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ISTANBUL

The Nation Land Capacity Building Model for Informatization

– an ICT based model to strengthen human resource capacity for the sustainability of land administration modernization projects

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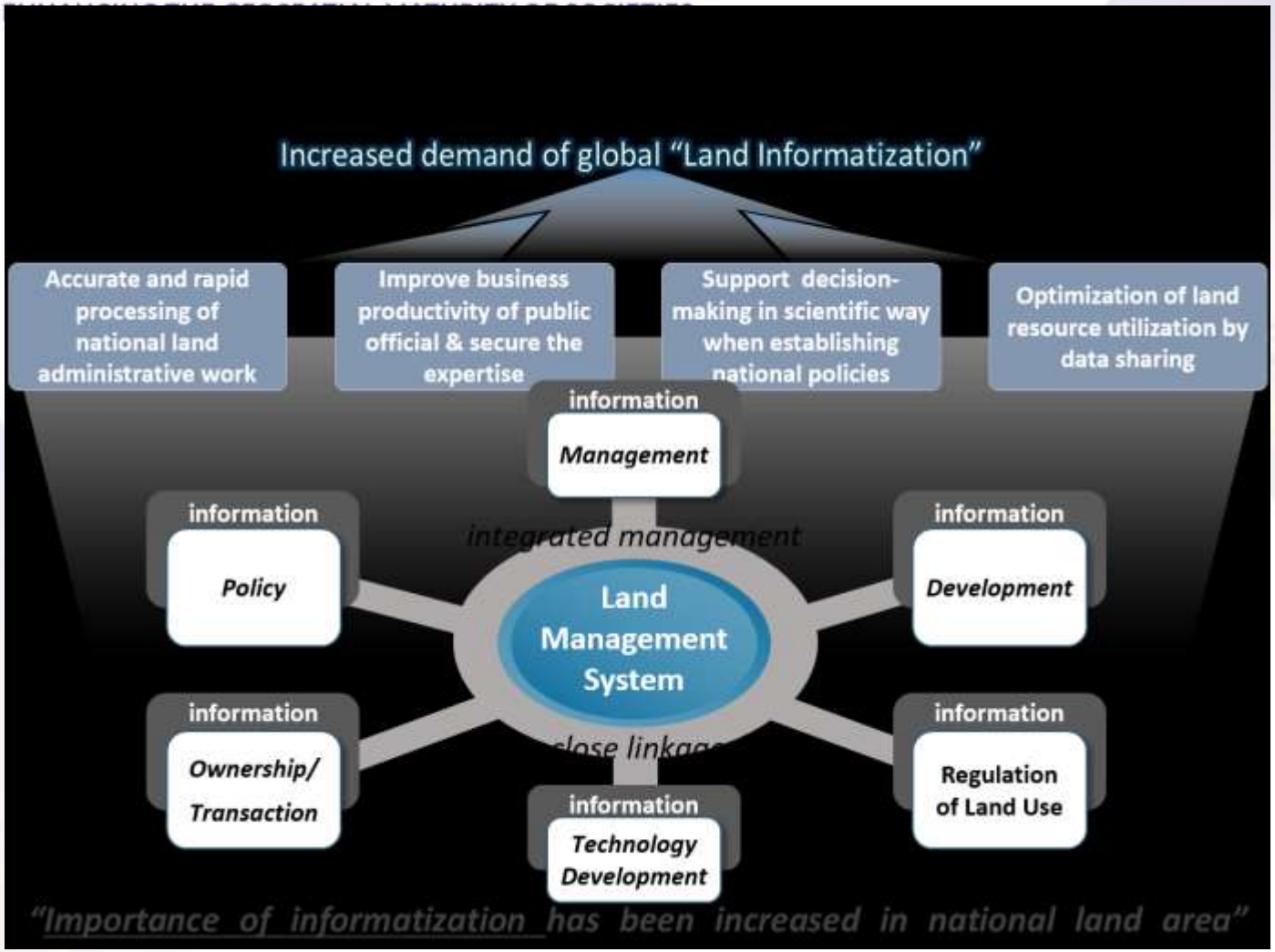
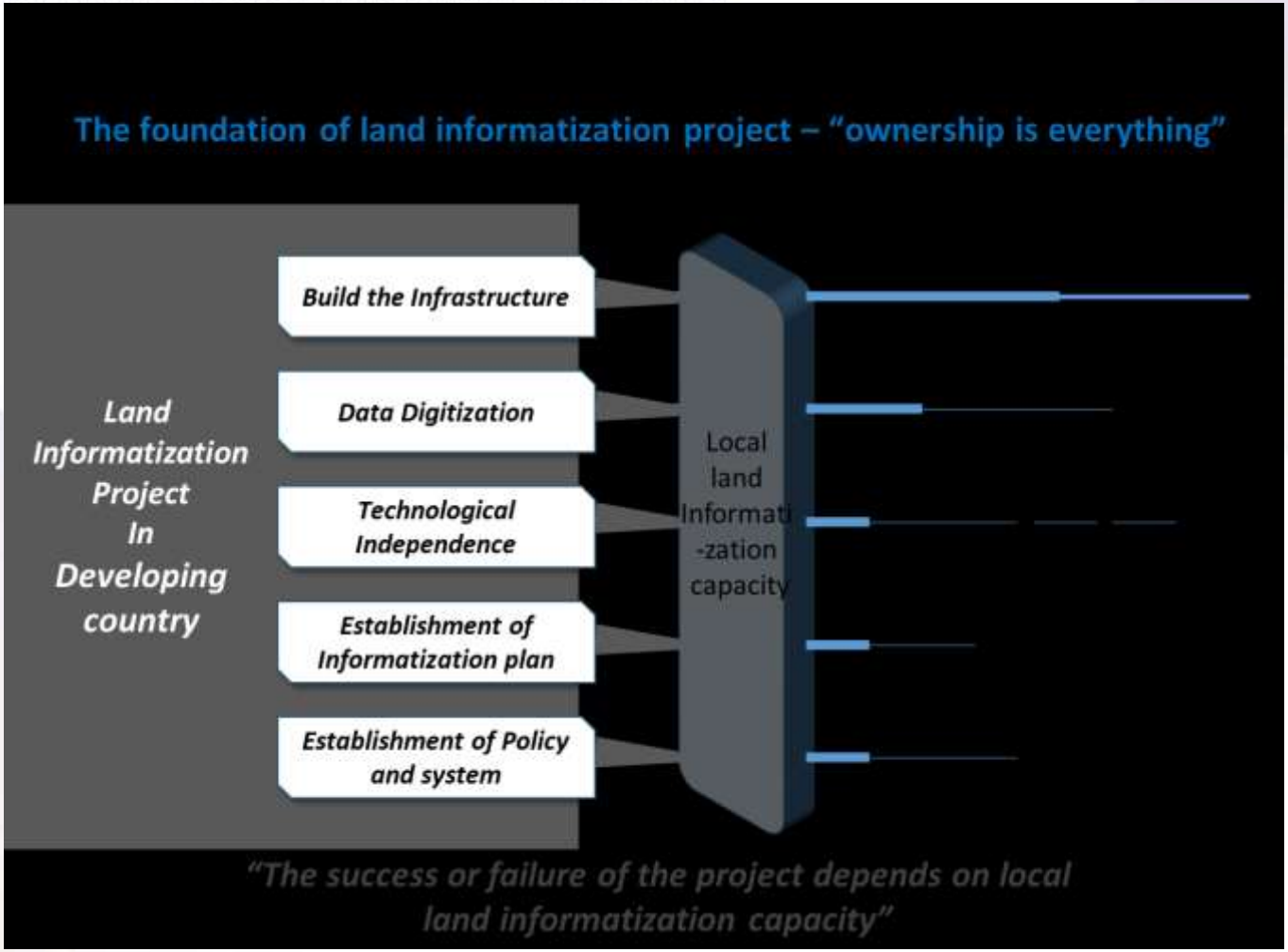
What is Capacity Building?

" the ability of people, organization, and society as whole to manage their affairs successfully." (OECD/DAC 2006)

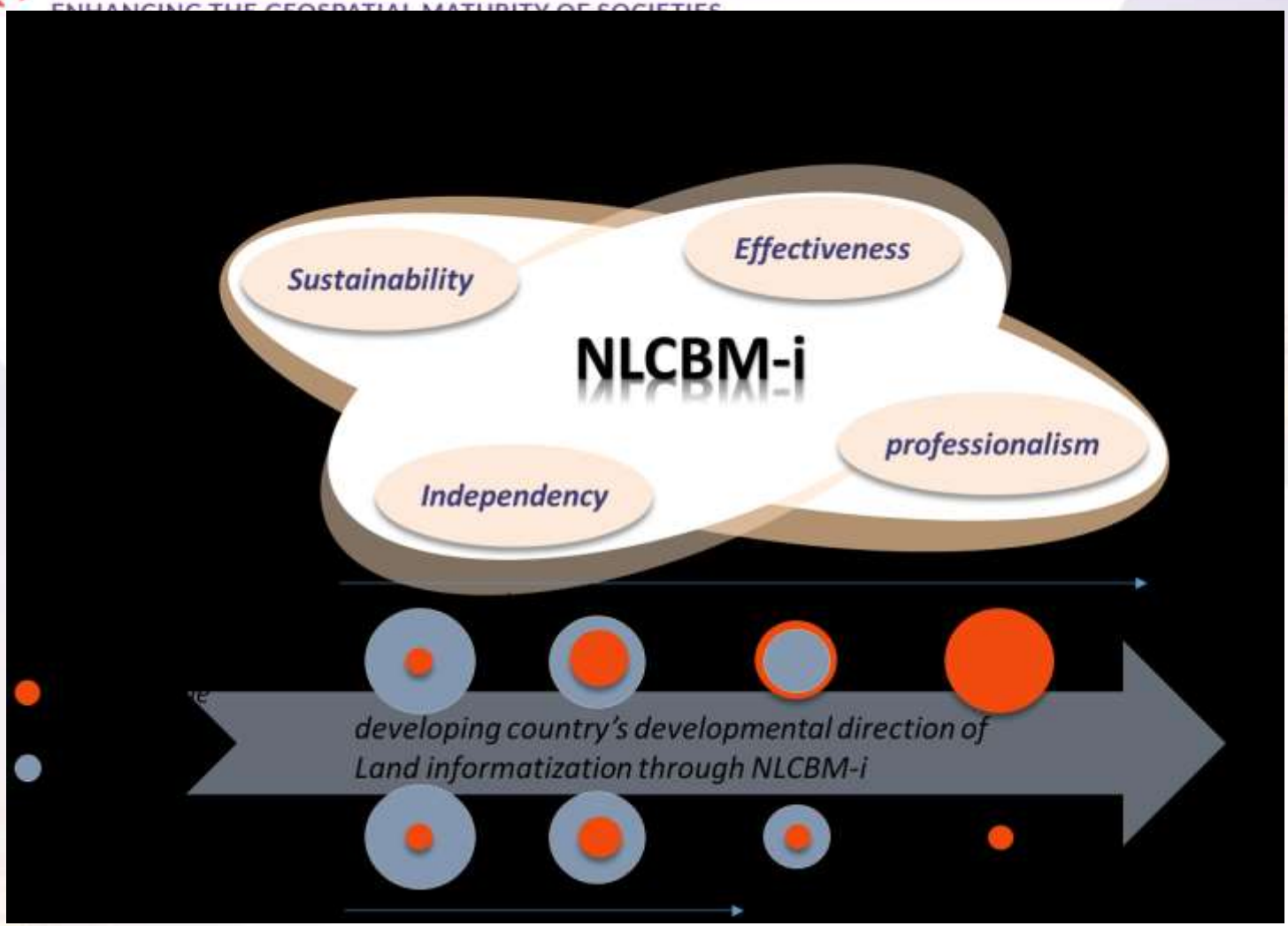
" the ability of individuals and organization and organizational units to perform functions effectively, efficiently, and sustainably." (UNDP, 1998).

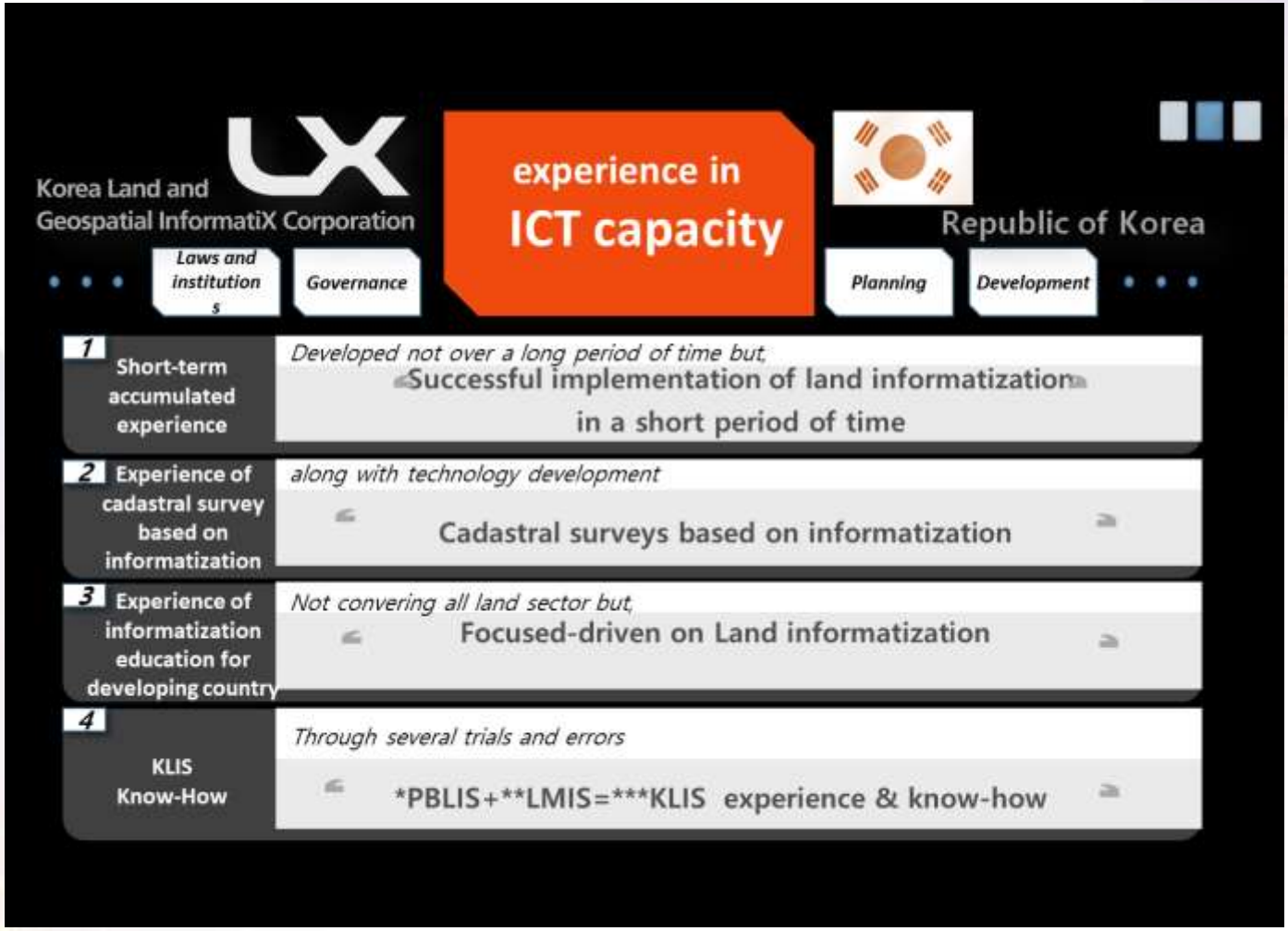
" … (i) capacity is not a passive state but is part of a continuing process; (ii) it ensures that human resources and the way in which they are utilized are central to capacity development; and (iii) it requires that the overall context within which organizations undertake their functions will also be a key consideration in strategies for capacity development." ("Capacity Building in Land Administration – A Conceptual Approach"by Enemark and Williamson 2004)


Increased demand of global "Land Informatization"
Accurate and rapid processing of national land administrative work
Improve business productivity of public official & secure the expertise
Support decision-making in scientific way when establishing national policies
Optimization of land resource utilization by data sharing
information
Management
information
Policy
integrated management
information
Development
Land Management System
information
Ownership/ Transaction
information
Regulation of Land Use
information
Technology Development
"Importance of informatization has been increased in national land area"


The foundation of land informatization project – "ownership is everything"
Land Informatization Project In Developing country
Build the Infrastructure
Data Digitization
Technological Independence
Establishment of Informatization plan
Establishment of Policy and system
Local land Informati -zation capacity
"The success or failure of the project depends on local land informatization capacity"


Capacity building focusing on
Land informatization
National Land informatization Policy
Plan
Introduction
Application
Assessment
National Land Data
Survey/ Processing
Digitization
Analysis
Management
National Land Management (information) System
Analysis
Design
Development/ Test
Maintenance

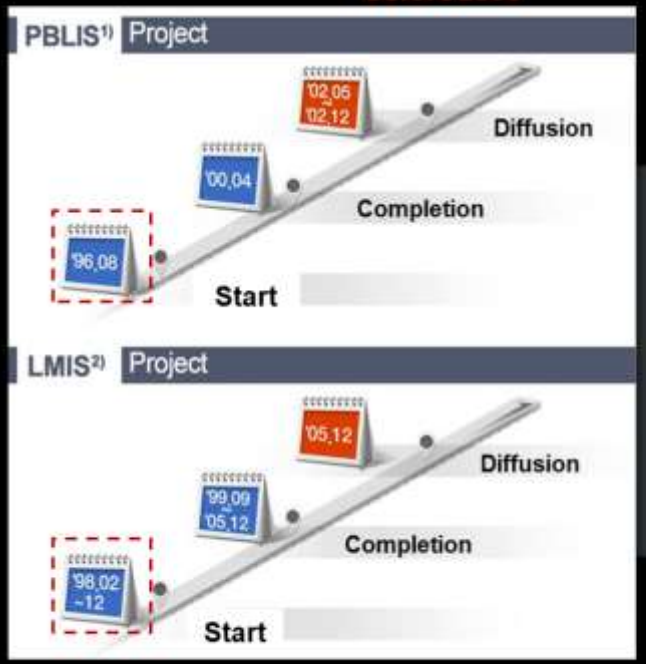

Sustainability
Effectiveness
NLCBM-i
professionalism
Independency
developing country's developmental direction of
Land informatization through NLCBM-i


Korea Land and Geospatial InformatiX Corporation
experience in ICT capacity
Republic of Korea
Laws and institutions
Governance
Planning
Development
1 Short-term accumulated experience
Developed not over a long period of time but,
Successful implementation of land informatization in a short period of time
2 Experience of cadastral survey based on informatization
along with technology development
Cadastral surveys based on informatization
3 Experience of informatization education for developing country
Not convering all land sector but,
Focused-driven on Land informatization
4 KLIS Know-How
Through several trials and errors
*PBLIS+**LMIS=***KLIS experience & know-how

Construction of a nationwide ICT-based system

using an ultra high-speed national network, linking the Ministry of Land, Infrastructure, and Transport with 17 metropolitan cities and provinces, and 229 cities, counties, and wards

Before 2006



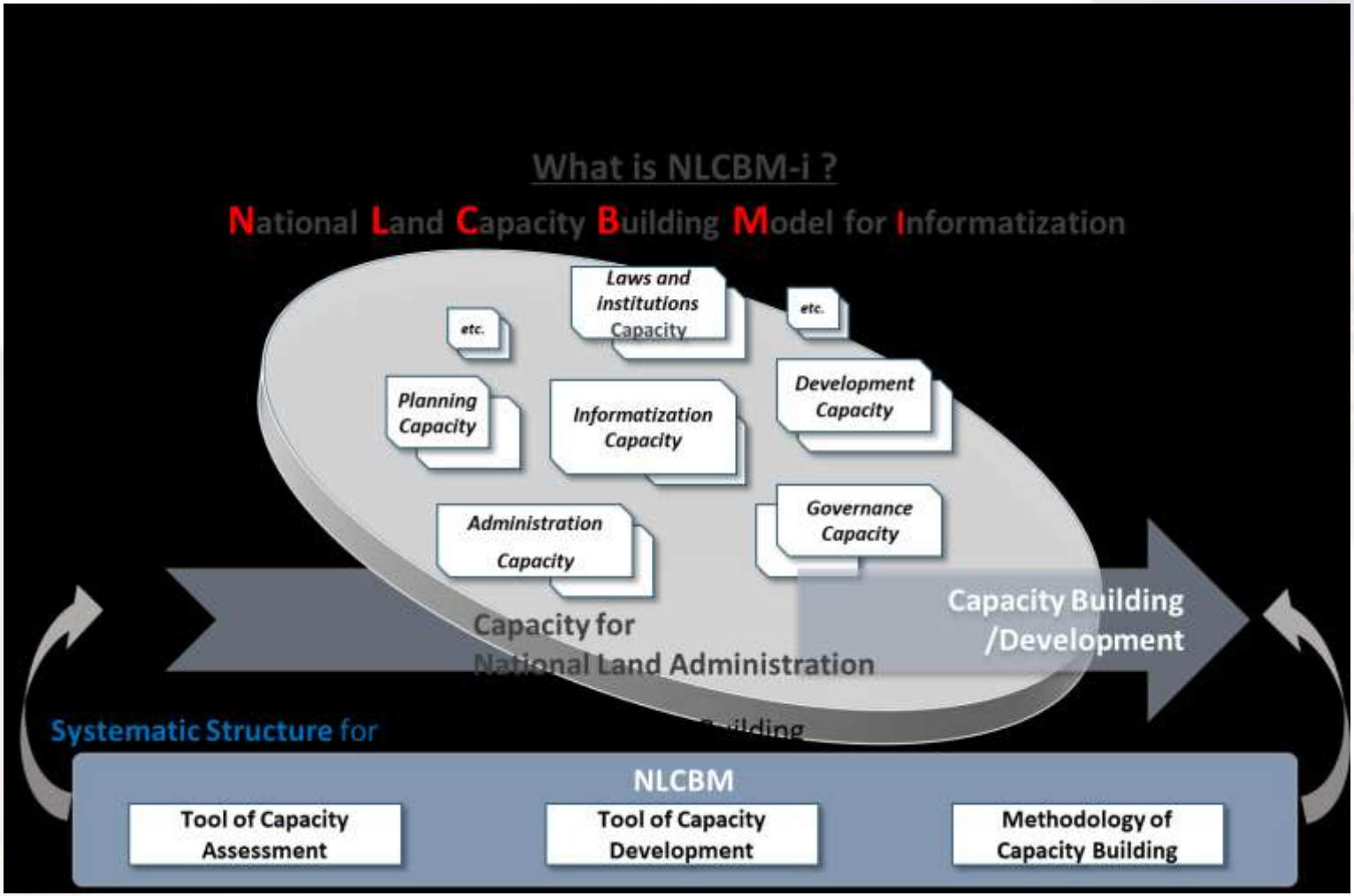
After 2006

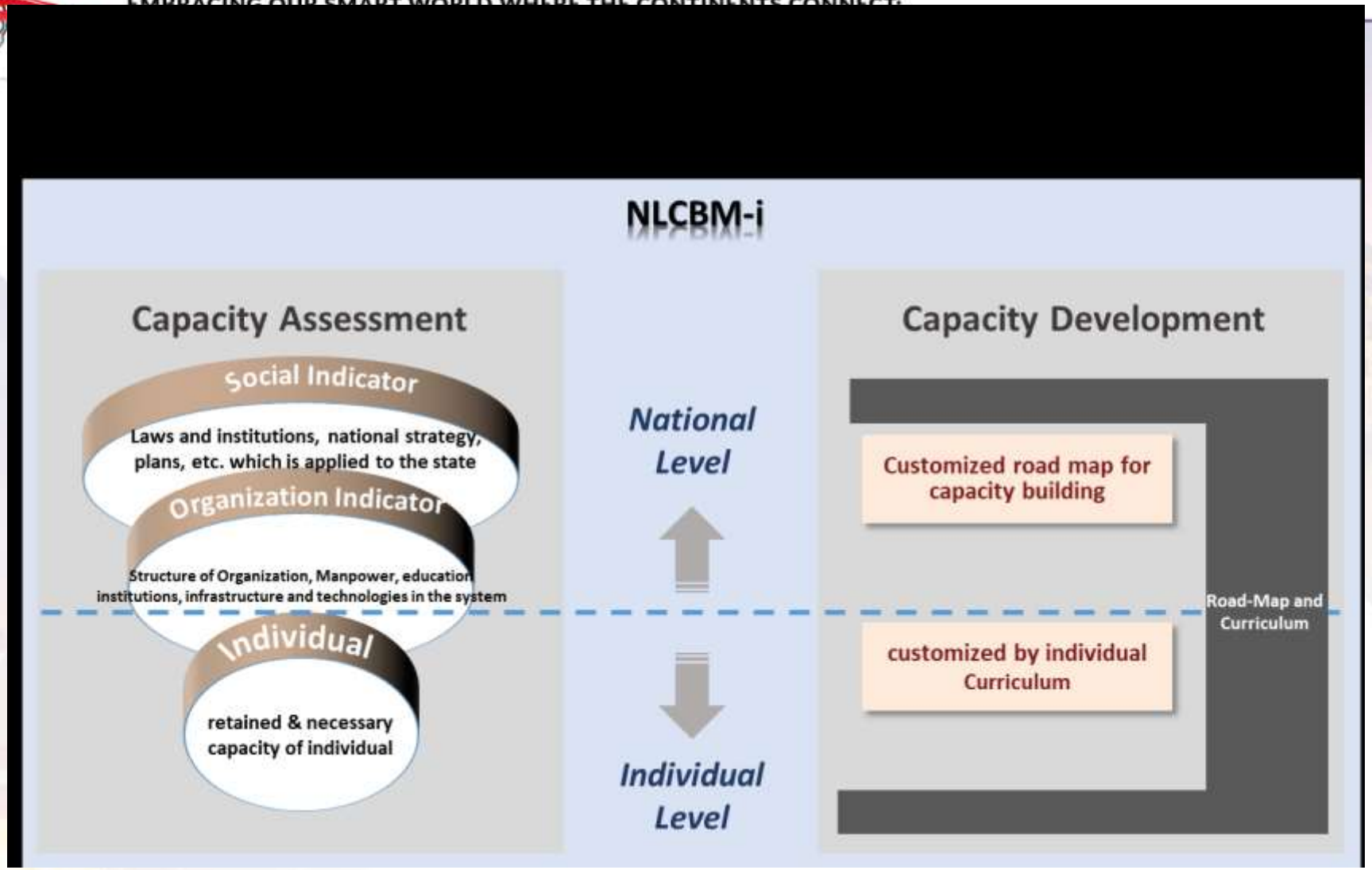
KLIS Project

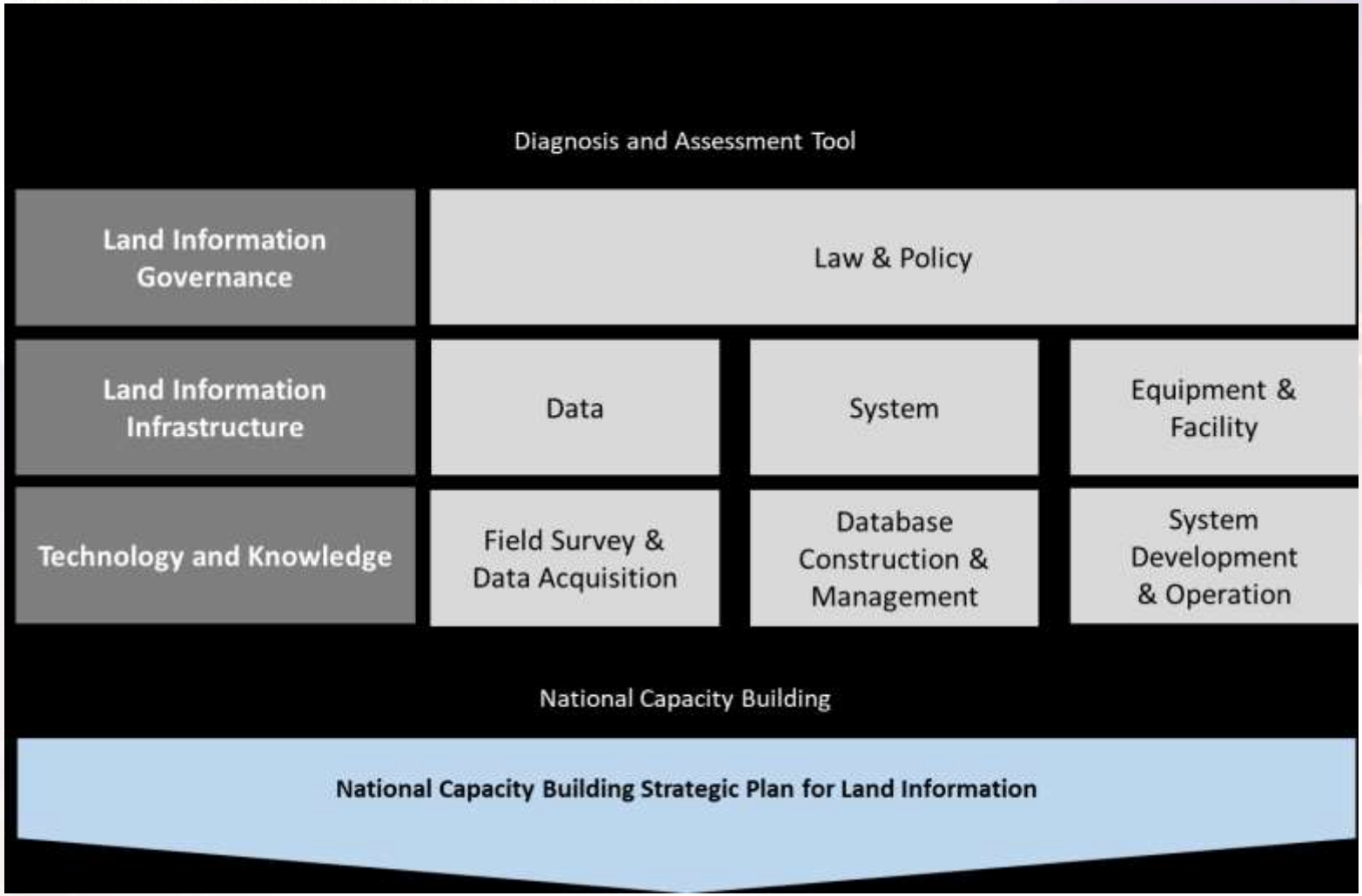
- **Integration Development** with Office of Prime Minister's Public Order (PBLIS + LMIS)
- Completed in 2006
- Maintenance & update on-going

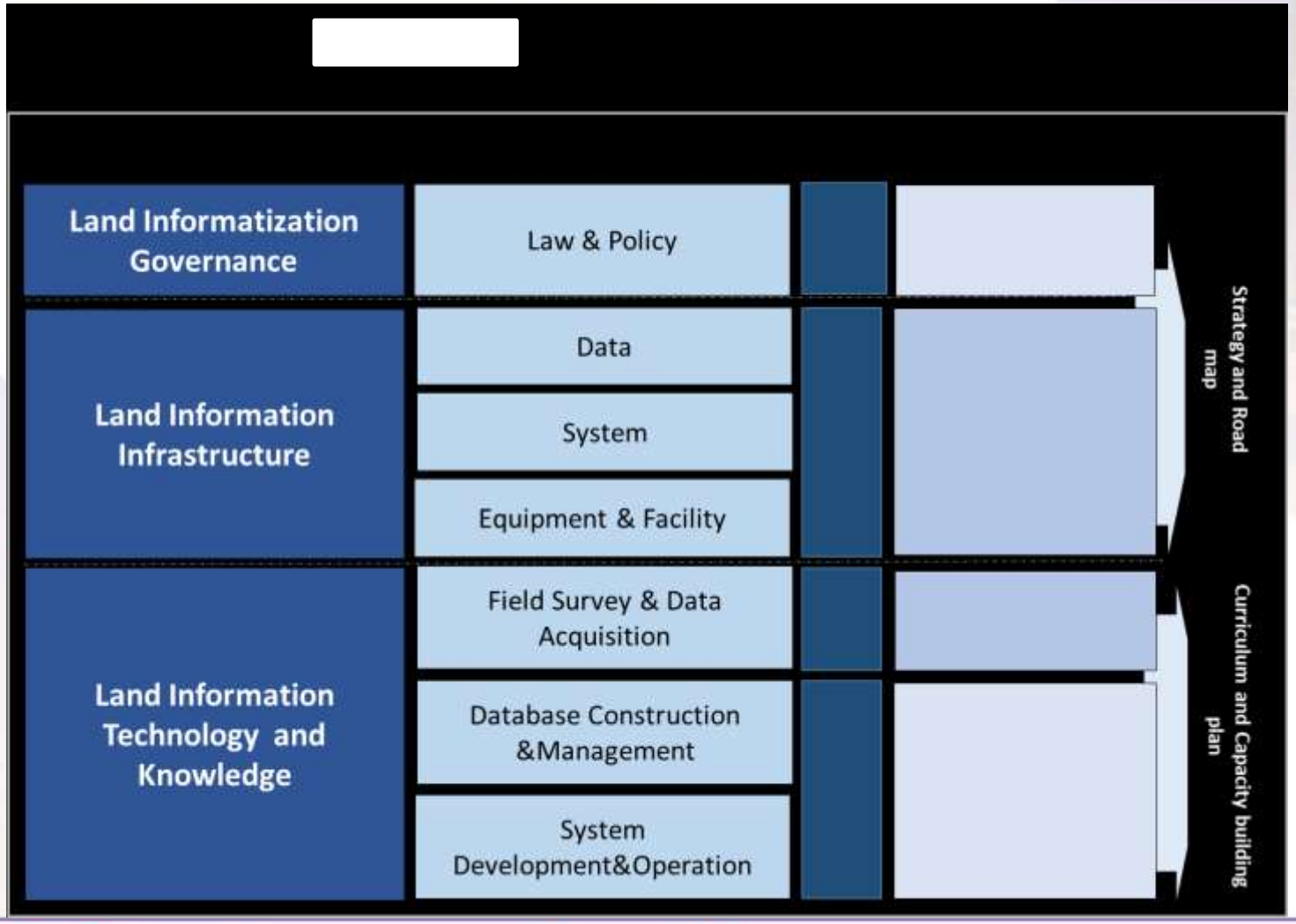
[KLIS Project Cost]

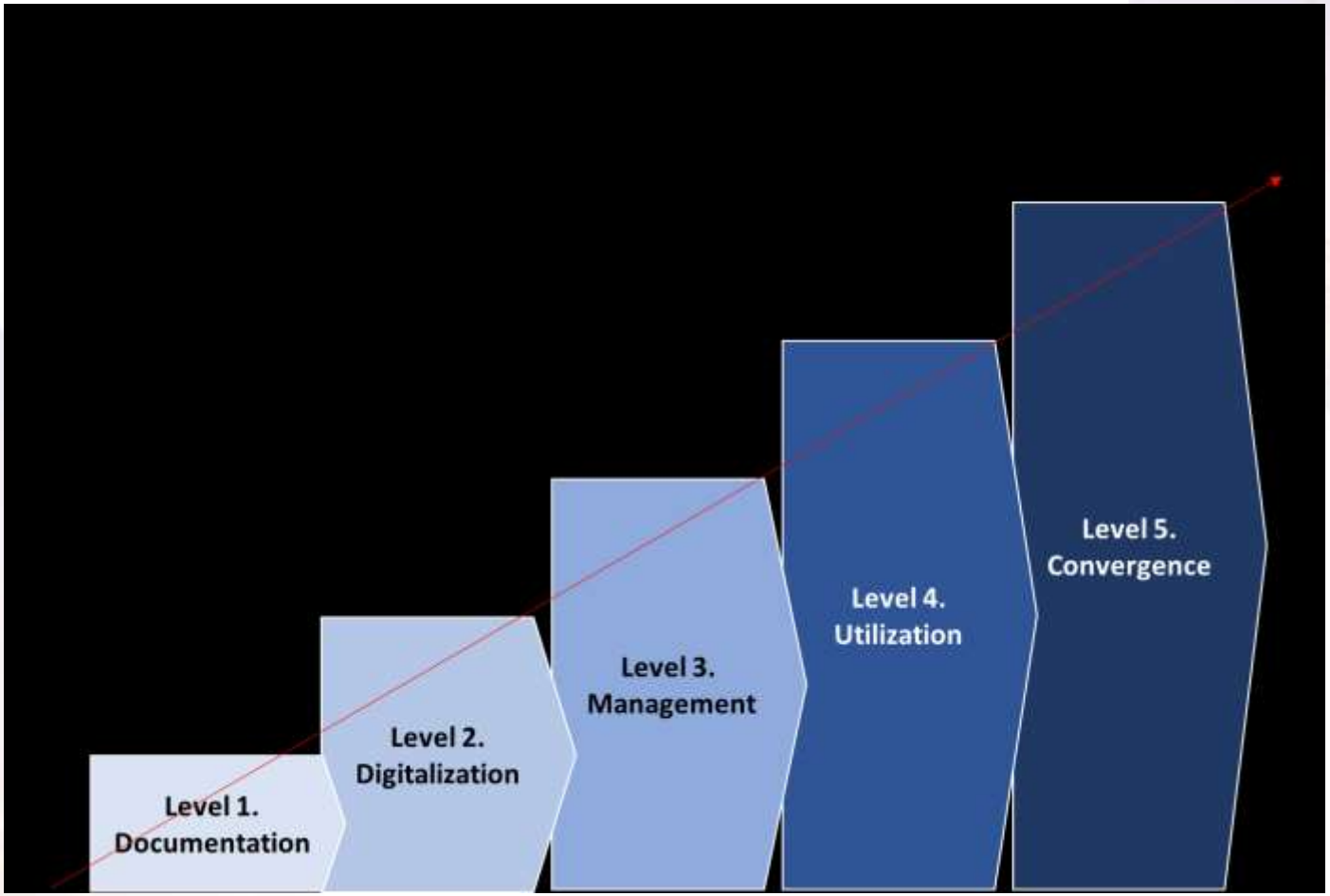
	Before 2006	After 2006	TOTAL
LMIS	200	-	(Unit: USD mil.)
PBLIS	109	-	
KLIS	-	36	
TOTAL	309	36	345

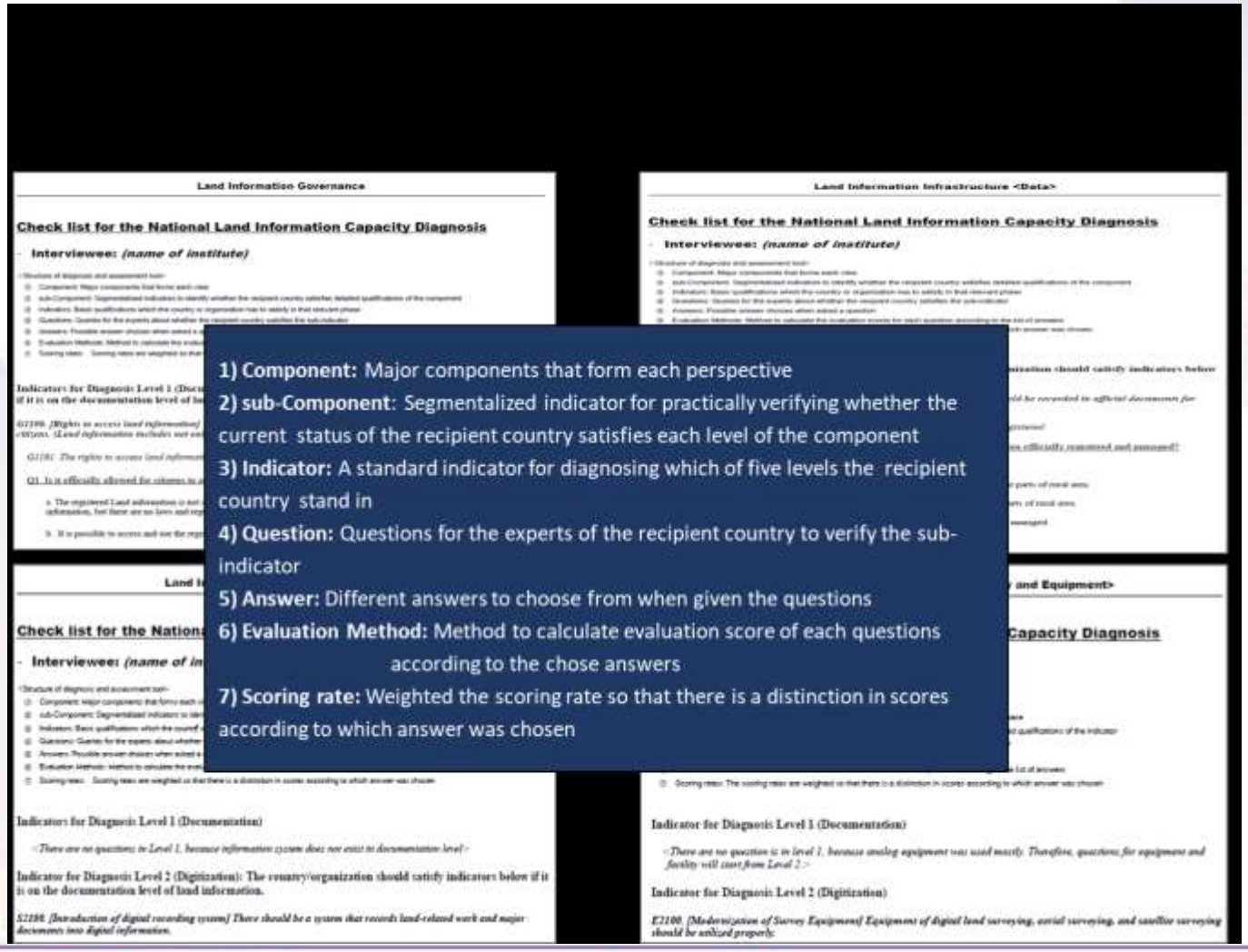

What is NLCBM-i ?
National Land Capacity Building Model for Informatization
Laws and institutions Capacity
etc.
etc.
Planning Capacity
Informatization Capacity
Development Capacity
Administration Capacity
Governance Capacity
Capacity for National Land Administration
Capacity Building /Development
Systematic Structure for
NLCBM
Tool of Capacity Assessment
Tool of Capacity Development
Methodology of Capacity Building


NLCBM-i
Capacity Assessment
Social Indicator
Laws and institutions, national strategy, plans, etc. which is applied to the state
Organization Indicator
Structure of Organization, Manpower, education institutions, infrastructure and technologies in the system
Individual
retained & necessary capacity of individual
National Level
Individual Level
Capacity Development
Customized road map for capacity building
customized by individual Curriculum
Road-Map and Curriculum


Diagnosis and Assessment Tool
Land Information Governance
Law & Policy
Land Information Infrastructure
Data
System
Equipment & Facility
Technology and Knowledge
Field Survey & Data Acquisition
Database Construction & Management
System Development & Operation
National Capacity Building
National Capacity Building Strategic Plan for Land Information


Land Informatization Governance
Law & Policy
Land Information Infrastructure
Data
System
Equipment & Facility
Land Information Technology and Knowledge
Field Survey & Data Acquisition
Database Construction &Management
System Development&Operation
Strategy and Road map
Curriculum and Capacity building plan


Level 1.
Documentation
Level 2.
Digitalization
Level 3.
Management
Level 4.
Utilization
Level 5.
Convergence



1) **Component:** Major components that form each perspective
2) **sub-Component**: Segmentalized indicator for practically verifying whether the current status of the recipient country satisfies each level of the component
3) **Indicator:** A standard indicator for diagnosing which of five levels the recipient country stand in
4) **Question:** Questions for the experts of the recipient country to verify the sub-indicator
5) **Answer:** Different answers to choose from when given the questions
6) **Evaluation Method:** Method to calculate evaluation score of each questions according to the chose answers
7) **Scoring rate:** Weighted the scoring rate so that there is a distinction in scores according to which answer was chosen

Key Assessment	
1	The basic right to access land information is guaranteed
2	Land information is not standardized
3	Administration of land information is conducted under legally defined roles and responsibilities
4	Lack of clearly defined legal framework pertaining to usage of digital land information
5	Preparation for utilizing spatial information is inadequate

Key Issue	
1	**[Category for Basic Land Use]** Land use category is not clearly defined by law. And also, the role to register the category is not clear among ministries
2	**[Category of Land Taxation]** There is no taxation on land. Only local tax exist in municipality
3	**[Standardization of Land Measure]** OTC recommends land measure system for land survey. But many surveyors still don't follow the system
4	**[Digitized Land Information Use]** There is no law and policy on usage and sharing of digitized Land information

Key Assessment	
1	Land information is managed in paper-based format, and land transactions are conducted with government validated paper-based document
2	Map production taking place independently with agencies often focus only on their short-term objectives. As a result, quality of maps are substandard and updates are not performed regularly
3	Land information is coded with identifiers in order to link information between organizations. Nevertheless, there are difficulties in linking use of information between organizations due to varying levels of sophistication among them
4	The environment is not fully developed to produce and manage digital land information
5	A new registration request is estimated to take at least nine months to complete

Key Issue	
1	**[Accuracy of registered land information]** There is no belief on the accuracy of land survey results. Because, in case of private company's land survey, there is no review process to check their results.
2	**[Land Information Digitalization]** 50% of OTC data is managed as analog
3	**[Digitalization of Land administration]** Most administrative proceedings and reports are process by hand
4	**[Data integration & Update]** Because of lack integration between other agencies, headquarters and branch offices, there is a difficulty of integration and update

Key Assessment Check List	
1	Tunisia operates a software application developed in-house that supports administrative tasks related to recording and managing land attributes information, and to register land, as well as certificate issuance
2	Even though cadastral maps are produced using Auto CAD, there is no single system that records and manages those cadastral maps
3	There is no integrated land information system that links access to and usage of major land information such as land attributes, cadastral maps, topography, etc

Key Issue	
1	**[Digital mapping]** Most surveyors use CAD for drawing cadastral plan, but they are lack of capacity to develop the digital seamless map. There is only digital seamless map for small area through a pilot project.
2	**[Information system for land administration]** There is tailored information system for reception and registration in CPF. But this system can not support full process for land administration.
3	**[Geographic cadastral information system]** There is no information system which is operated based on geographic data, and no information system for supporting land surveying, mapping, and land data processing

Key Assessment Check List	
1	Land surveys are conducted using modern surveying equipment including GPS
2	Even though cadastral maps are produced using Auto CAD, there is no single system that records and manages those cadastral maps
3	There is no integrated land information system that links access to and usage of major land information such as land attributes, cadastral maps, topography, etc.

Key Issue	
1	**[Utilization of aerial/satellite images]** OTC is difficult to acquire its own aerial/satellite images, but CNCT uses aerial/satellite images
2	**[Distribution of PC for land administration]** TI has a significantly lower PC distribution rate, but OTC and CPF have a high distribution rate of PCs.
3	**[Institutional data integration infrastructure]** There is no data center for the integrated management of data within the OTC organization, and there is no network for data linkage between headquarters and branch offices.

Key Assessment Check List	
1	Total stations are actively used to conduct cadastral surveys
2	CAD technology is available to all OTC surveyors
3	Geodetic Control Point (GCP) are well distributed across regions and 23 GNSS CORS are installed and fully operational
4	The technology to create Cadastral maps by processing aerial and satellite images is substandard
5	Only about 15 percent of OTC's cadastral and land diagram records are maintained in scanned form
6	Shortage of ge-oreferencing experts to perform coordinate conversion

Key Issue	
1	**[Analog data digitization]** Vectorizing is in progress, but most of the drawing data is simply scanned and archived / archived data is also simply scanned and archived
2	**[Utilization of aerial image and satellite imagery]** Lack of equipment makes it difficult to acquire aerial and satellite imagery and lacks image processing capability
3	**[GNSS CORS]** There are 23 CORS, but lacks operational and management capabilities and no training courses for installation / operation

Key Assessment Check List	
1	More than 90 percent of the working documents follow a standard format
2	Land documents are managed under separate process explicitly dedicated to update and maintain documents
3	PCs are utilized to input and save land data
4	Data architecture and standardization have not been implemented
5	No specialized personnel trained in DMBS
6	A comprehensive data base system has not been established

Key Issue	
1	**[Data architecture/ standardization]** Knowledge of data architecture absent and capacity is deficient
2	**[Data architecture]** Knowledge of data architecture absent and capacity is deficient
3	**[Build-up Maintenance]** Data maintenance level limited to scanning / enhancement is necessity

Key Assessment Check List	
1	Operational procedures and functional standards are defined
2	Use of GIS to perform administrative functions
3	Endowed with basic PC skills
4	Deficient knowledge of system architecture and standardization planning
5	Most organizations do not have an operational land information system
6	Most organizations do not have an IT room

Key Issue	
1	**[System Architecture/Standardization]** Lack of Architecture and Standardization knowledge / need for standardization
2	**[GIS S/W utilization]** GIS S / W is used for specific tasks but lacks knowledge about software tools
3	**[PC and Data Management]** Organizations that need to use PCs have a high penetration rate of PCs but not all organizations are not managed due to lack of dedicated IT department
4	**[Data Server Management]** There are data server, but lacks maintenance and operation capabilities

Assessment Items for Priority / Assessment Result			Tunisia				Korea			
			Strategic Importance				Strategic Importance			
			Strategic -①	Influence -②	Urgency -③	Average	Strategic -①	Influence -②	Urgency -③	Average
Governance	G01	Standardization for construction of land information database and system should precede	5	5	5	5.0	5	5	5	5.0
	G02	The legal basis for ensuring the scope and use rights of digitized land information should be secured	4.5	5	5	4.8	5	5	5	5.0
	G03	Land information system and land informatization plan should be established from the long-term perspective of spatial information convergence and integration	5	4.25	4.5	4.6	3	3	3	3.0
Data	D01	Systems and procedures must be established to produce and manage accurate land information.	4.25	4.5	4	4.3	5	5	4	4.7
	D02	Land ownership information, land administrative duties, cadastral maps, etc. should be computerized to obtain available data	4.17	5	3.25	4.1	4	4	5	4.3
	D03	To link and update the data, the land information data of the major agencies and their relationship should be structured and managed	3.25	3.25	2.5	3.0	3	5	4	4.0
System	S01	To create precise and efficient cadastral maps, an information system capable of producing computerized geographical information such as CAD should be secured	3.5	2.75	2.5	2.9	4	4	2	3.3
	S02	An information system based on geographical information should be established to manage cadastral maps and related land information.	4.75	4.25	2.5	3.8	5	5	4	4.7
	S03	Ortho-photo applications should be introduced for mapping	2.5	2.5	1.5	2.2	4	5	2	3.7
Equipment	F01	PC and modernization surveying equipment should be additionally supplied for computerization of land information.	3.75	3.5	2.75	3.3	3	5	3	3.7
	F02	Facilities and networks are needed for data integration management within main organizations.	3.25	3	2.5	2.9	3	5	5	4.3
Technology	T01	Train personnel to maintain and manage land information systems	4.5	4.25	3	3.9	5	5	4	4.7
	T02	Strengthen capacity to utilize digitized land information.	5	4.5	2.75	4.1	5	5	4	4.7

Assessment Result / Assessment Items for Priority			Strategic Importance (Average)	
			Tunisia	Korea
Governance	G01	Standardization for construction of land information database and system should precede	5.0	5.0
	G02	The legal basis for ensuring the scope and use rights of digitized land information should be secured	4.8	5.0
	G03	Land information system and land informatization plan should be established from the long-term perspective of spatial information convergence and integration	4.6	3.0
Data	D01	Systems and procedures must be established to produce and manage accurate land information.	4.3	4.7
	D02	Land ownership information, land administrative duties, cadastral maps, etc. should be computerized to obtain available data	4.1	4.3
	D03	To link and update the data, the land information data of the major agencies and their relationship should be structured and managed	3.0	4.0
System	S01	To create precise and efficient cadastral maps, an information system capable of producing computerized geographical information such as CAD should be secured	2.9	3.3
	S02	An information system based on geographical information should be established to manage cadastral maps and related land information.	3.8	4.7
	S03	Ortho-photo applications should be introduced for mapping	2.2	3.7
Equipment	F01	PC and modernization surveying equipment should be additionally supplied for computerization of land information.	3.3	3.7
	F02	Facilities and networks are needed for data integration management within main organizations.	2.9	4.3
Technology	T01	Train personnel to maintain and manage land information systems	3.9	4.7
	T02	Strengthen capacity to utilize digitized land information.	4.1	4.7

Assessment Result		Assessment Items for Priority	Strategic Importance Average	
			Tunisia	Korea
Governance	G03	Land information system and land informatization plan should be established from the long-term perspective of spatial information convergence and integration	4.6	3.0
Data	D03	To link and update the data, the land information data of the major agencies and their relationship should be structured and managed	3.0	4.0
System	S03	Ortho-photo applications should be introduced for mapping	2.2	3.7
Equipment	F02	Facilities and networks are needed for data integration management within main organizations.	2.9	4.3

It reflects the opinion of the Tunisian expert who understands the situation of the present Tunisia.

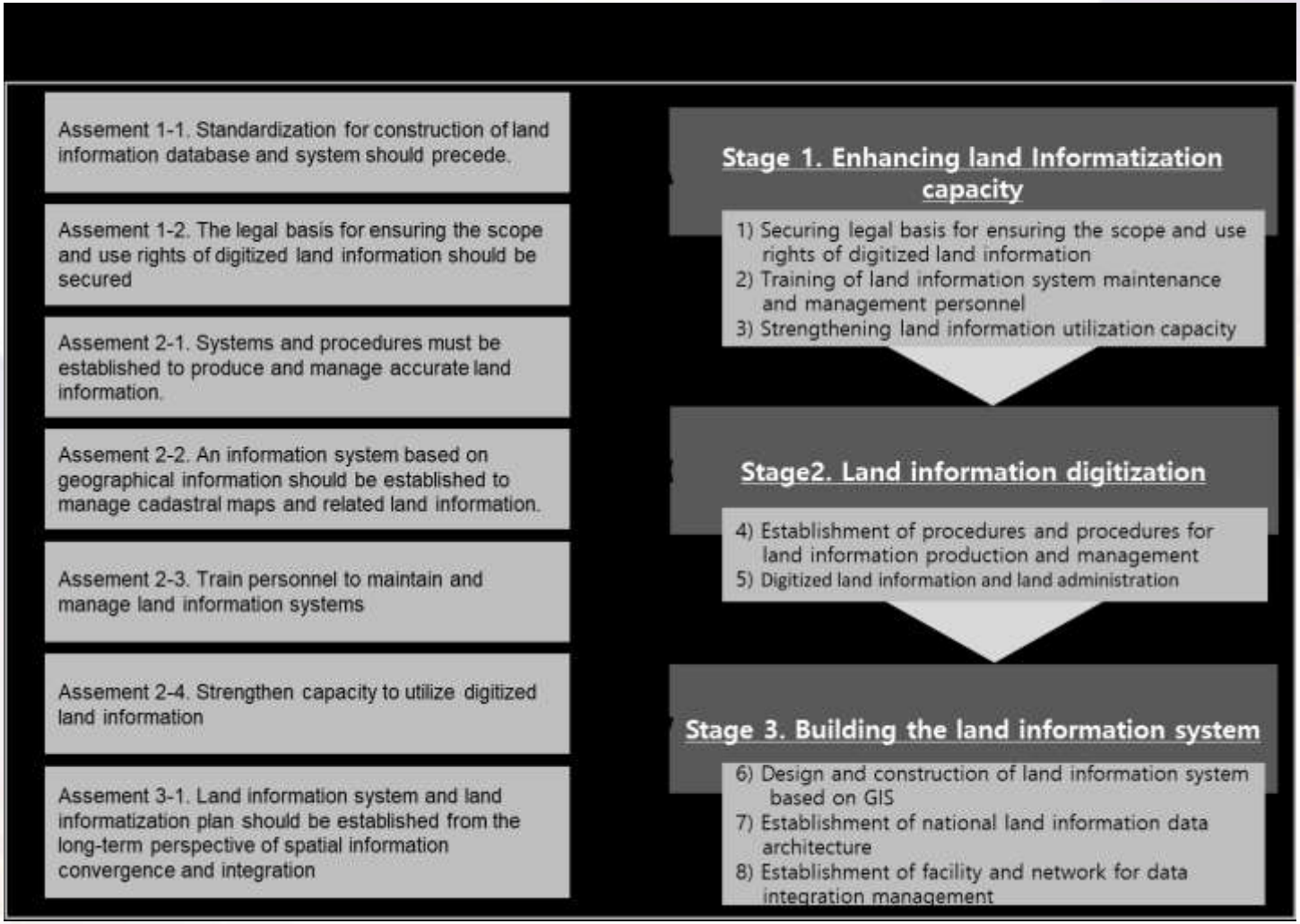
Since the data is in a state of insufficient data, it is determined that data acquisition is the priority and a low score is assigned. However, it is reasonable to maintain the opinions of the existing Korean experts considering the national level.

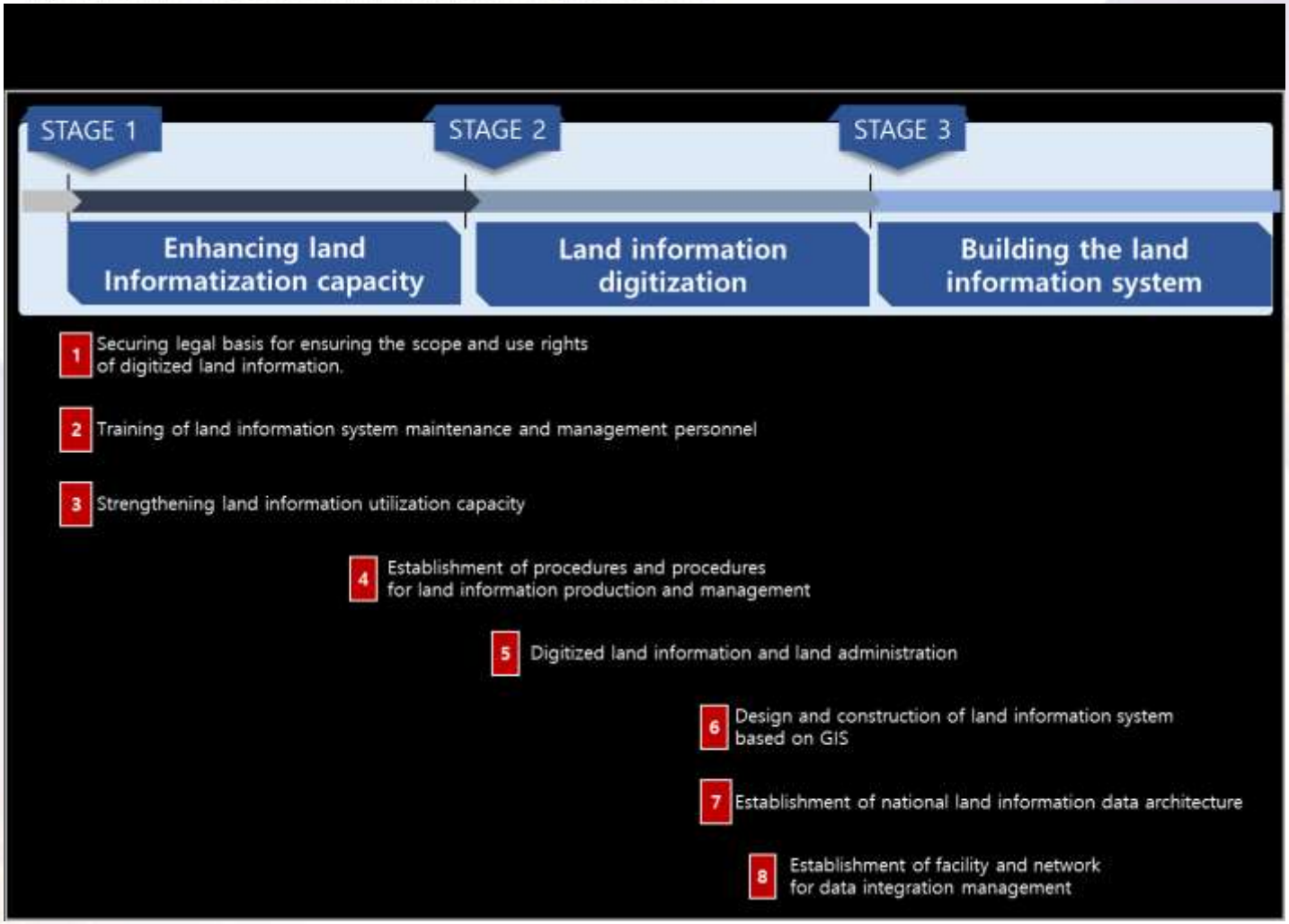
Due to the use of low-resolution orthographic and aerial photographs, there are some problems such as land disputes. Therefore, the reliability of orthographic and aerial photographs is low, and they are not urgently required at present.

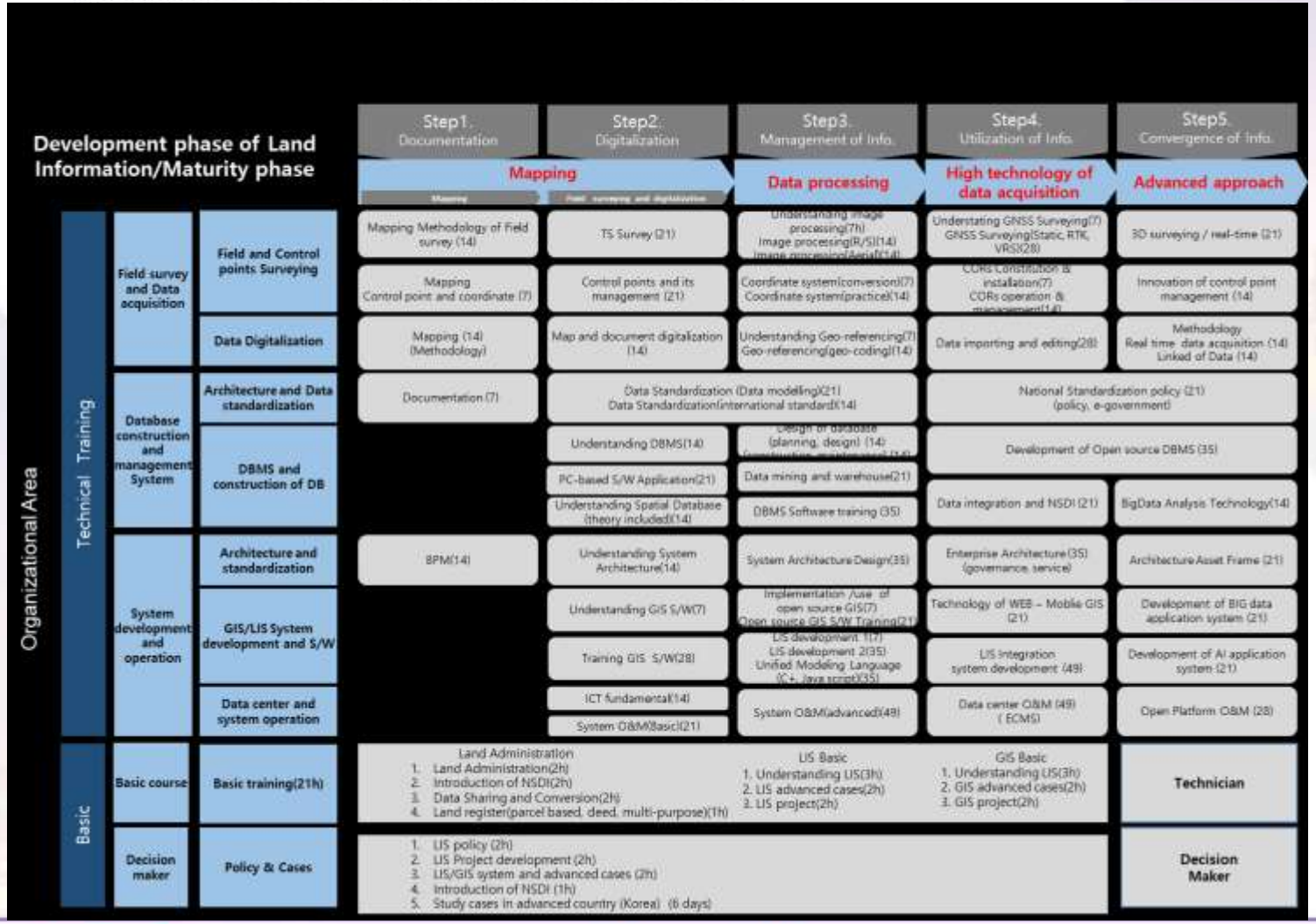
Securing data is more important than network construction. It is true that the network should be established for sharing, managing, utilizing, and securing the collected data after the data is collected to some extent, but the importance is low, now.

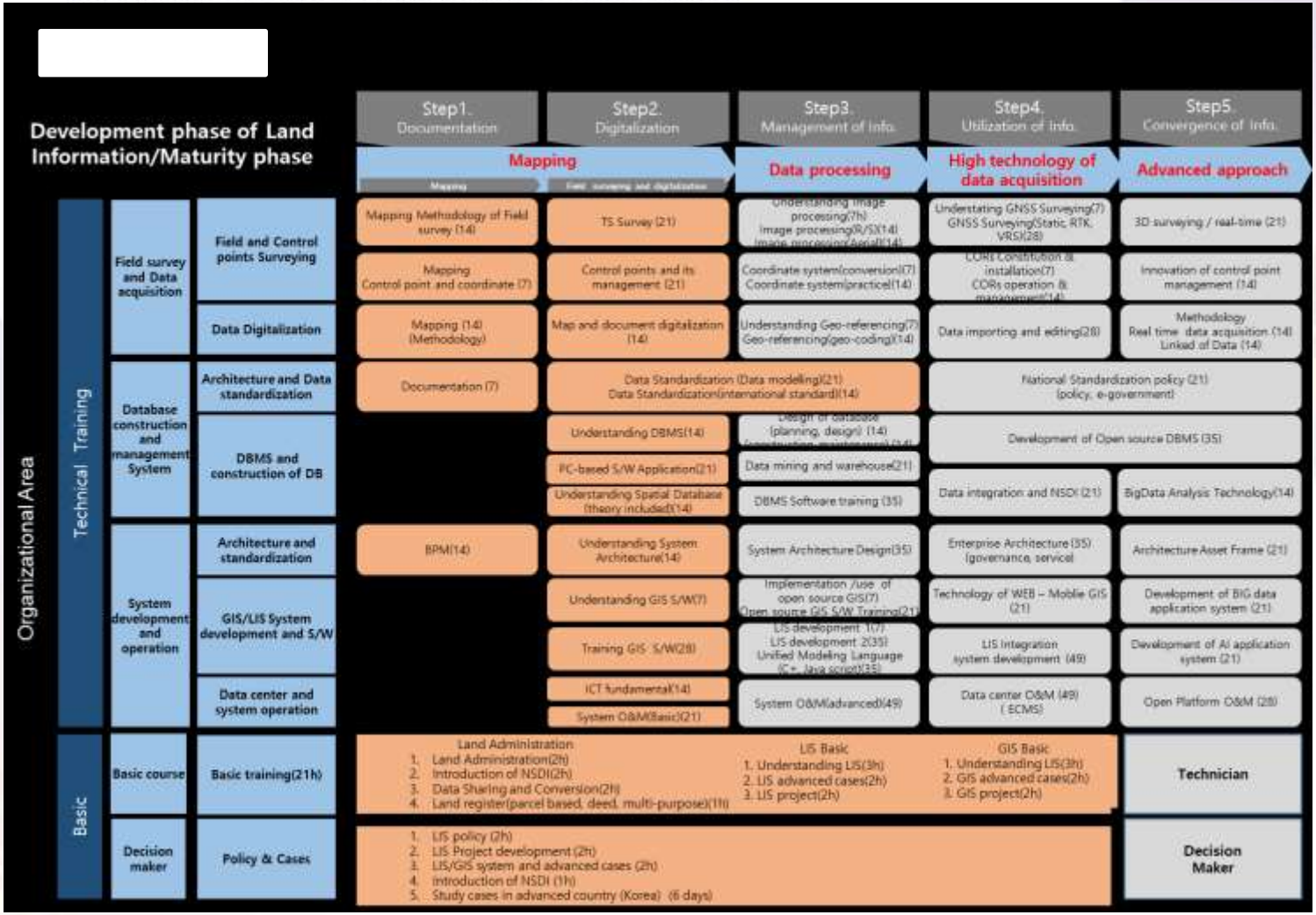
Assessment Result		Assessment Items for Priority	Strategic Importance	
			Average	Rank
Governance	G01	Standardization for construction of land information database and system should precede		1
	G02	The legal basis for ensuring the scope and use rights of digitized land information should be secured		1
	G03	Land information system and land informatization plan should be established from the long-term perspective of spatial information convergence and integration		3
Data	D01	Systems and procedures must be established to produce and manage accurate land information.		2
	D02	Land ownership information, land administrative duties, cadastral maps, etc. should be computerized to obtain available data		
	D03	To link and update the data, the land information data of the major agencies and their relationship should be structured and managed		
System	S01	To create precise and efficient cadastral maps, an information system capable of producing computerized geographical information such as CAD should be secured		
	S02	An information system based on geographical information should be established to manage cadastral maps and related land information.		2
	S03	Ortho-photo applications should be introduced for mapping		
Equipment	F01	PC and modernization surveying equipment should be additionally supplied for computerization of land information.		
	F02	Facilities and networks are needed for data integration management within main organizations.		
Technology	T01	Train personnel to maintain and manage land information systems		2
	T02	Strengthen capacity to utilize digitized land information.		2

(G01) Standardization for construction of land information database and system should precede	1
(G02) The legal basis for ensuring the scope and use rights of digitized land information should be secured	1
(D01) Systems and procedures must be established to produce and manage accurate land information.	2
(S02) An information system based on geographical information should be established to manage cadastral maps and related land information.	2
(T01) Train personnel to maintain and manage land information systems	2
(T02) Strengthen capacity to utilize digitized land information	2
(G03) Land information system and land informatization plan should be established from the long-term perspective of spatial information convergence and integration	3


Assement 1-1. Standardization for construction of land information database and system should precede.
Assement 1-2. The legal basis for ensuring the scope and use rights of digitized land information should be secured
Assement 2-1. Systems and procedures must be established to produce and manage accurate land information.
Assement 2-2. An information system based on geographical information should be established to manage cadastral maps and related land information.
Assement 2-3. Train personnel to maintain and manage land information systems
Assement 2-4. Strengthen capacity to utilize digitized land information
Assement 3-1. Land information system and land informatization plan should be established from the long-term perspective of spatial information convergence and integration
Stage 1. Enhancing land Informatization capacity
1) Securing legal basis for ensuring the scope and use rights of digitized land information
2) Training of land information system maintenance and management personnel
3) Strengthening land information utilization capacity
Stage2. Land information digitization
4) Establishment of procedures and procedures for land information production and management
5) Digitized land information and land administration
Stage 3. Building the land information system
6) Design and construction of land information system based on GIS
7) Establishment of national land information data architecture
8) Establishment of facility and network for data integration management


STAGE 1
STAGE 2
STAGE 3
Enhancing land Informatization capacity
Land information digitization
Building the land information system
1 Securing legal basis for ensuring the scope and use rights of digitized land information.
2 Training of land information system maintenance and management personnel
3 Strengthening land information utilization capacity
4 Establishment of procedures and procedures for land information production and management
5 Digitized land information and land administration
6 Design and construction of land information system based on GIS
7 Establishment of national land information data architecture
8 Establishment of facility and network for data integration management


Development phase of Land Information/Maturity phase
Step1. Documentation
Step2. Digitalization
Step3. Management of Info.
Step4. Utilization of Info.
Step5. Convergence of Info.
Mapping
Data processing
High technology of data acquisition
Advanced approach
Organizational Area
Technical Training
Basic
Field survey and Data acquisition
Database construction and management System
System development and operation
Basic course
Decision maker
Field and Control points Surveying
Data Digitalization
Architecture and Data standardization
DBMS and construction of DB
Architecture and standardization
GIS/LIS System development and S/W
Data center and system operation
Basic training(21h)
Policy & Cases
Mapping Methodology of Field survey (14)
TS Survey (21)
Understanding image processing(7h)
Image processing(R/S)(14)
Understanding GNSS Surveying(7)
GNSS Surveying(Static, RTK, VRS)(28)
3D surveying / real-time (21)
Mapping Control point and coordinate (7)
Control points and its management (21)
Coordinate system(conversion)(7)
Coordinate system(practice)(14)
CORs Constitution & installation(7)
CORs operation &
Innovation of control point management (14)
Mapping (14) (Methodology)
Map and document digitalization (14)
Understanding Geo-referencing(7)
Geo-referencing(geo-coding)(14)
Data importing and editing(28)
Methodology Real time data acquisition (14) Linked of Data (14)
Documentation (7)
Data Standardization (Data modelling)(21)
Data Standardization(International standard)(14)
National Standardization policy (21) (policy, e-government)
Understanding DBMS(14)
Design of database (planning, design) (14)
Development of Open source DBMS (35)
PC-based S/W Application(21)
Data mining and warehouse(21)
Understanding Spatial Database (theory included)(14)
DBMS Software training (35)
Data integration and NSDI (21)
BigData Analysis Technology(14)
BPM(14)
Understanding System Architecture(14)
System Architecture Design(35)
Enterprise Architecture(35) (governance, service)
Architecture Asset Frame (21)
Understanding GIS S/W(7)
Implementation /use of open source GIS(7)
Open source GIS S/W Training(21)
Technology of WEB - Mobile GIS (21)
Development of BIG data application system (21)
Training GIS S/W(28)
LIS development 1(7)
LIS development 2(35)
Unified Modeling Language (C++, Java script)(35)
LIS Integration system development (49)
Development of AI application system (21)
ICT fundamental(14)
System O&M(advanced)(49)
Data center O&M (49) (ECMS)
Open Platform O&M (28)
System O&M(Basic)(21)
Land Administration
1. Land Administration(2h)
2. Introduction of NSDI(2h)
3. Data Sharing and Conversion(2h)
4. Land register(parcel based, deed, multi-purpose)(1h)
LIS Basic
1. Understanding LIS(3h)
2. LIS advanced cases(2h)
3. LIS project(2h)
GIS Basic
1. Understanding LIS(3h)
2. GIS advanced cases(2h)
3. GIS project(2h)
Technician
1. LIS policy (2h)
2. LIS Project development (2h)
3. LIS/GIS system and advanced cases (2h)
4. Introduction of NSDI (1h)
5. Study cases in advanced country (Korea) (6 days)
Decision Maker


Development phase of Land Information/Maturity phase
Step1. Documentation
Step2. Digitalization
Step3. Management of Info.
Step4. Utilization of Info.
Step5. Convergence of Info.
Mapping
Data processing
High technology of data acquisition
Advanced approach
Organizational Area
Technical Training
Basic
Field survey and Data acquisition
Field and Control points Surveying
Data Digitalization
Database construction and management System
Architecture and Data standardization
DBMS and construction of DB
System development and operation
Architecture and standardization
GIS/LIS System development and S/W
Data center and system operation
Basic course
Basic training(21h)
Decision maker
Policy & Cases
Mapping Methodology of Field survey (14)
TS Survey (21)
Understanding Image processing(7h)
Understating GNSS Surveying(7)
GNSS Surveying(Static, RTK, VRS)(28)
3D surveying / real-time (21)
Mapping Control point and coordinate (7)
Control points and its management (21)
Coordinate system(conversion)(7)
Coordinate system(practice)(14)
CORS Constitution & installation(7)
CORs operation & management(14)
Innovation of control point management (14)
Mapping (14) (Methodology)
Map and document digitalization (14)
Understanding Geo-referencing(7)
Geo-referencing(geo-coding)(14)
Data importing and editing(28)
Methodology
Real time data acquisition (14)
Linkad of Data (14)
Documentation (7)
Data Standardization (Data modeling)(21)
Data Standardization(international standard)(14)
National Standardization policy (21) (policy, e-government)
Understanding DBMS(14)
Design of database (planning, design) (14)
Development of Open source DBMS (35)
PC-based S/W Application(21)
Data mining and warehouse(21)
Understanding Spatial Database (theory included)(14)
DBMS Software training (35)
Data integration and NSDI (21)
BigData Analysis Technology(14)
BPM(14)
Understanding System Architecture(14)
System Architecture Design(35)
Enterprise Architecture (35) (governance, service)
Architecture Asset Frame (21)
Understanding GIS S/W(7)
Implementation /use of open source GIS(7)
Technology of WEB – Moblie GIS (21)
Development of BIG data application system (21)
Training GIS S/W(28)
LIS development 1(7)
LIS development 2(35)
Unified Modeling Language
LIS integration system development (49)
Development of AI application system (21)
ICT fundamental(14)
System O&M(advanced)(49)
Data center O&M (49) (ECMS)
Open Platform O&M (28)
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Thanks for your attention!

Q & A