# Land Use Evaluation Promoted by GIS Model

Mengyi Zhang SuperMap Software Co., Ltd.



#### CONTENTS



PART 1
Introduction
on Land Use
Evaluation



PART 2
Framework of
Land Use
Evaluation



PART 3
GIS Model in
Land Use
Evaluation



PART 4
GIS Model in
Sustainable
Development











#### Environmental Issues

- Climate change
- Clean water
- Ocean health
- Biodiversity







CTBTO, FAO, GCF, IAEA, ICAO, IFAD, ILO, IMF, IMO, IOM, ITC, ITC-ILO, ITU, OPCW, UN Secretaria CIBIO, PAO, GC., PAE, ILAU, IPAD, ILO, MP, MO, IDM, II, IT-CAU, ITI, OVAW, ON Secretarias IECA, ECE, ECLAC, ESCAP, ESCWA, OHCHE, Pieze Operations, UNEP, BRS, CBD, DORNO Secretaria UN-Habitat, UNHQ, UNOQ, UNON, UNOV, Other UN Secretariat entities, UNADS, UNCCD, UNDP, UNESCO, UNFCC, UNFAPA, UNHCE, UNICEF, UNICC, UNDPO, UNHCR, UNOPS, UNIVA, UNSSC, UNU, UNV, UN Women, UNIVTO, UPU, WFP, WHO, WIPO, WMO, World Bank Group, WTO.

> The full Report and entity-level data are available at greeningtheblue.org



### Sustainable Development Goals

- To promote prosperity while protecting the planet
- Social needs
- Climate change and environmental protection







#### Clean Water and Sanitation

The natural environment e.g. forests, soils, and wetlands contruibutes to management and regulation of water availability and water quality .....



#### Sustainable Cities and Communities

There is a strong link between the quality of life in cities and how cities draw on and manage the natural resources available to them.



#### Climate Action

The Climate Emergency we currently face requires adequate and immediate action.



#### Life on Land

Protect, restore and promote sustainable use of terrestrial ecosystems ..... halt and reserve land degradation and halt biodiversity loss







### PART 1 Introduction on Land Use Evaluation Everything relies on the use of land.



Land comprises the physical environment, including climate, relief, soils, hydrology and vegetation, to the extent that these influence potential for land use.



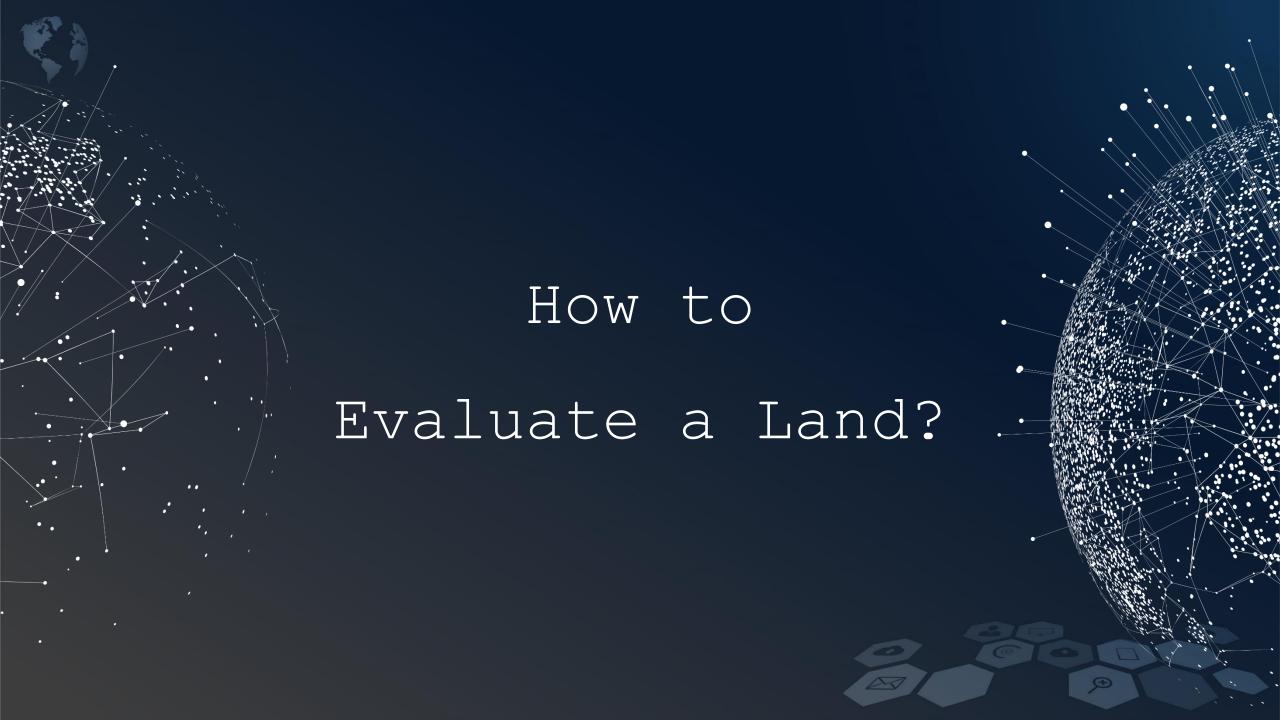
#### What we need to know about the land space?













### UN Evaluation Framework

Land suitability is the fitness of a given type of land for a defined use. The land may be considered in its present condition or after improvements. The process of land suitability classification is the appraisal and grouping of specific areas of land in terms of their suitability for defined uses.

ORDER	CLASS	SUBCLASS	UNIT
$\Omega$	S1		
	S2	S2m	
		S2e	S2e-1
			S2e-2
			S2e-3
		S2me	
	S3		
N	N1	N1m	
		N1e	
	N2		



#### US Evaluation Framework

A Land Evaluation and Site

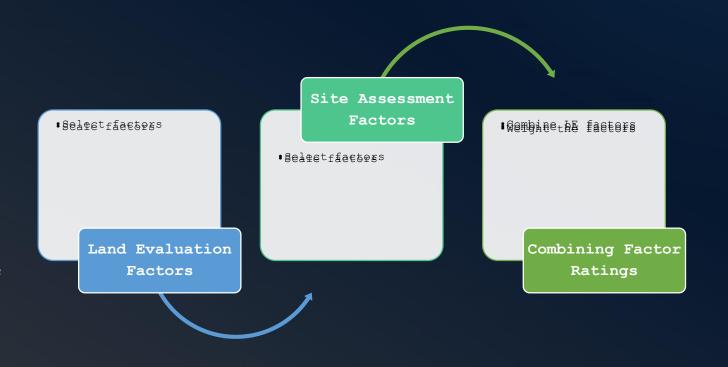
Assessment (LESA) is a rating
system created by the United

States Department of Agriculture

Natural Resources Conservation

Service (USDA NRCS) to determine

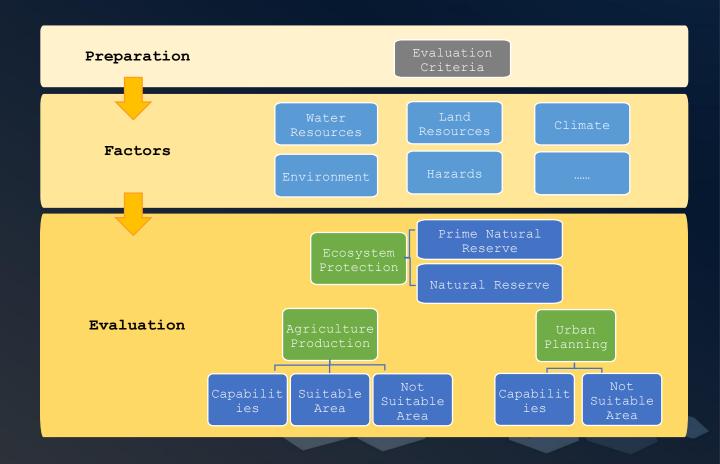
whether land is prime for
agricultural use.





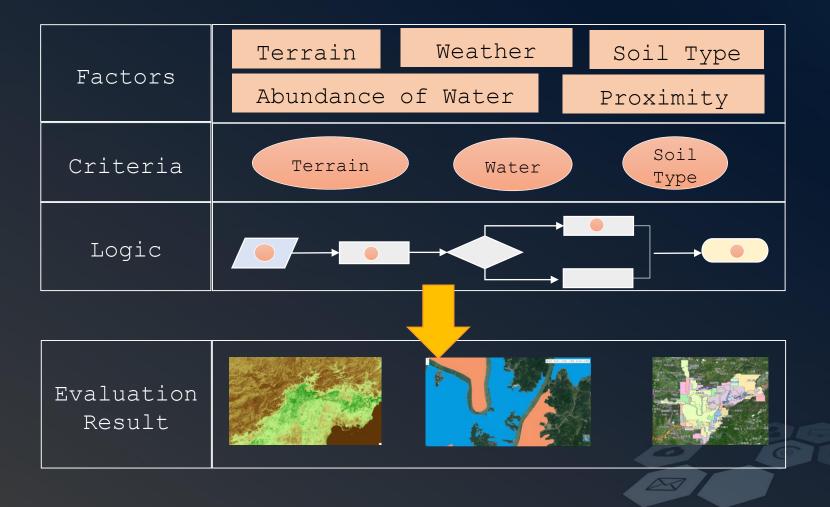
China Evaluation Framework

According to Evaluation Guide on Environmental Resource Capability and Spatial Planning Suitability, land evaluation at town and larger scale will based on a double-criteria system considering resource capability and spatial suitability equivalently.





#### Generalized Framework





#### Factors on Land Use Evaluation



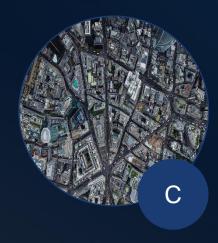
Land Capability

moisture availability erosion resistance flooding hazard



Environmental Impact

air and water quality watershed function generation of waste wildlife habitat



Socio-economic Feasibility

accessibility to traffic location in relation to markets productivity per unit









# GIS Technology in Land Use Evaluation

DEM
Remote Sensing
Vector

Slope Analysis Network Analysis

Raster Reclassify

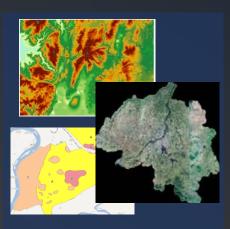
Raster Algebraic

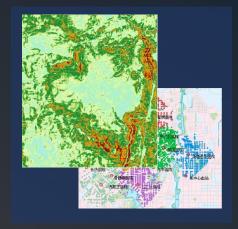
Data

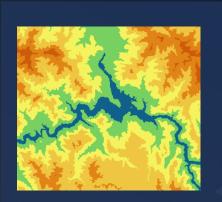
Factors

Criteria

Logic





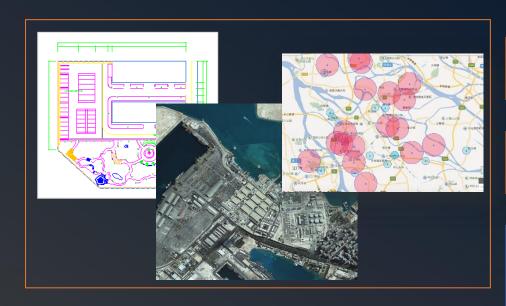




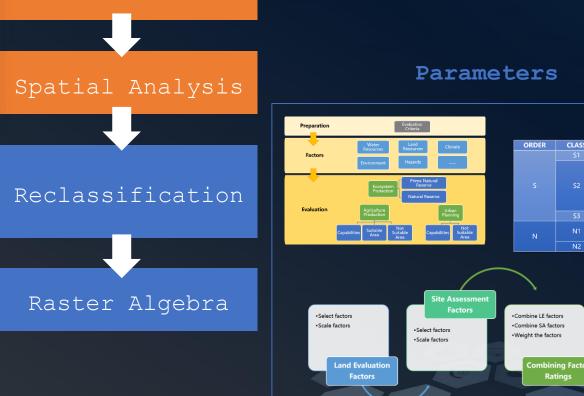


#### GIS Workflow in Land Use Evaluation

Data Process

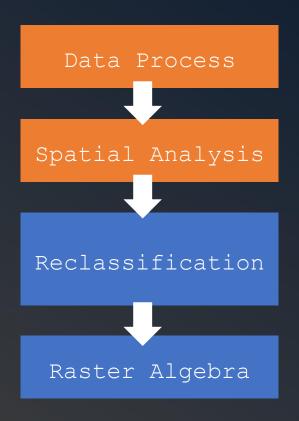


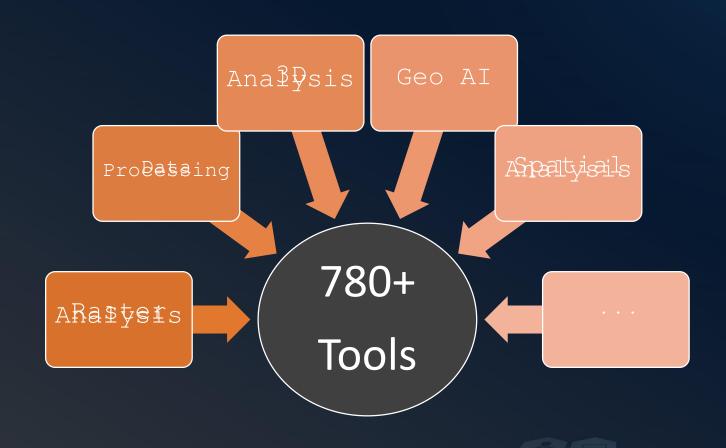
Algorithms





#### Step by step?





Œ



# GIS Processing Model

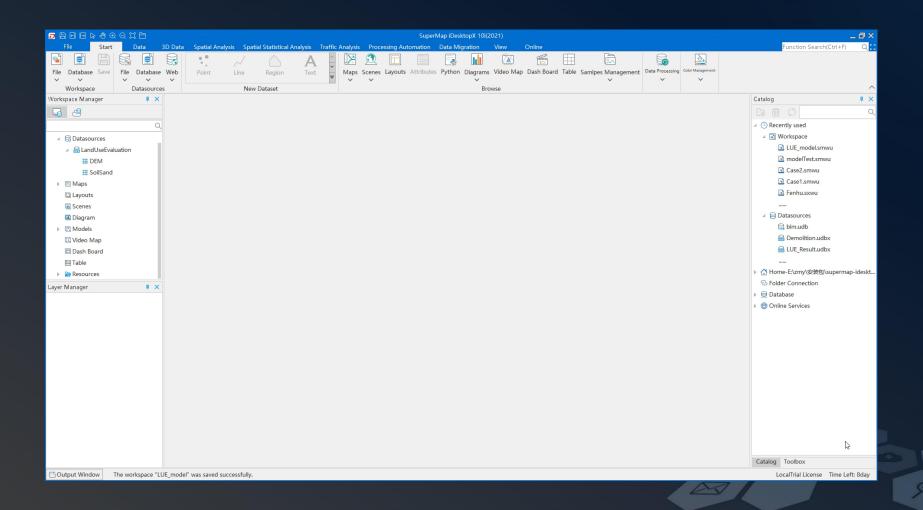
As multiple GIS tool are involved in land use evaluation, a new data processing manner could be introduced to the system to improve the efficiency.

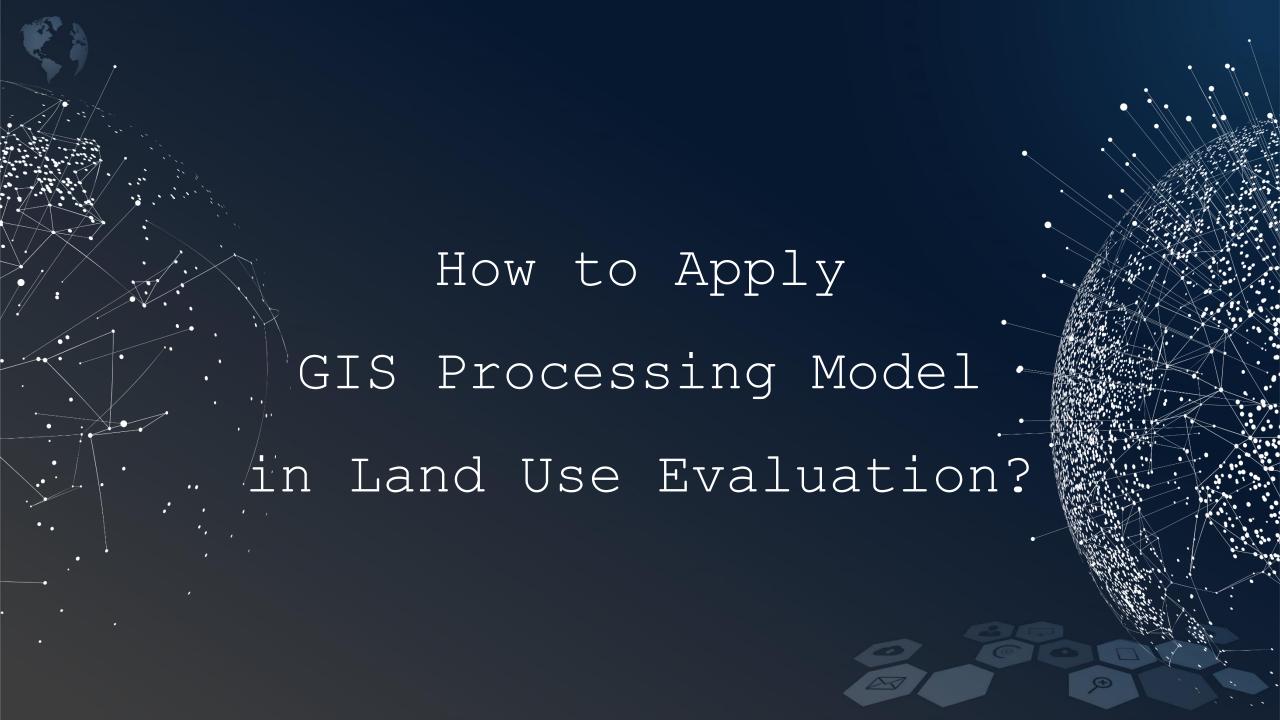
GIS processing model — a collection of GIS processing and analysis tools connected based on logic, which can automatically works as the workflow designed.





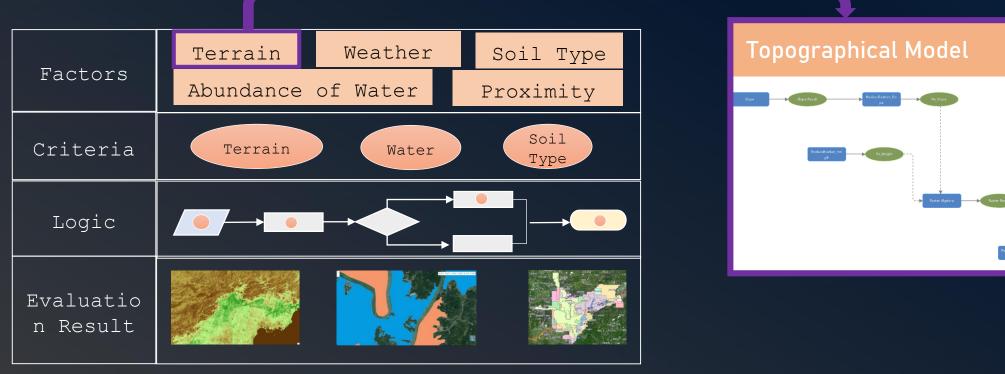
#### Build GIS Processing Model

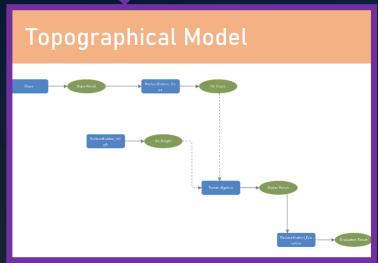






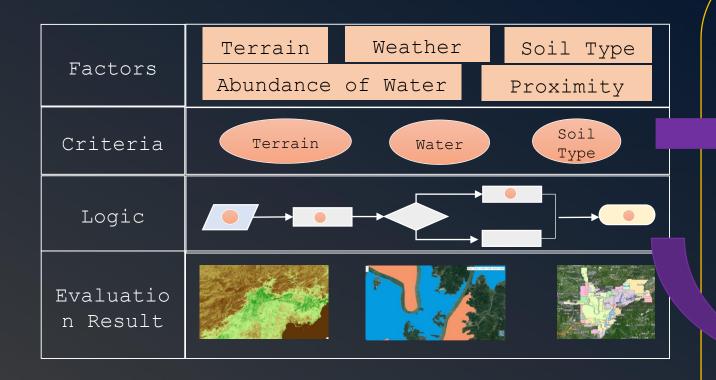
#### PART 3 GIS Model for Land Use Evaluation Transform criterion into a sub-model.

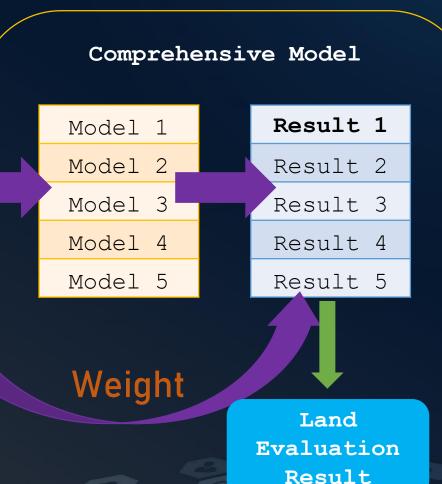






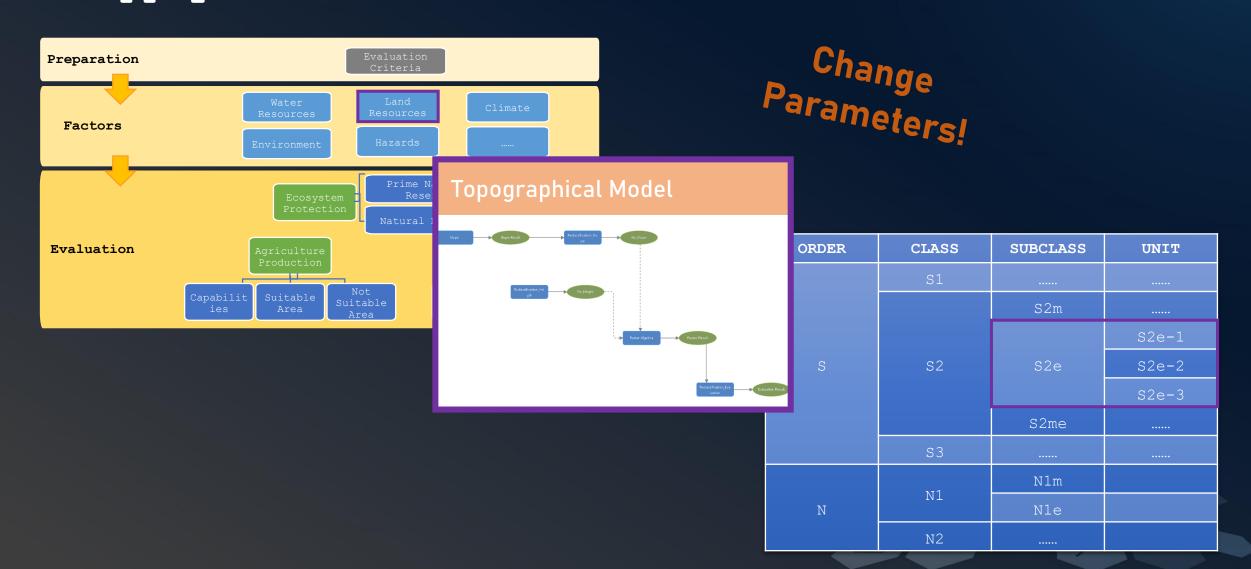
# PART 3 GIS Model for Land Use Evaluation Combine sub-models together.







# PART 3 GIS Model for Land Use Evaluation Apply same sub-model in different frameworks.



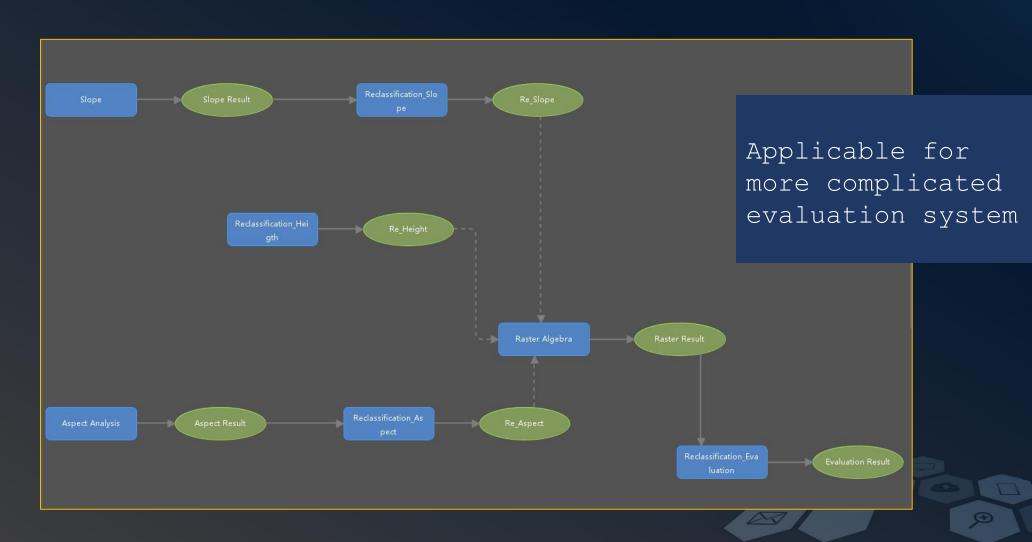


#### Instance 1 Model for Terrain Evaluation



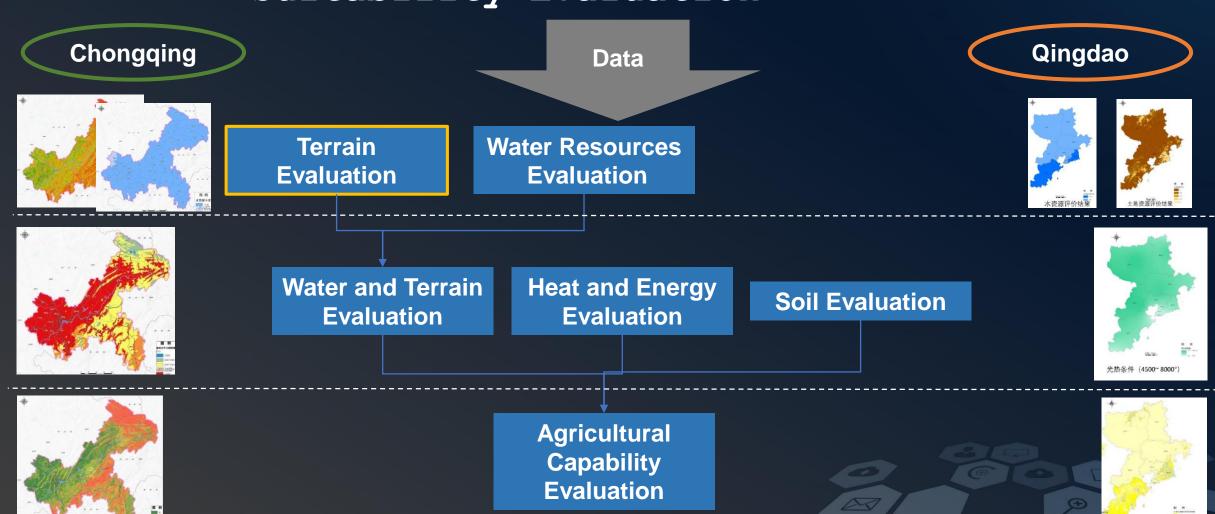


#### Instance 1 Model for Terrain Evaluation





# Instance 2 Agricultural Capability and Suitability Evaluation





# Instance 2 Agricultural Capability and Suitability Evaluation

#### Chongqing



Agricultural Capability Evaluation

**Suitability Classification** 

Connectivity Evaluation

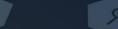
Agricultural Suitability Evaluation

#### Qingdao



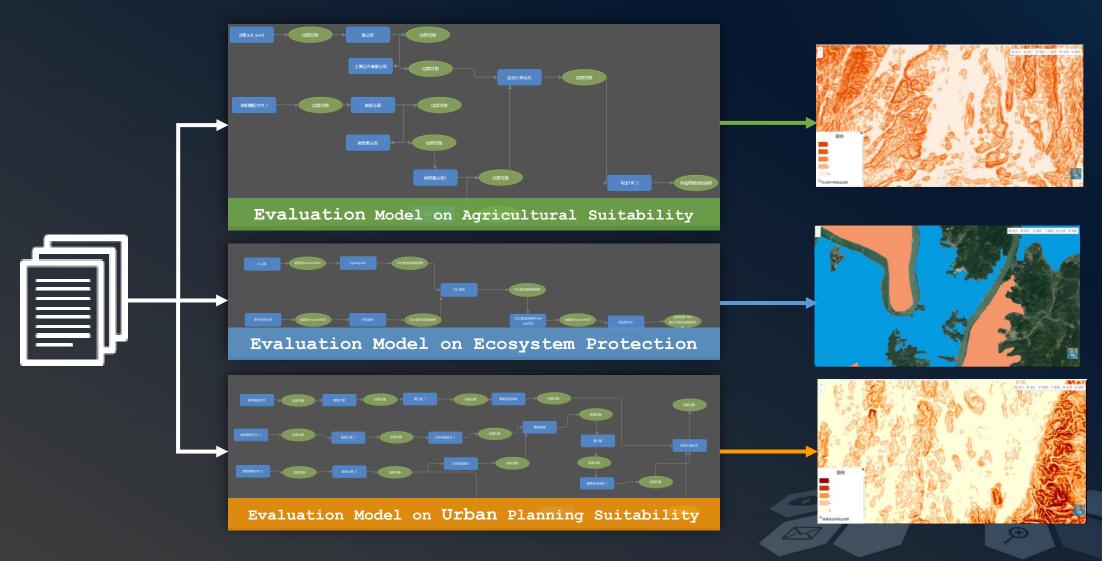








#### Instance 3 Multi Models for A Set of Data





GIS processing model in Land Use Evaluation.

Automation

Efficiency

Flexibility





PART 4
GIS Model for
Sustainable
Development





#### PART 4 GIS Model for Sustainable Development

Standardized Process



Variation in Data & Parameters



Repeated Operations



GIS Processing Model



#### PART 4 GIS Model for Sustainable Development

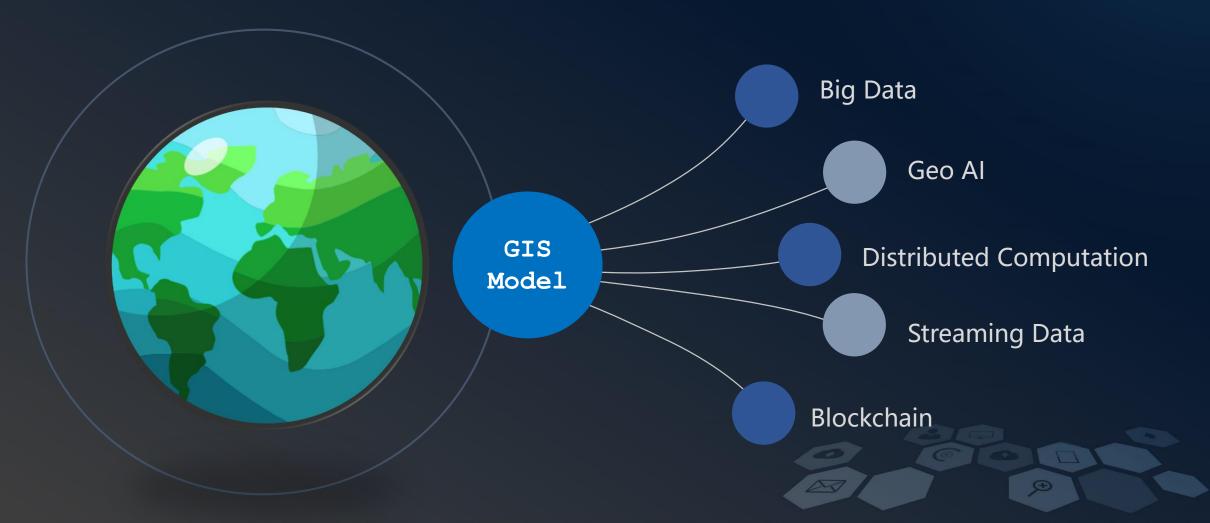
More application in sustainable development.





#### PART 4 GIS Model for Sustainable Development

Informative GIS model for sustainable development of the Earth



The Fourth International Workshop on GIS Technology and Application THANK YOU.