Introduction of National Land Survey and monitoring in China

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- **General Information of land management**

- **The 1st Round National Land Survey**

- **The 2nd Round National Land Survey**

- **National Land Use Change Survey**

- **The 3rd Round National Land Survey**

Part 1

General Information of land management in China

Ⅰ. Land Management System

■ **The People's Republic of China practices** socialist public ownership of land, namely, **state ownership and rural collective ownership.**

● **State Ownership（53%）**：**State Ownership means that the State Council exercises the right of ownership of State-owned land and land use unit and individual only have land use right.**

● **Rural Collective Ownership（47%）**：**The ownership of rural-collective owned land belongs to the rural collective and the land is operated and managed by rural collective economic organization or villager's committee.**

II. Agency and Responsibility

- **1986-1998:**
- ➤ **State land Administration（SLA）**
- ➤ **managing the land all over the country**
- **1998- March 2018**
- ➤ **Ministry of Land and Resources（MLR）**
- ➤ **managing land, mineral and marine resources in China.**
- **March 2018—present**
- ➤ **Ministry of Natural Resources（MNR）**
- ➤ **managing natural resources in China.**

III. Institutional framework

■ **A five-level institutional framework of land management from Central to local government**

➤ **National**

➤ **Province**

➤ **City (Prefecture-level city)**

➤ **County (county level city)**

➤ **Township**

IV. National Land Survey

- **1984--1996：The 1st Round National Land Survey**

- **2007--2009：The 2nd Round National Land Survey**

- **2010--2017 ： Annual National Land Use Change Survey**

- **2018--2020：The 3rd National Round Land Survey**

Part II

The 1st Round National Land Survey

The 1st National Land Survey

1984----1996：

➢ **Adopting satellite and aerial imagery**

➢ **Survey Scale**

- **Agricultural area :   1:10000**

- **Forestry area :   1:25000**

- **Pastoral area :   1:50000----1:100000**

➢ **The survey results were mainly stored in hardcopy (paper)**

The status of national land resource was preliminarily found out for the first time in China.

Part III

The 2nd Round National Land survey

■ The 2nd Round National Land Survey was officially launched on the 1st July 2007.
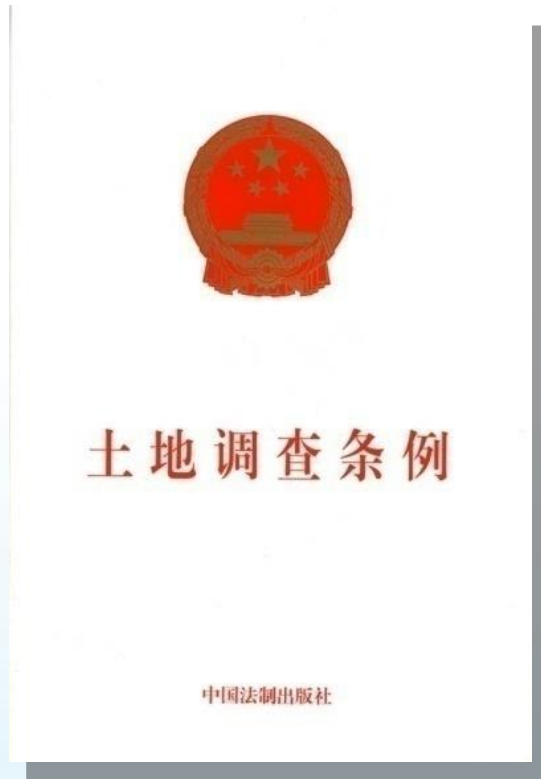

Document No. 38 released by the State Council in 2006

Video conference for startup and deployment
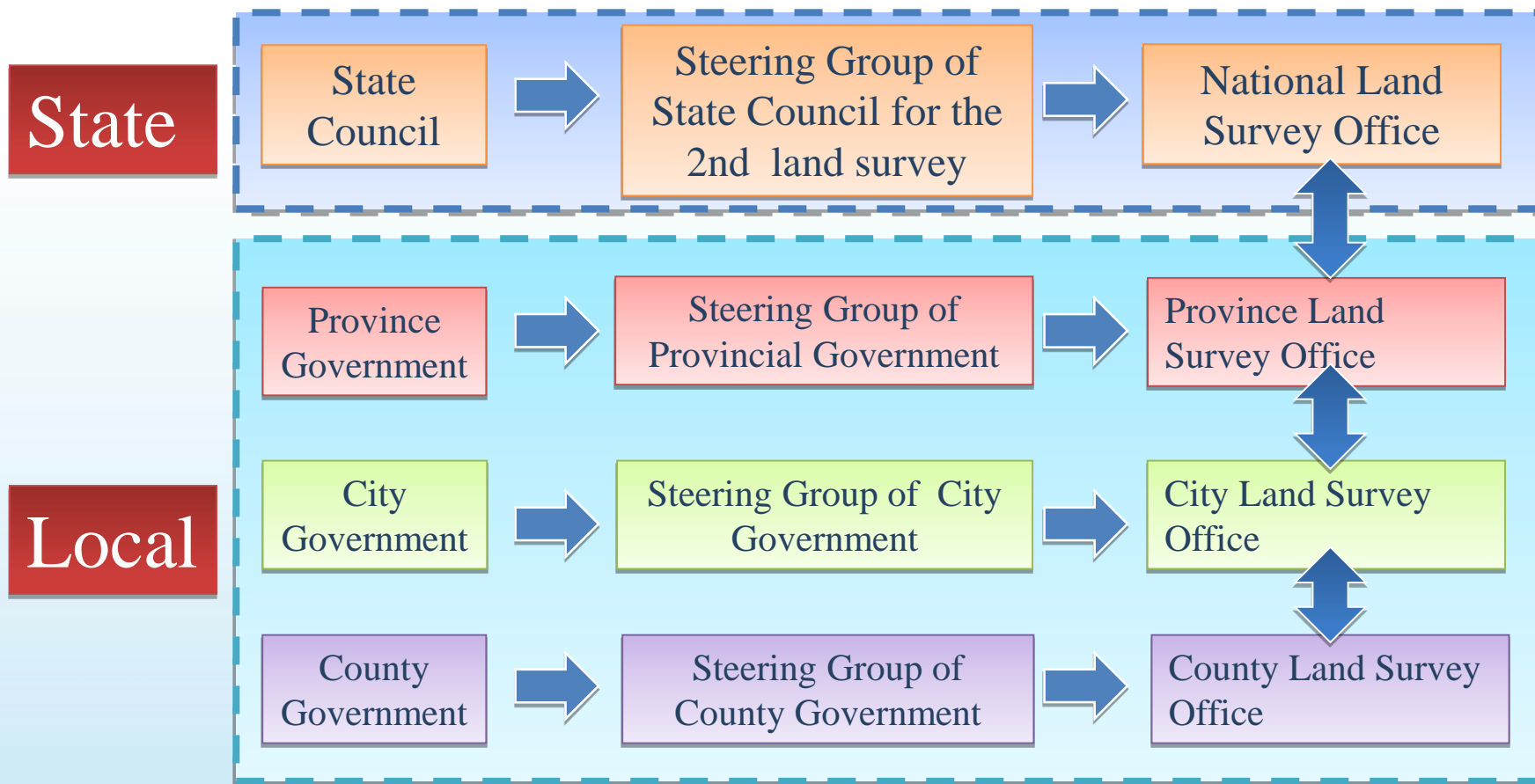
I. Regulations and standards

'Regulation on Land Survey' promulgated by the State Council

National standard of Current Land Use Classification

II. Organization Model

- **Local governments organized land survey**
- **The central government carried out the overall quality-control .**
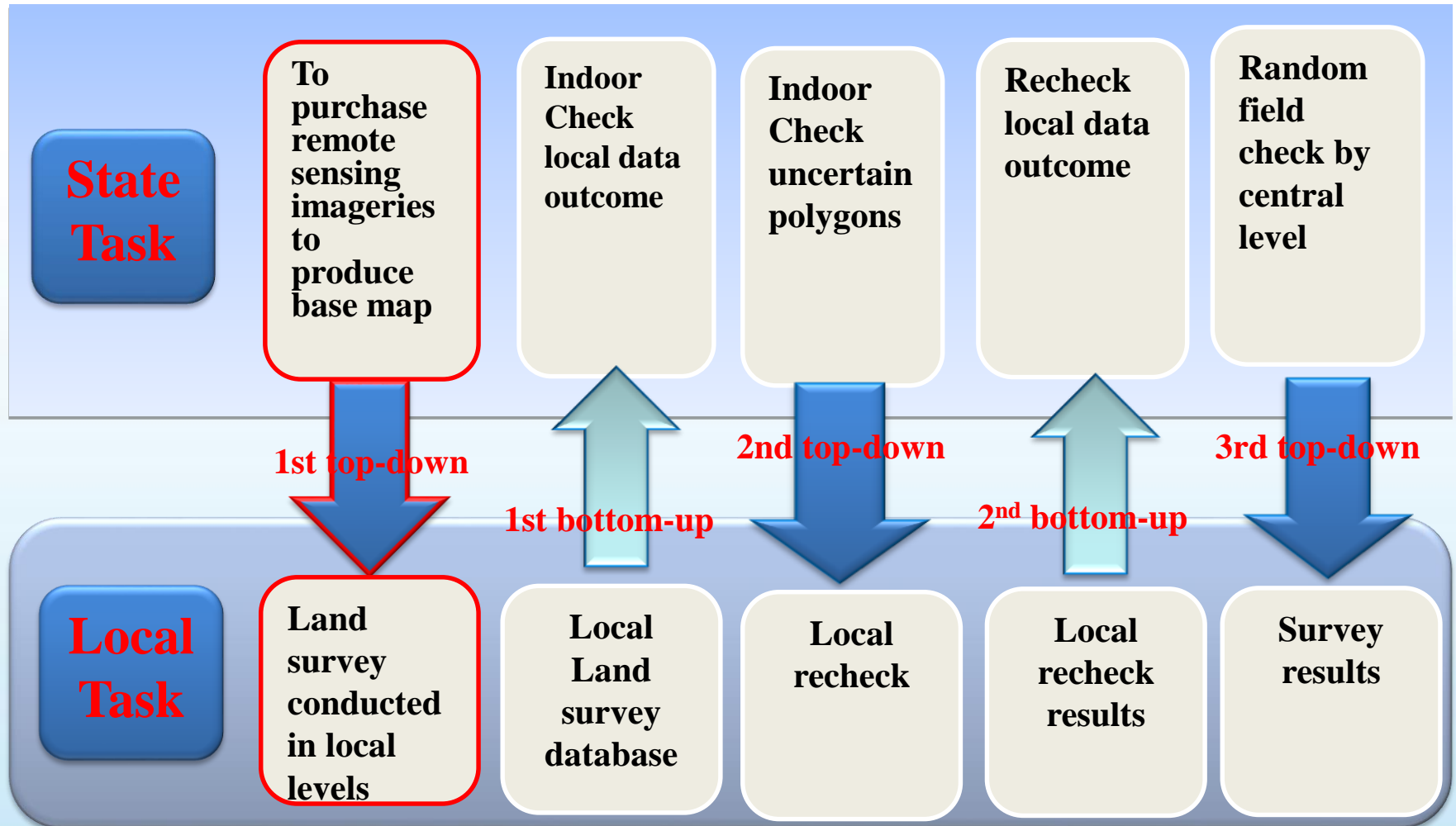
III. Methods and Approaches

■ **The advanced modern technologies represented by RS, GIS and GPS have been applied in the second land survey.**

➤ **By use of RS to obtain high-resolution remote sensing images covering the nationwide land use situation.**

➤ **By use of GPS and other modern means to accurately gain information of each parcel including its use purpose, ownership, boundaries, area etc.**

➤ **By use of GIS technology to build land database containing survey information of all kinds of land.**
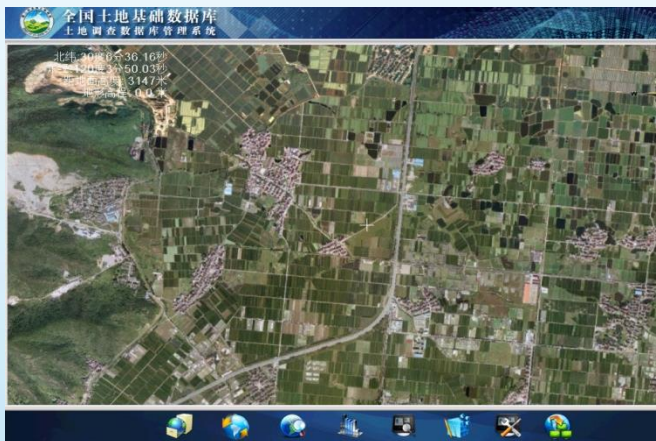
III. Methods and Approaches

The Chart of Top-down and bottom-up interactive processes

III. Methods and Approaches

■ **"1st top-down process":**

National Land Survey Office made unified purchase of remote sensing images to produce survey base map uniformly and send down to local levels

III. Methods and Approaches

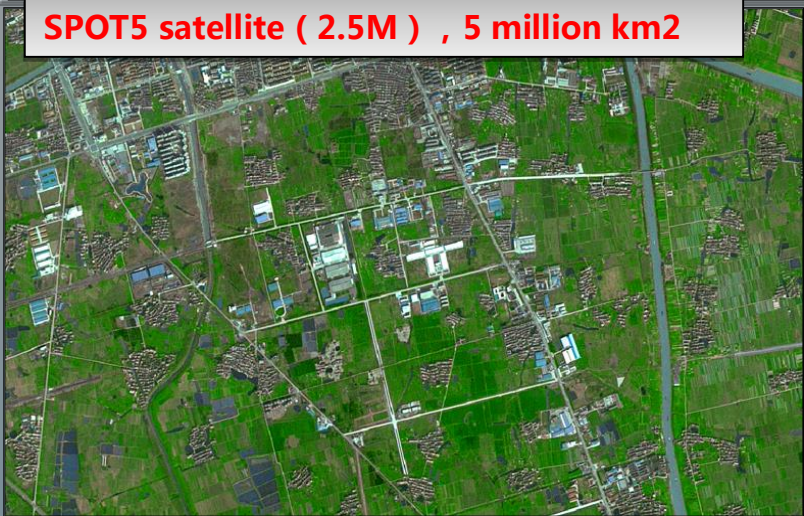## Satellite and aerial imageries of different resolution and covered area

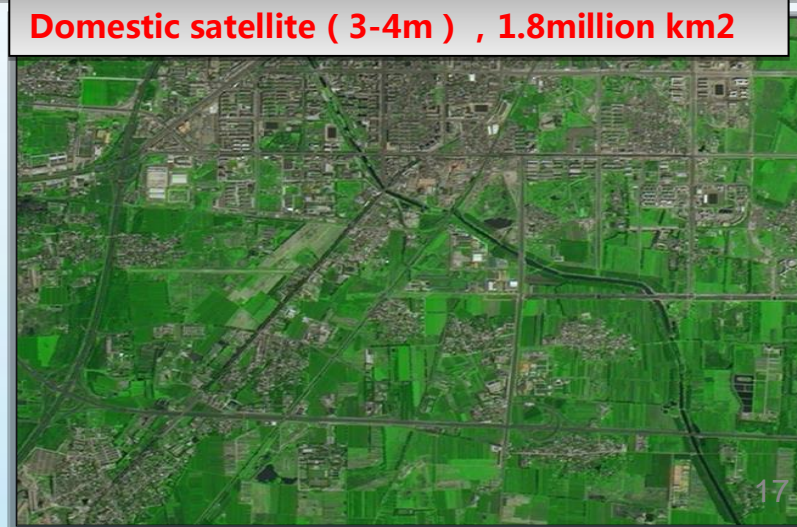aerial imagery（0.3-0.5m）, 1.4million km2

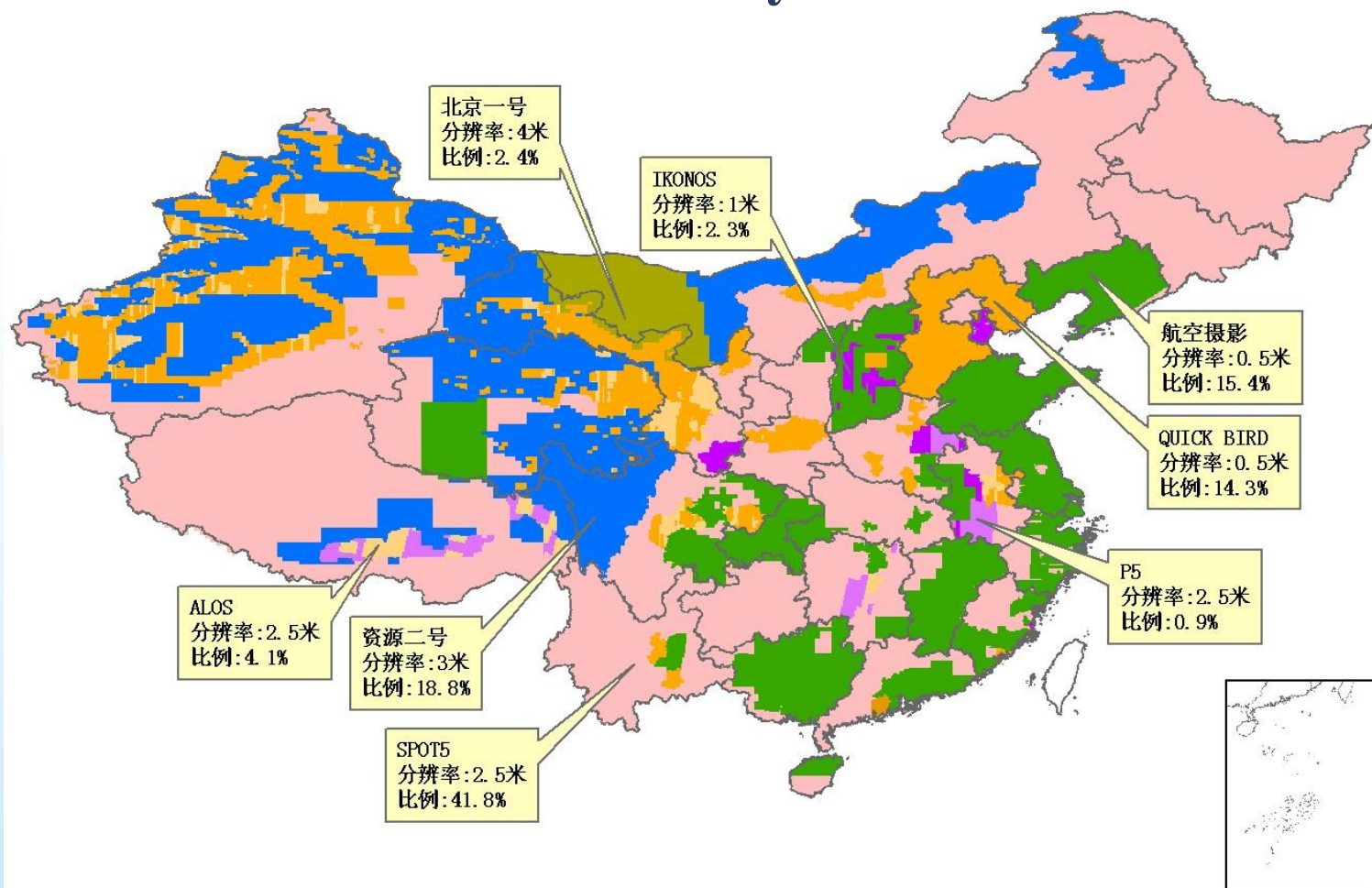QUICKBIRD（0.6-1m）, 1.4million km2

SPOT5 satellite（2.5M）, 5 million km2

Domestic satellite（3-4m）, 1.8million km2

Distribution Map of Remote Sensing Imageries of different resolutions in the 2nd Land Survey

III. Methods and Approaches

1. "1st bottom-up process":

By use of the base map issued by central agency, field investigations and surveys were conducted in **local levels** and results were reported to the National Land Survey Office

Outdoor field survey

Base Map for Field Survey

数据库属性信息

地类：耕地

权属单位：江苏省淮安市淮阴区王营镇苏家村八组

面积：56729.11平方米

Land Use Data submitted by Local Governments

III. Methods and Approaches

- **"2nd top-down process":**

Central technical agency carried out indoor check on the data submitted by local governments by comparing the data with remote sensing image of each parcel
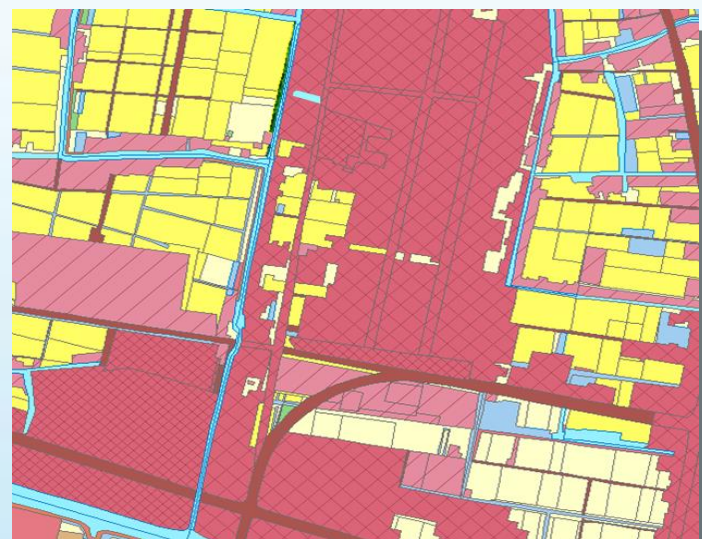

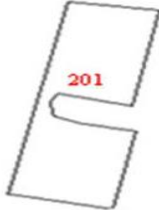**To discover uncertain polygons**

Remote sensing image

overlapping

Local survey data
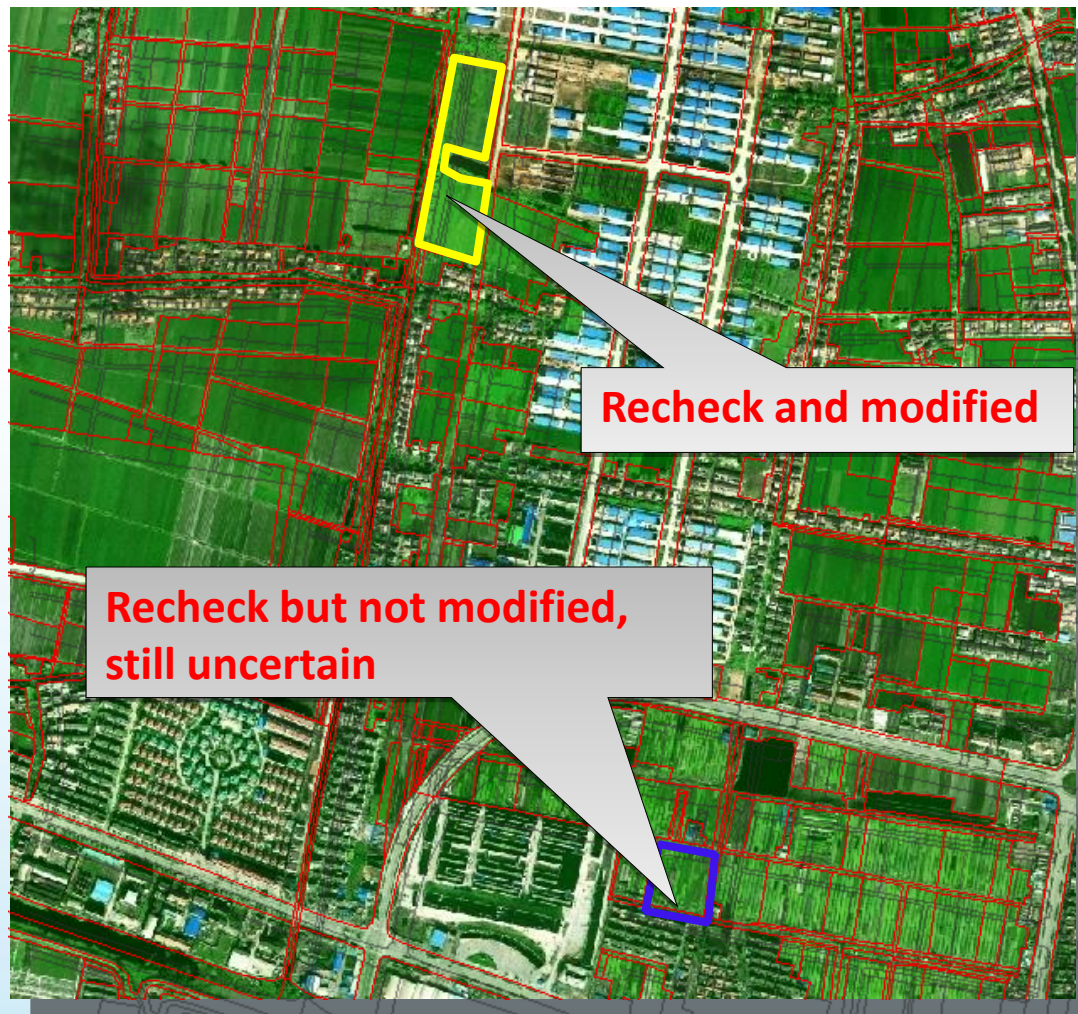
III. Methods and Approaches

■ **"2nd bottom-up process":**
local governments conducted field investigations on the uncertain polygons and to submit the correct data to central government.

序号	图幅号	图斑编号	地类编码		权属单位	权属性质
			复核前	复核后		
123	I51H121185	22	201	01	集体	20

地方上报外业复核记录表

The parcel is farmland by field investigation

The submitted data is incorrect.

III. Methods and Approaches

Recheck and modified

Recheck but not modified, still uncertain

Local Government recheck the results

III. Methods and Approaches

■ **"3rd top-down process":**

For those still uncertain parcels, the central government would organize expert team to conduct random field check to confirm the final results

To fill the field survey table and to take photo of the parcel from several different directions

国家外业实地核查记录表

IV. Main Achievements

- **The 2nd round national land survey was completed on 31 Dec., 2009.**

- **clearly identified the nationwide land use situation and known the resources base of all kinds of land**

  - the land type and distribution;

  - the area of each type of land;

  - the total area of prime farmland;

  - the ownership boundary of state-owned land and rural collective owned land;

  - the area of land for different uses in each administrative region at different levels.
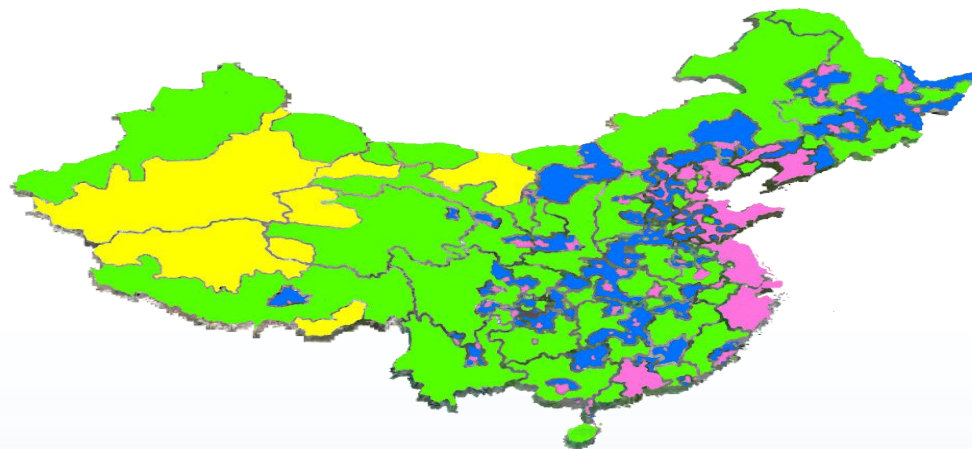
IV. Main Achievements

Land Survey Data at Standard Time on 31 Dec, 2009

Unit: 100 million mu

Land Classification	Area	%
Farmland	20.31	14%
Orchard	2.22	2%
Forestry	38.09	27%
Grassland	43.10	30%
Urban, villages and mining and industrial land	4.31	3%
Transportation land	1.19	1%
Water bodies and water conservancy facilities land	6.39	4%

IV. Main Achievements

分辨率为**0.3～0.5**米航空摄影影像面积**140**万平方公里，约占**14.5%**

分辨率为**0.6～1**米的卫星遥感影像面积**140**万平方公里，约占**14.5%**

分辨率为**2.5**米卫星遥感影像面积约**500**万平方公里，占**52%**

分辨率为**3～4**米遥感影像，面积约**180**万平方公里，占**19%**

4.8万幅1:5千调查底图,29万KM²
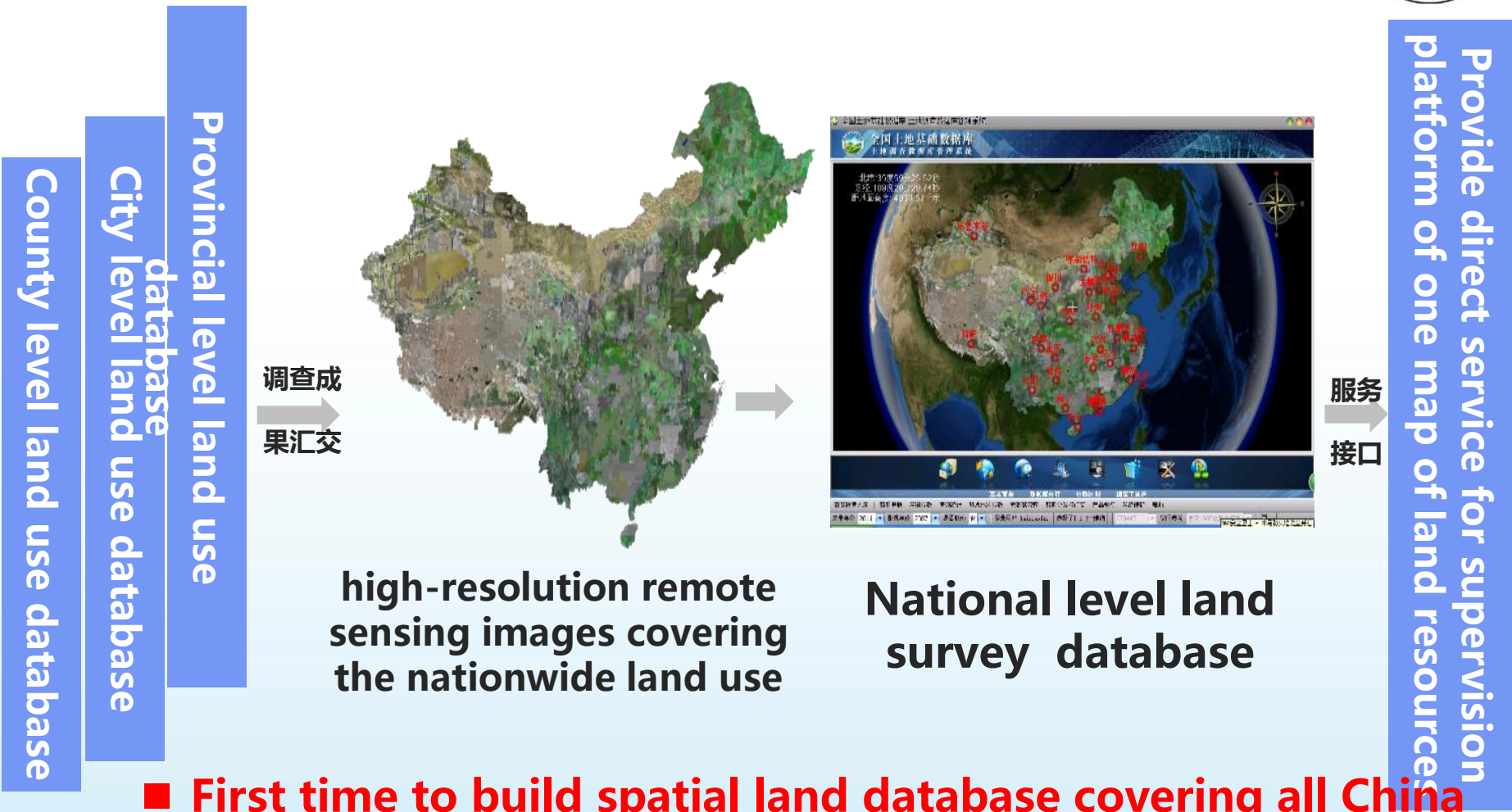

23.5万幅1:1万调查底图,553万KM²

1.2万幅1:5万调查底图,378万KM²

- **First time to apply aviation and aerospace remote sensing technology to obtain high-resolution remote sensing images covering the nationwide land use.**
- **First time to unify basic survey data, thus to avoid human interference and ensure survey data more objective and accurate.**

IV. Main Achievements

County level land use database

City level land use database

Provincial level land use database

调查成
果汇交

high-resolution remote sensing images covering the nationwide land use

National level land survey database

服务
接口

Provide direct service for supervision platform of one map of land resources

- **First time to build spatial land database covering all China with scale of 1: 10,000**
- **To get a breakthrough in assembling and management of massive spatial data**

Part IV

Annual National Land Use Change Survey

■ **From 2010 to now,**

Land Use Change survey has been carried out every year to maintain the accuracy of national land survey data.

➤ **undertake the procedure and methods used in 2nd National Land Survey**
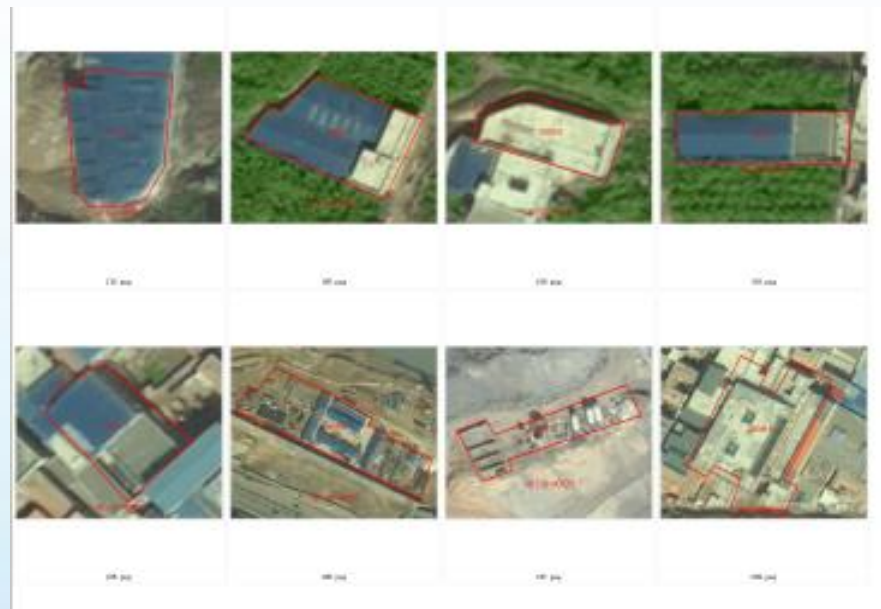

News on CCTV

II. Operation Procedure

■ The State government purchase the latest remote sensing images covering the whole territory to monitor the situation of newly-added built-up land and the occupation on farmland, and then send down monitoring result to the lower level governments to assist land use change survey.

Distribution of monitored areas

Polygon exaction of newly-added built-up land from remote sensing monitoring

■ According to the monitoring result from the State, field investigations were carried out at local levels to check the land use change, and the local governments submit land use change information during a survey-year to the State.

Field Investigation

II. Operation Procedure

■ The state government will conduct both indoor and outdoor check on the land use change information through remote sensing images and comprehensive supervision information platform of MLR

GPS+PDA

**Documents for field investigation**

- **Develop** the incremental updating technology for land survey data (only update the changed part during a survey-year), to ensure data and achievements be updated timely
- ➢ Local governments update land survey database at their own and the state government gathers information to form the database of annual land use change survey at national level .
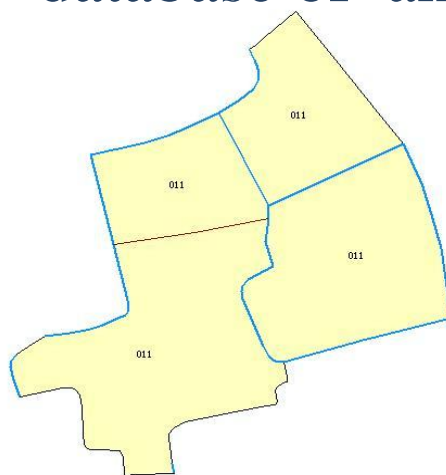
Database before update
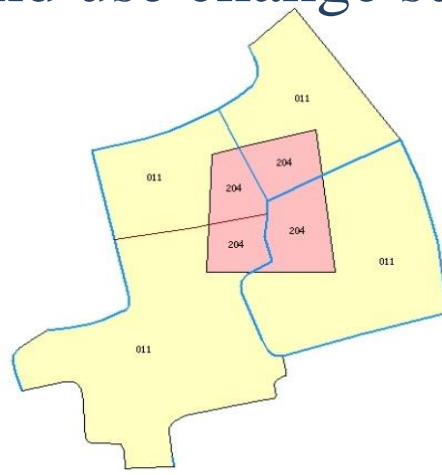
The updating process records information of each polygon before and after change
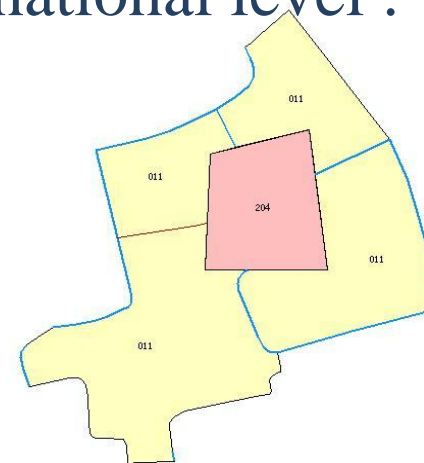
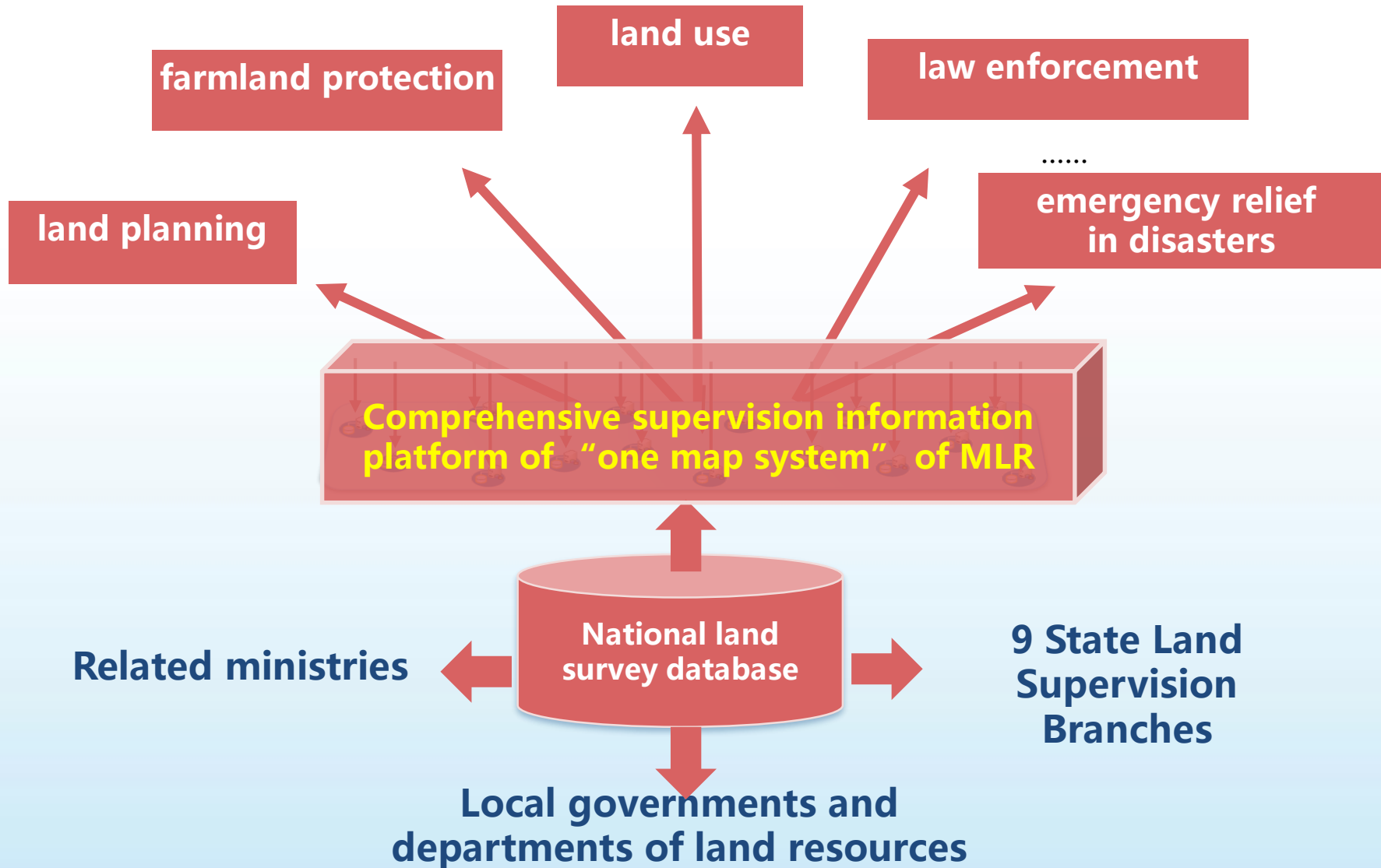Database after land use change update

III. National Database Update

- Annual updated data volume (image and vector data) is about 25TB

- At present, the total volume of national level database is 295TB, include image data 279TB and vector data 16TB

IV. Application of survey results

farmland protection

land use

law enforcement

......

emergency relief in disasters

land planning

Comprehensive supervision information platform of "one map system" of MLR

National land survey database

Related ministries

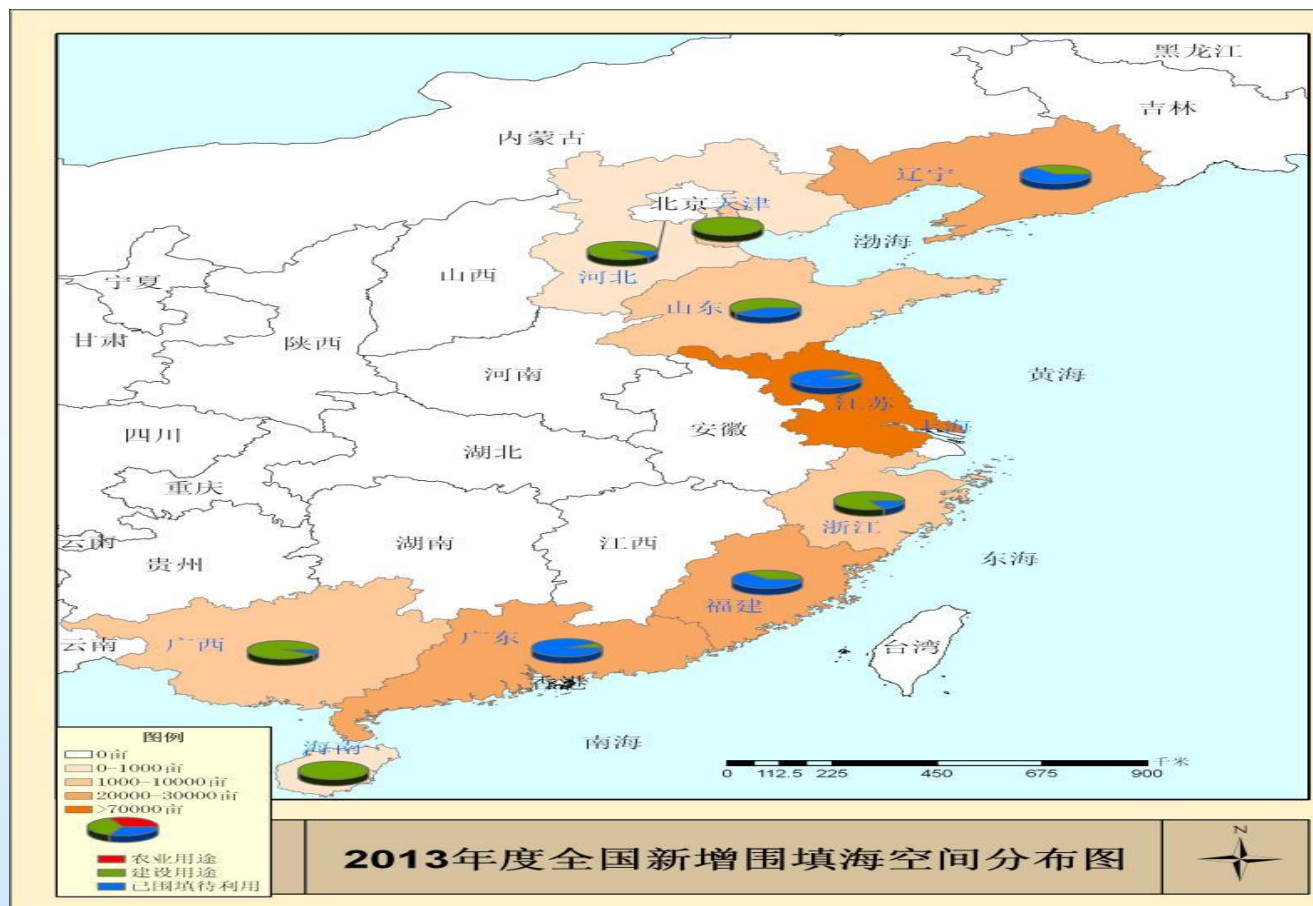**9 State Land Supervision Branches**

Local governments and departments of land resources

Comprehensive supervision information platform of "one map system " of MLR
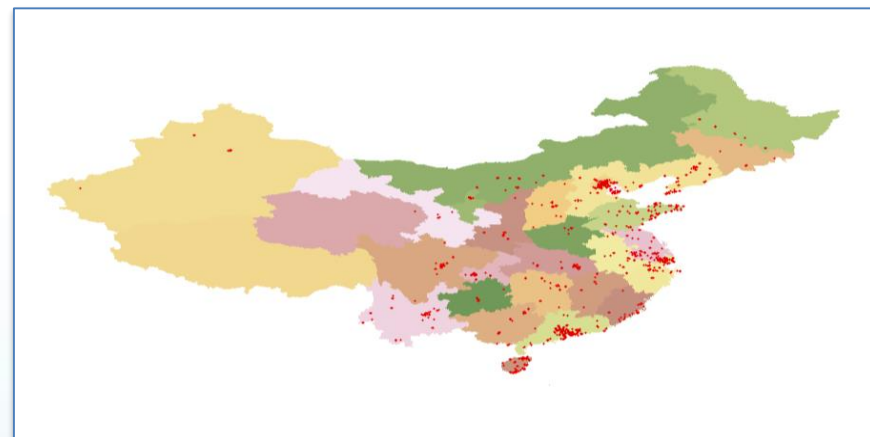
- **monitoring project of marine reclamation land all over the country**

The sketch map of newly reclaimed / consolidated marine area all over the country
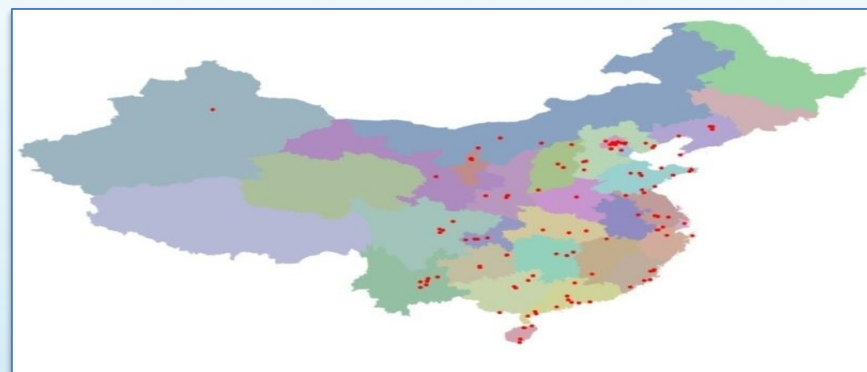
- **Land Monitoring project of golf courses all over the country**

Distribution map of golf courses

Monitoring Dada Management system for golf course

Distribution map of newly built golf courses since 2011

V. Regulations and standards

- **State Council's regulation: 1**
- **National standard: 1**
- **Ministerial standard: 4**
- **Engineering technology standard: 2**
- **Achievement and quality control standard: 2**

Part V

The 3rd Round National   Land Survey

I. Background

■ **National strategies put forward higher requirements for basic land data.**

➤ **Reform on land management system**

➤ **Supply side reform**

➤ **Transformation of economic development**

➤ **Unified registration of real estate**

➤ **Sounding supervision system of natural resources**

➤ **Improvement of the government's management ability according to law.**

➤ **……..**

I. Background

■ **Reform of Natural Resources management system**

MNR established in March, 2018 ,empowered with new responsibilities

➤ **Unified survey of natural resources (forestry , grass , water and wetland resources etc.);**

➤ **National land space planning**

➤ **Establishment of Dept. of Land Space Use Control in MNR**

➤ **Wetland utilization and protection**

➤ **……**

From 2018 to 2020

➤ **To build a more detailed "background land database of nationwide natural resources**

➤ **To establish a more perfect system of land survey , monitoring and statistics.**

➤ **To Establish open and effective mechanism for making public and sharing use of land survey data;**

➤ **To transfer the goal of land survey from finding out the background situation of natural resources and serving management to serving society and improving the government's supervision ability to natural resources management.**

Thanks!