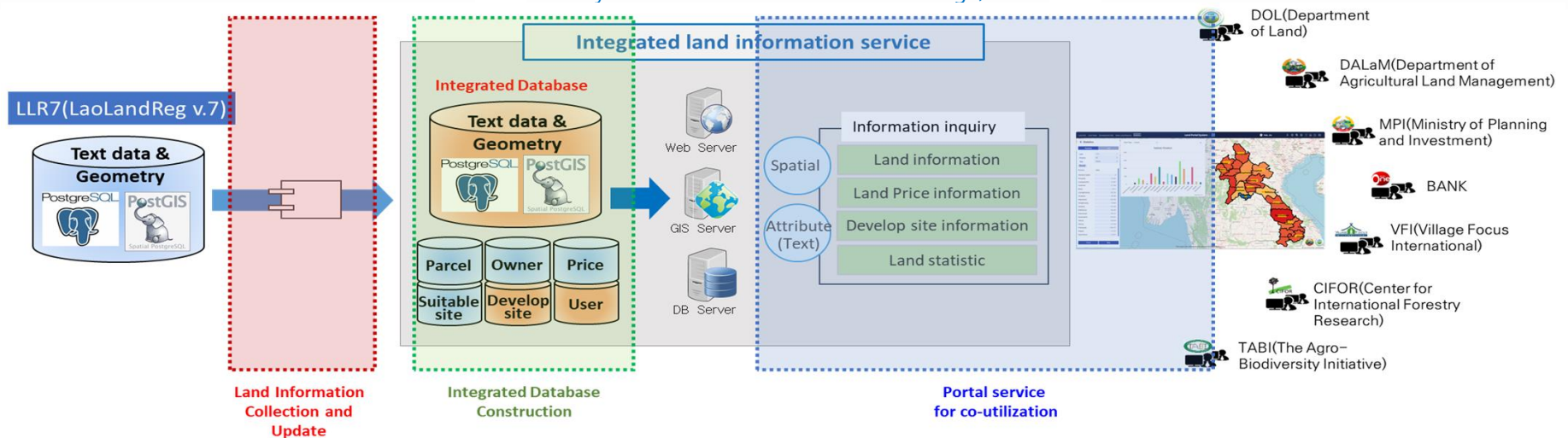
- Integrated Management of Data Related to Land Registration
 - Construction of a converged database of land-related information; land information, land value, national reserve, etc.
- Design & Implementation of Integrated Data
 - Design of an integrated database considering the scalability of land and other real estates.

Development of a System for Land Information Collection and Update

- Design of a System for Data Integration
 - Configuration of integration channels through target systems, update cycles, etc.
- Development of Features for Data Transmission /Reception and Management of Data Collection
 - Configuration of the data collection feature; data transfer, processing and loading, synchronization environment settings, etc.

Development of a Portal Service for Co-utilization

- Development of a feature for co-utilization of real estate data
 - Implementation of inquiry features: land, owner, land value, national reserve, etc.
- Management of Current Status through Statistics and Analysis
 - Various types of map-based visualization of statistics; by category, type, and period.

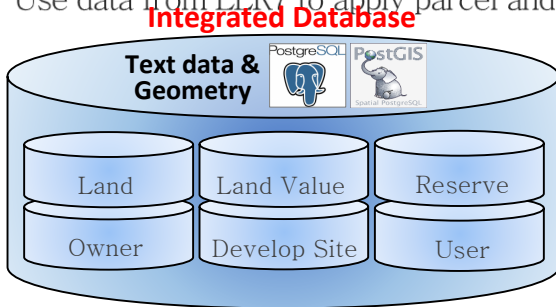


4. Integrated Land Information Management and Portal Service

Content on the Construction of Integrated Database for Land Information

- Tables by schema are designed to enable integrated management of land-related information and considering future schema addition and expansion.

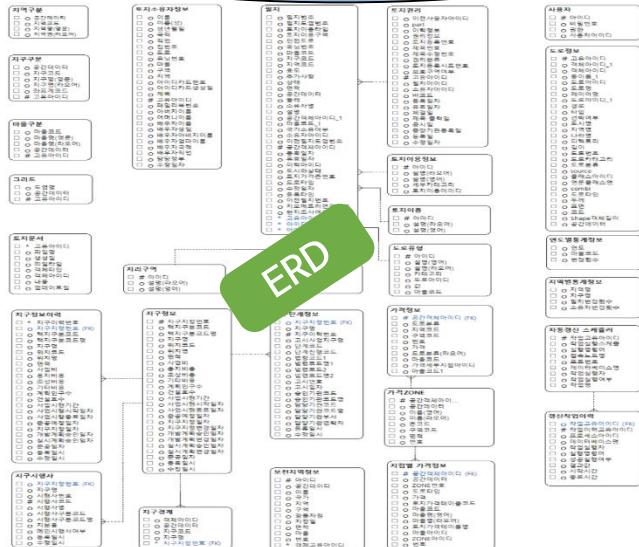
Use data from LLR7 to apply parcel and owner information



Schema	Table(Eng)	Description
topo	province	• Definition of shapes, codes, and names for 18 provinces (at the provincial level)
	district	• Definition of shapes, codes, names, and UTM fields for 148 districts (at the district level)
	village	• Definition of a point data set containing shapes, codes, and names for 8641 villages (at the village level)
	grid	• Definition of A-grid map sheets with MapSheetNumber in WGS 84, covering the entire territory
	landvaluezone	• Definition of land value zone with geographic location, code and land value zone number (to be linked with parcels in the future)
	landvaluesubzone	• Definition of land value information and surveying locations by village
common	urbanizationlevel	• Presidential Decree 003
	ltstreetcategory	• use zones for survey price calculation
	ltstatus	• based on categories of provinces, districts and streets
	landvaluezone	• types, etc
cadastre	parcel	• Definition of information on ownership and other forms of land rights
	landrights	• Definition of parcel owner information (More than one person can own a same parcel and one person can own multiple parcels)
	person	• Table for managing document files registered in LaoLandReg
devland	document	• Definition of basic information of development sites
	dstrc_info	• Definition of development site change histories
	dstrc_info_hist	• Definition of development site boundary information
	dstrc_zone	• Definition of project contractor information
	dstrc_comp	• Definition of development phase
	dstrc_step_hist	• Definition of user information
	member	• Definition of road boundary information
	roads	• Table for managing regional statistical information
cron	statistic	• Table for managing yearly statistical information
	statisticsyear	• Definition of information on update task schedules
	job	• Definition of history information for update tasks
	job_run_detailss	

- Land data configuration in conjunction with the database of the LLR7
 - There are newly created databases required for system operation.

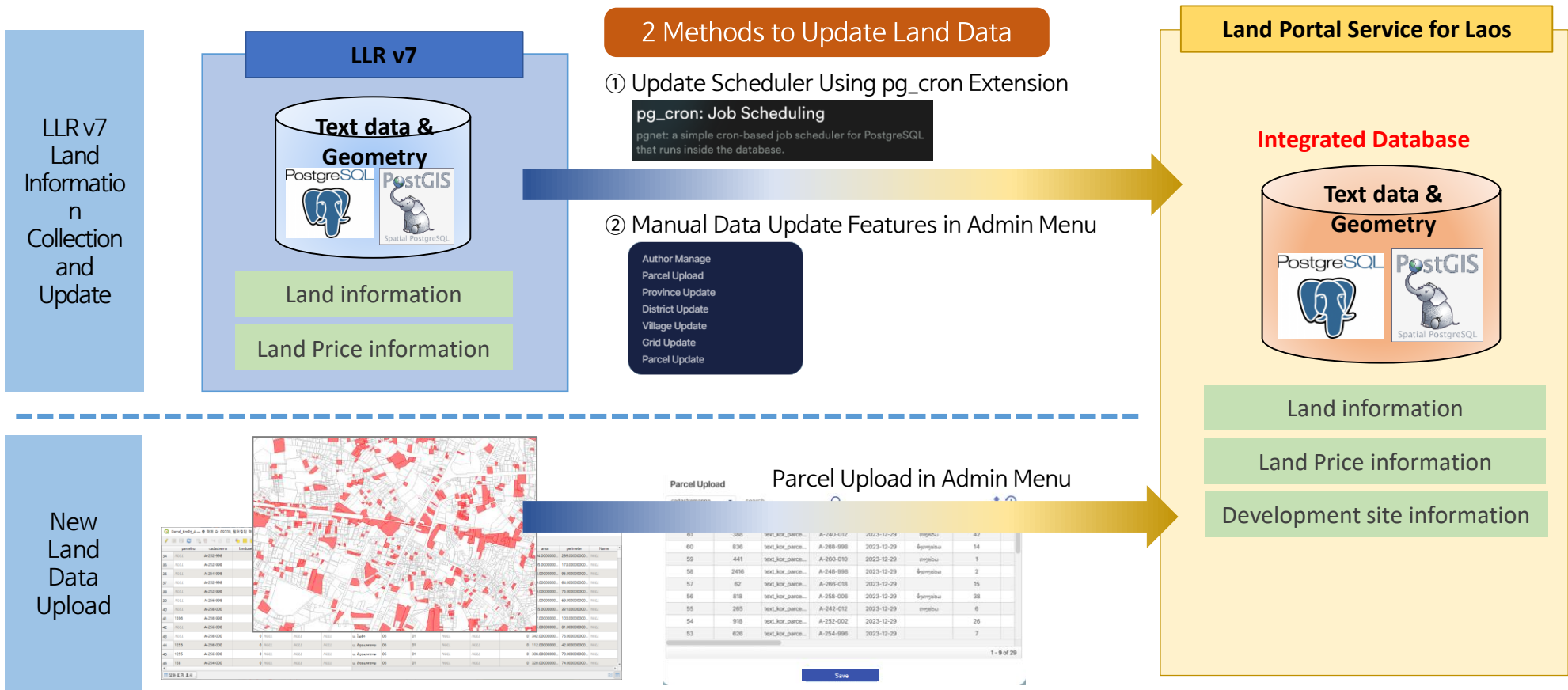
Integrated Database is configured with 5 schemas and 28 tables to store 6 data types.



4. Integrated Land Information Management and Portal Service

Content on the Development of a System for Land Information Collection and Update

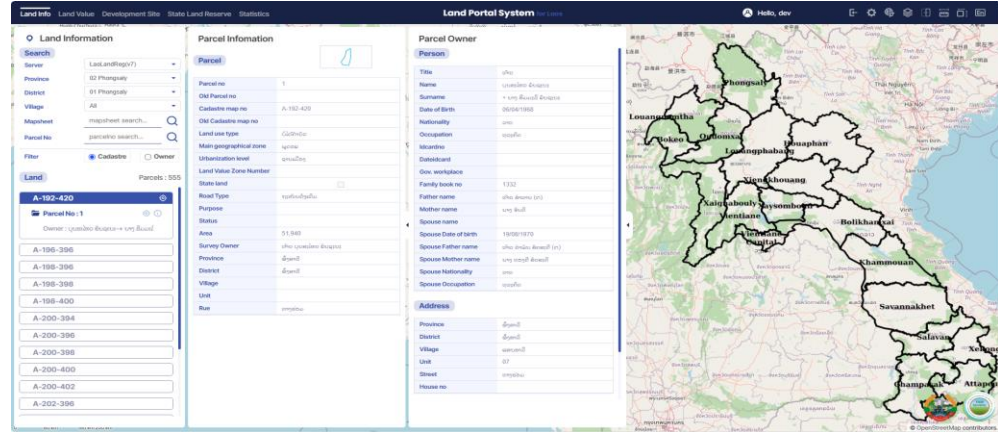
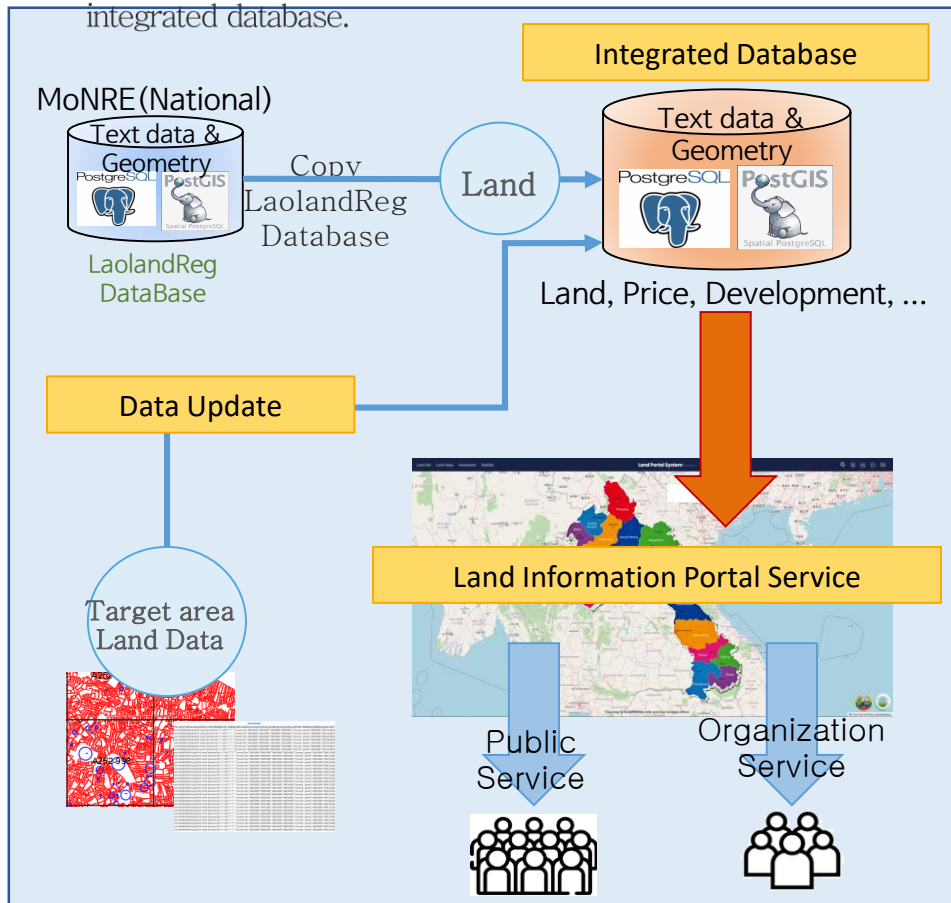
- Land information collection and update system is composed of updating land information by connecting to LLR v7 (LaoLandReg v7) and uploading newly constructed parcel data to the integrated database.



4. Integrated Land Information Management and Portal Service

Content on the Development of Portal Service for Co-utilization

Development of Portal Service for web-based land information co-utilization allowing for the inquiry of land-related information through integrated database.



Menu	Feature	Description
Land Info	Parcel Information	•Inquire basic information of parcels
	Owner Information	•Inquire information of the parcel owners
Land Value	Land Value by Zone	•Inquire land value by value zone (min/max)
	Land Value by Village	•Inquire land value by village, categorized into 4 levels
Development Site	Development Site	•Inquire information of development sites
	Project Contractors	•Inquire information of development project contractors
State Land Reserve	National Reserves	•Inquire information of national reserves
Statistics	Regional Statistics	•Inquire regional statistics of land registration (Table/Graph)
	Yearly Statistics	•Inquire yearly statistics of land registration (Table/Graph)
	Map-based	•Visualize statistical information on the map

The project for the strengthening capability on the establishment and utilization of land information infrastructure in Lao PDR

5. Capacity Building

Dispatch of Korean Experts



- Period: 18 Jul. 2022. ~ 12 Aug. (4weeks)
- Trainee: DoL staff (31 from local & central gov.)
- Place: Polytechnic University

QGIS practice

Necessity of geo-spatial information
 Understanding of QGIS DB & coordinate system
 Practicing vector data using QGIS, etc.

Remote sensing

Introduction to RS & Photogrammetry basic theory
 Work process of RS & Photogrammetry
 Introduction to the cutting edge technology (MMS, D

Cadastral survey

Computerization process of Korean cadaster
 Functional description of Total station & *LandyGo*
LandyGo practice



Conduct post-satisfaction survey

- Survey item
 - ❖ Content, composition, communication, practice, time, relevance, facilities, goods, participation in future training
 - ❖ Highest score: willingness to participate in future training
 - ❖ Lowest score : Communication



5. Capacity Building

Invitational training (High-level)



- Period : 3 Apr. 2023. ~ 7 Apr. (1week)
- Target : High level official from DoL (13)
- Place : LX Global Center (Seoul)

E-government,
Land information & policy,
Land price & tax, Digital Twin,
etc.
**Land policy &
Spatial information
infrastructure**

NGII
Smart Seoul Exhibition Hall
Korea Territorial Development
Exhibition Hall
**Site visit to
land & spatial
related
organization**

3rd stage interim report
Follow up project discussion

Workshop

- Cases sharing of Korean Land & Spatial policies**
 Status of Korea land information & computerization
 History of Land Administration System (KLIS & KRAS)
 Demonstration of S-map, Seoul Real Estate Information
- Korea Land Appraisal & Land Tax**
 Property Tax & Comprehensive real estate tax
 Taxation characteristics & Political issues
 Sharing solutions to institutional issues
- Korea type address information system**
 Roles of Ministry of the Interior and Safety
 Status of on-going Address system
 Classification & management of Address system
- Sharing experience of establishment for LX Digital Twin**
 Background, Pros & cons of LX platform
 Demonstration the platform services & functions

- e-Government linked to Land information in Korea**
 History of each stage for Korea e-government
 Success factors of e-government

- Introduction to constructing spatial information infra.**
 Explanation of the Integrated platform for Land Use Information
 Background & Results of Land Use Information System
 Sharing the 4th National Land Use Information System Cont. Plan



5. Capacity Building

Invitational training (Working-level)



- Period : 22 May 2023. ~ 3 Jun. (2weeks)
- Target : Working level from DoL(15)
- Place : LX Global Center (Seoul KOREA)

Spatial Inf. Const. & App.

National land use information system
Spatial information standard & quality mgt.
Korea type address information system
Introduction to LX overseas projects & platform

Land Management

Case sharing of Korean land innovation
Computerization of Korea's land books & maps
Transformation of world geodetic system

Survey Technology

Cutting edge technology of DB acquisition
Overseas projects using aerial & satellite images
Status of DB & System construction in LaoPDR

Site Visit

Smart Seoul Exhibition Hall
Korea Territorial Development Exhibition Hall
LX Education Institute : training curriculum
LX Local office: visiting a surveying site

- ✓ Case sharing of Korea Land Innovation
Development of Korea's Land Administration System
Computerization of Korea's Land books and maps
Development of Land data acquisition technology

- ✓ Introduction to overseas projects using aerial & satellite images
Korea Aerospace Research Institute(KARI)
Development status of the global space industry
The latest trends using satellite images

- ✓ Transformation of World Geodetic System
Understanding of coordination transformation
Ellipsoid, Coordinate system, Projection
Explaining of 2D & 3D coordination transformation

- ✓ Computerization of Land books & cadastral maps
Knowledge sharing of computerization process
(Book type – Card type – Digital)
History of Land Administration System (KLIS to KRAS)

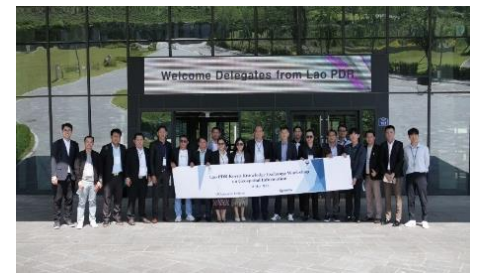
- ✓ Cutting edge technology of DB acquisition

Background of innovative surveying technology

Knowledge sharing of errors and trials in

- ✓ Korea type cadastral surveying & Spatial information standard & quality control

Introduction to standard & quality control



6. Procurement

2 Vehicles



Server 1 set



6 Desktop Computers



2 Scanners



Survey equipment



Donation

- 3 total stations , 3 pen computers
- 3 laptop computers
- Other surveying accessories
(prisms, poles, tripods, etc.)

1. Future Plan

✓ Basis and contents of Follow up project

Documentation from Lao gov.



□ Laos People's Democratic Republic □

Prime Minister – Deputy Prime Minister, Minister of Planning and Investment
2020~2023 EDCF Capital Loan

3. Production area project plan(100 mil. \$)
- Land information center construction (15 mil. \$)

Follow up project discussion



- ✓ Establishment of National Data Center (MoNRE)
- Data Center (Building, Server, etc.)
- Data utilization/service development
- Data sharing platform development



- ✓ Establishment and operation of training center (MoNRE)
- Training Center (Building)
- Curriculum development
- Certification program development

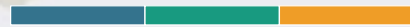


- ✓ Spatial database construction
- Natural environment DB
- Orthophoto covering entire country

➡ Deliver detailed project concept paper to EDCF office in Lao PDR & MoNRE



Thank you



Q&A