

A satellite with solar panels is shown in orbit against a blue background. The satellite is cylindrical with two large rectangular solar panel arrays extending from its sides.

Fifth expert meeting of IAEG-SDG: WGGI

Report of Task Steam 1

-Geospatial Disaggregation and aggregation Supporting SDGs

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¹ National Geomatics Center of China

² Executive Secretary SNIT, Chile

Dec. 5, 2018



Content

Task Stream 1

Activities in last six months



Future Plans

Questions



Task Stream 1 Being Established

In April 2018, IAEG-SDGs: WGGI decided to establish a Task Stream on geospatial disaggregation and aggregation:

- **Mandate:** Provide expertise and advice to IAEG-SDGs and the larger statistical/geospatial community as to how geographical disaggregation and aggregation can reliably and consistently contribute to SDG indicators measuring, analysis and monitoring
- **Working period:** 2018-2019
- **Co-leads:** Macarena Perez Garcia (Chile)
Jun Chen (China)



Geospatial Disaggregation and Aggregation

United Nation GA adopted the Global Indicator Framework (GIF) for the 2030 SDGs in its resolution A/RES/71/313 On 6th July 2017,

- **SDG indicators should be disaggregated, where relevant, by** income, sex, age, race, ethnicity, migratory status, disability **and geographic location**, or other characteristics, in accordance with the Fundamental Principles of Official Statistics [from the preambular of the GIF]
- Previous disaggregation and aggregation works were focused mainly on people-centric variables (such as gender, age, income, education, race, ethnicity, and disability)
- A geographic location perspective needs to be taken into consideration



Content

Task Stream 1

Activities in last six months



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Major Activities in Last Six Months

2.1 Prepared a work plan

2.2 Conducted a case study in Deqing County

2.3 Organized a special session during UN-WGIC



2.1 Prepared a work plan

- **Defined the scope of Task**

Aiming to identify and develop good practices, and document methodologies on geospatial disaggregation and aggregation for supporting SDGs.

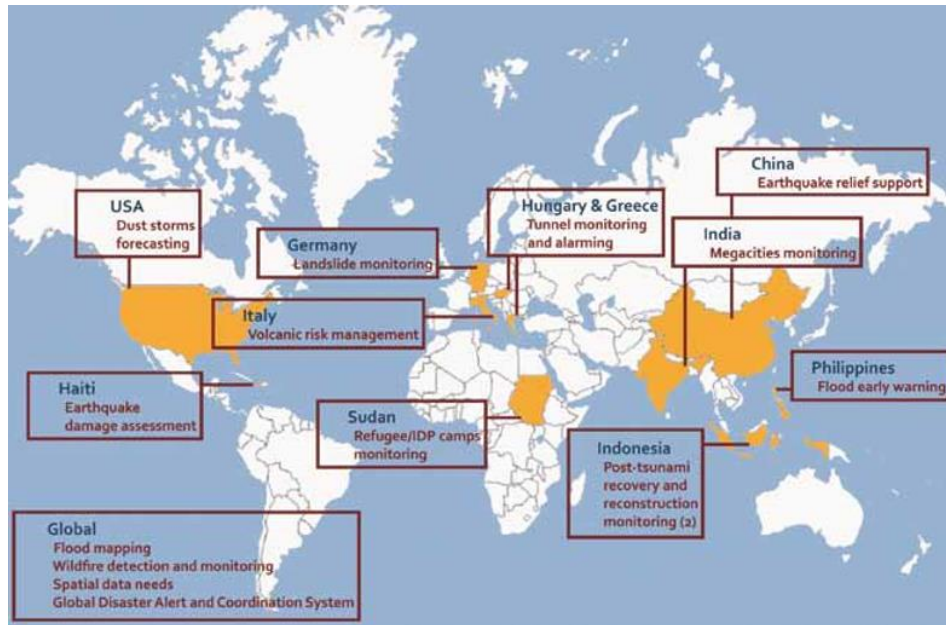
(1) Develop a booklet on good practices by identifying exemplars

(2) Prepare a technical guideline by documenting methodologies



(1) Develop a Booket of Good Practises

Present 10-15 good practices or exemplars on geospatial disaggregation and aggregation from different regions from the world



Approach to Dust Forecasting

Sample satellite-based dust forecast system

Three steps are needed to produce reliable dust forecasts (Figure 2). Step 1 is to assimilate satellite measurements over land into a dust simulator (Nickovic et al., 2001); Step 2 optimizes model outputs to determine model performance; and Step 3 requires public health authorities and health care providers to assess the versatility of dust information for health. The combined system adds a dust forecast to the daily regional weather forecast. Weather parameters include near surface properties, while dust parameters are drawn from Earth observing sensors. The system's performance has been verified and validated by comparing data obtained from ground monitors with modeled dust events between 2003 and 2008 (Morain and Sprigg 2005; Morain and Sprigg 2007; Morain and Budge 2008). These dust forecasts are beginning to be used by health care professionals in the region.

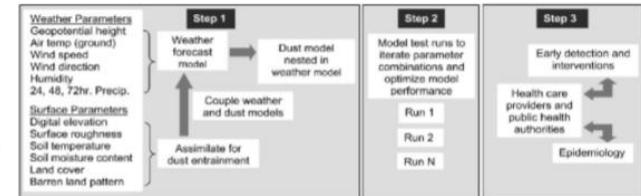


Figure 2: Step-wise procedure for forecasting dust episodes for health surveillance.

Metrics	Wind Speed (m/s)	Wind Direction (°)	Temp (K)	Definition
Agreement Index	0.74 0.75	0.74 0.76	0.71 0.95	$1 - \frac{\sum_{i=1}^N (M_i - O_i)^2}{\sum_{i=1}^N (M_i - \bar{M})^2 + (O_i - \bar{O})^2}$

Table 1: Model performance metrics before and after data assimilation. Bold values are after data assimilation. For the equation M = modeled, O = observed

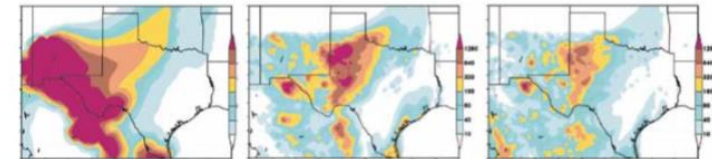


Figure 3: The triptych shows three generations of model improvements for a dust storm across New Mexico and Texas on 15-16 December, 2003. (left) the baseline model performance before satellite data were included; (middle) after satellite data replaced baseline parameters; (right) the same storm modeled by a higher resolution, weather forecasting model.

- Should come basically from or recommended by IAEG-SDGs: WGGI members

- How data can be disaggregated/ aggregated geospatially and used for deriving indicators



Actions to be completed

- Identify and collect good practices
 - desirable to have a diverse set of examples from different regions and circumstances so that it has the greatest breadth of impact to various Member States.
- Analyze and evaluate the proposed/ recommended good practices
- Edit and re-format the selected good practices

Prof Zhilin Li (Hon Kong Poly Univ.) and Prof Zhao Xuesheng (China Mining Univ.) agreed to assist the coordination



(2) Prepare a Technical Guideline

Summarizing available mainstream methodologies and tools which can be used for geospatial disaggregation and aggregation

- Concepts and methodologies for implementing disaggregation and aggregation by geographic location
- Typical applications in supporting SDGs measuring and monitoring.

Target readers include the both statistical and geospatial professionals.

A close collaboration with the UN-GGIM Expert Group on Integration of Statistical and Geospatial Information



Draft Content of the Technical Guideline

1 Introduction

- 1.1 Needs of Data Disaggregation and Aggregation for SDG
- 1.2 Multiplicity and Diversity of Data for SDG

2 Data preprocessing

- 2.1 Unification of Space-Time Reference Framework
- 2.2 Geocoding of Statistical data
- 2.3 Normalization of Statistical data

3 Disaggregation for SDG

- 3.1 Interpolation with Area/Distance Weighting
- 3.2 Dasymetric Disaggregation
- 3.3 Stochastic Allocation

4. Aggregation for SDG

- 4.1 Classification/Clustering
- 4.2 Interpolation/Resampling
- 4.3 Simplification/Typification
- 4.4 Smoothing/Filtering

5 tools/resources

- 5.1 Software tools
- 5.2 Available resources

6 Examples and Recommendations

- 6.1 Selected examples
- 6.2 Recommendations

References



Actions to be taken

- Identify experts who are interested and able to contribution
- Invite contributors for each chapter or sub-chapter
- Review and edit the manuscript

Prof Sonnian Li (Canada Rayson Univ.) & Dr Hu Yungang (Beijing Civil Eng. Univ.) agreed to assist the coordination



Comments and Feedbacks Received

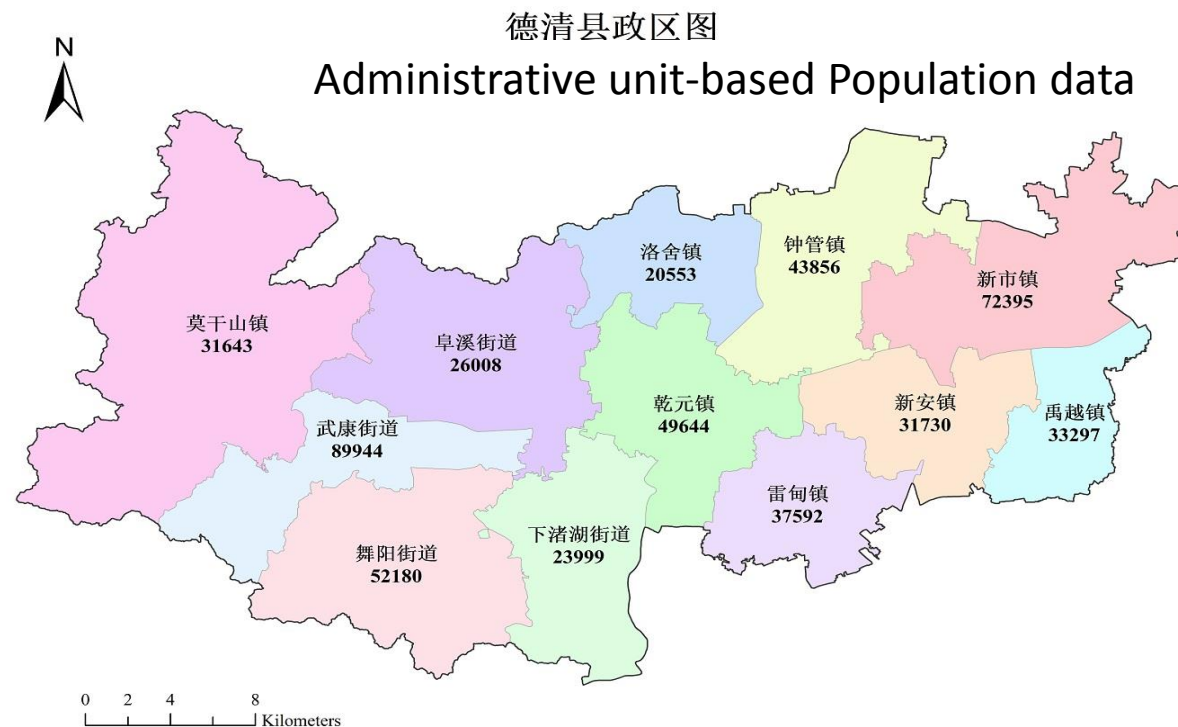
- This draft work plan was circulated to IAEG-SDGs:WGGI for comments
- A face-to-face discussion held during the UN-GGIM 8th session in Aug
- Reported to IAEG-SDGs: WGGI twice (July 27th and Oct 4th)
- Presented at the special session 'Geospatial disaggregation and aggregation in support of SGDs' during UN-WGIC on Nov. 20, this year



2.2 A Case Study in Deqing County

Populations data needs to be disaggregated into geographical space with the help of ancillary geospatial data for in-depth SDG indicator measurement

镇名 Town names	人口 population
武康街道	89944
阜溪街道	26008
下渚湖街道	23999
舞阳街道	52180
洛舍镇	20553
钟管镇	43856
莫干山镇	31643
乾元镇	49644
雷甸镇	37592
新市镇	72395
禹越镇	33297



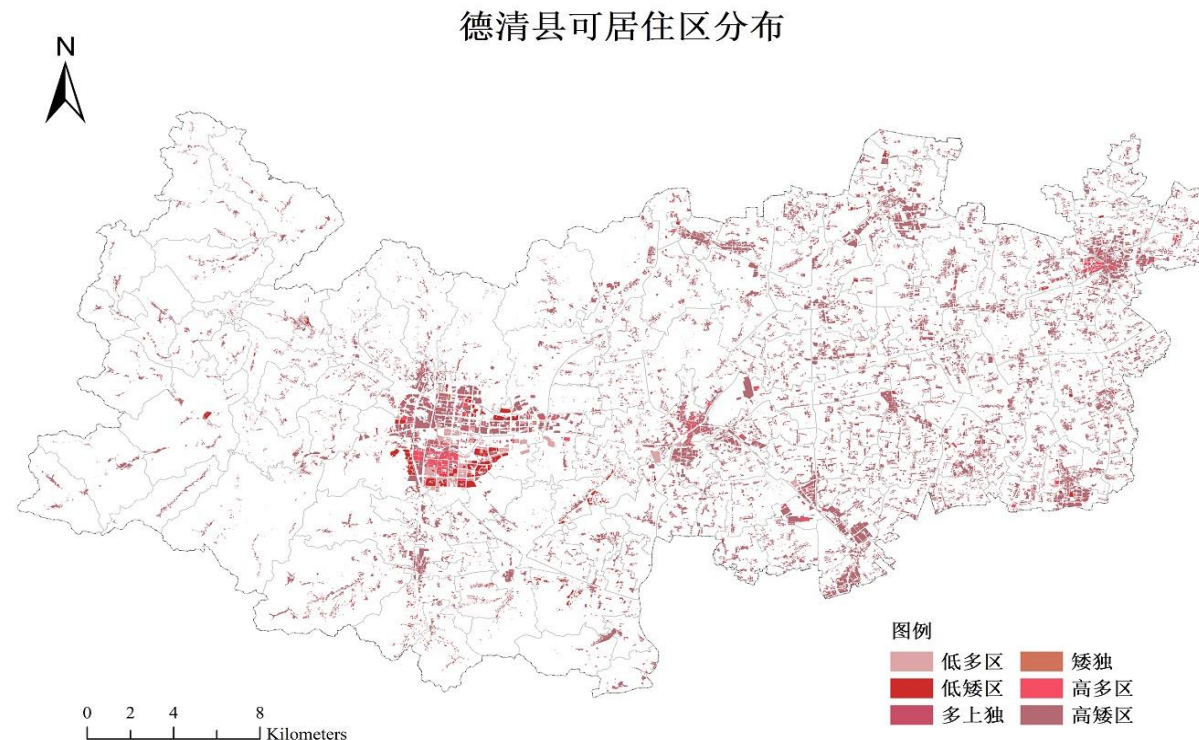
Spatial variation details are smoothed out



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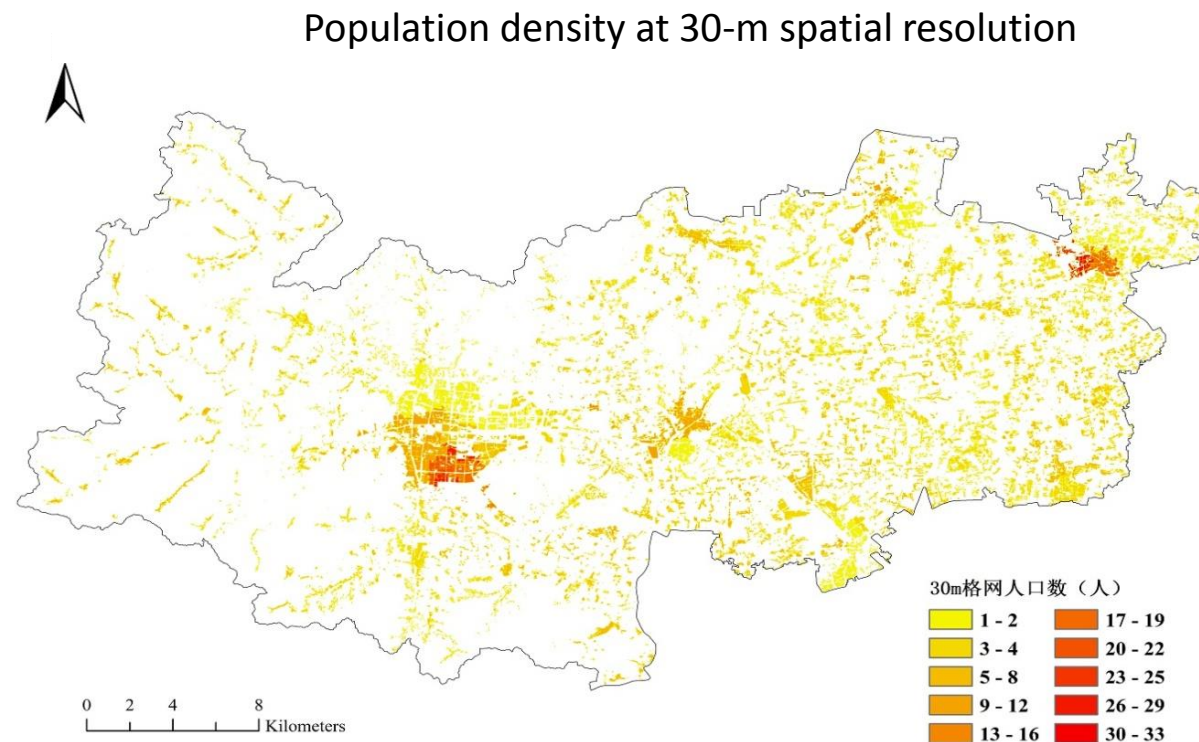
Establish relationship with the population density



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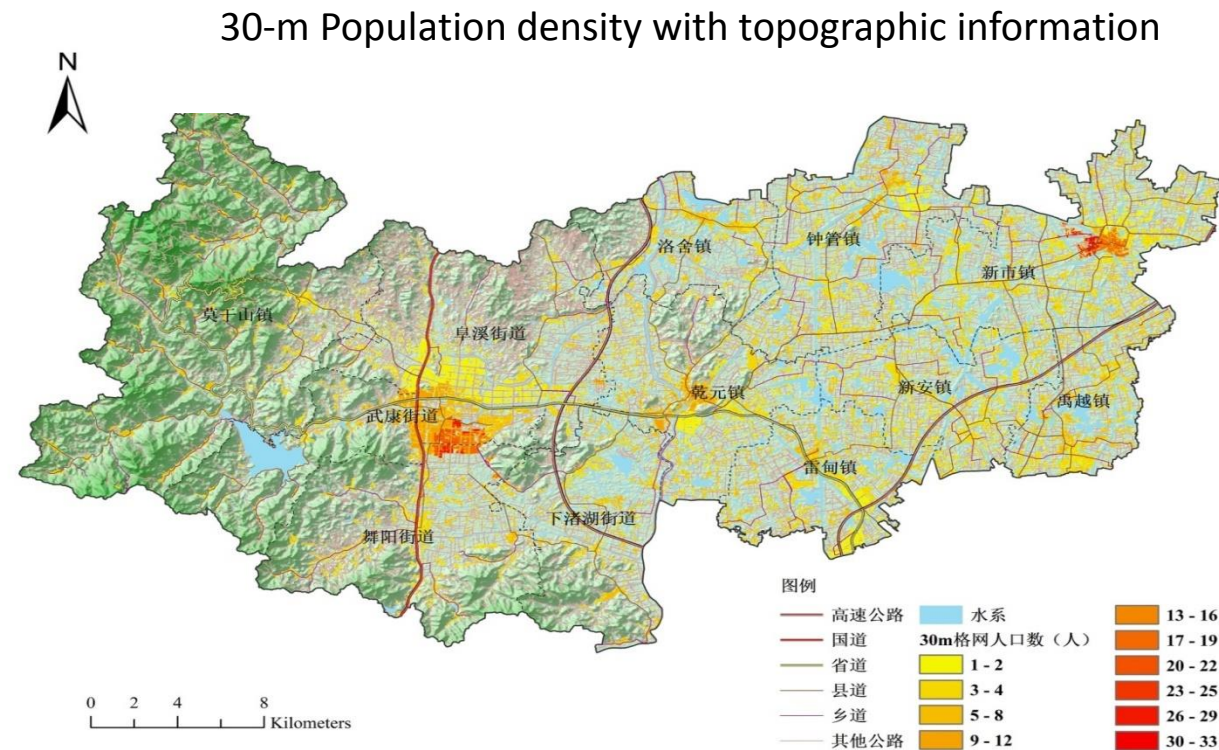
Providing more spatial details



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Enabling integrated geospatial and statistical analysis



Deriving SDGs Indicators

Three indicators were derived using the disaggregated data

- Indicator 3.8.1- *coverage of the basic health services;*
- Indicator 4.a.1- *allocation of educational resources;*
- Indicator 9.1.1- urban traffic
 - a. *The proportion of rural population living within 2 km of the whole season highway;*
 - b. *Traffic accessibility;*
 - c. *X hour life circle*

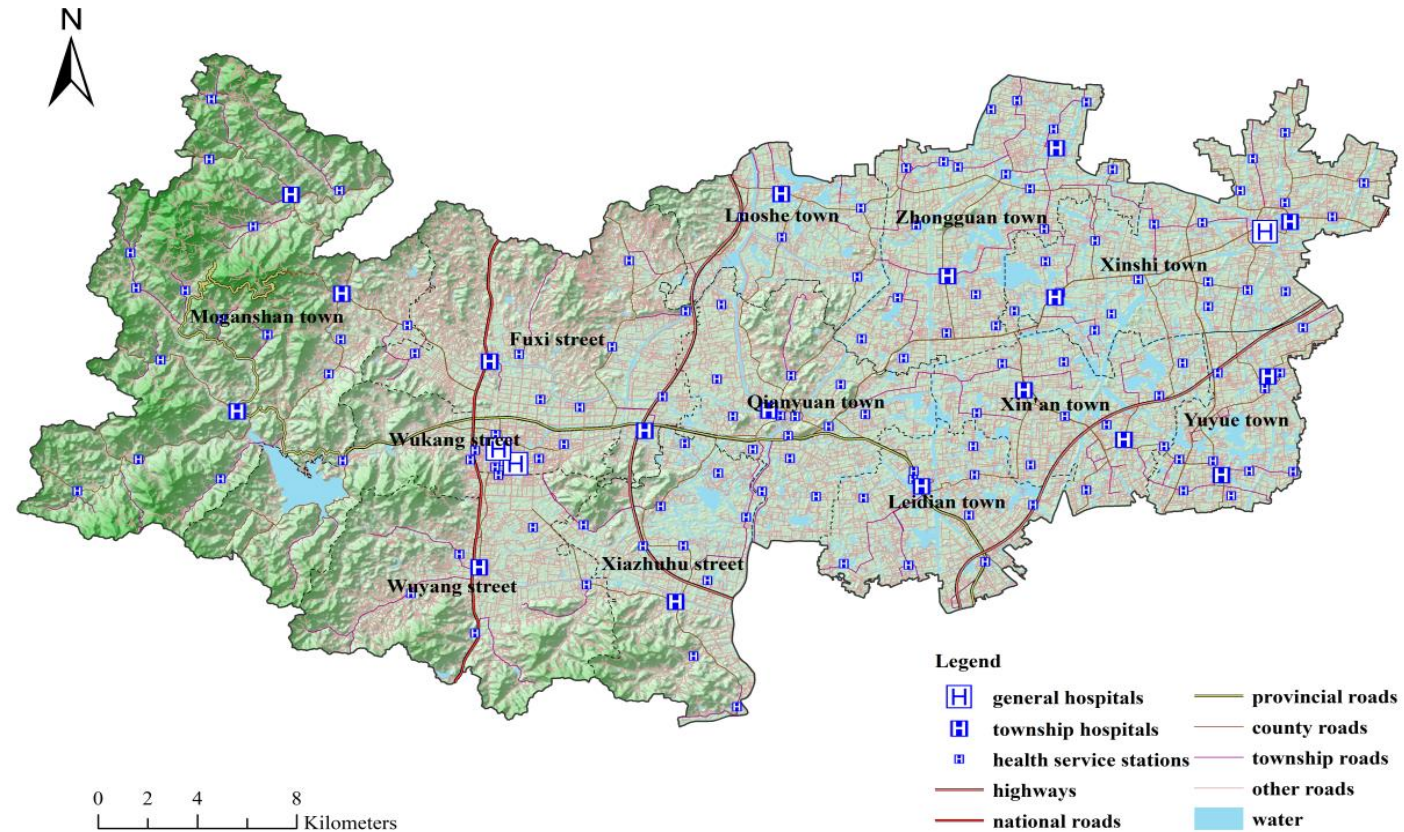


Indicator 3.8.1

SDGs— indicator 3.8.1 *Coverage of basic health services*

Deqing County has:

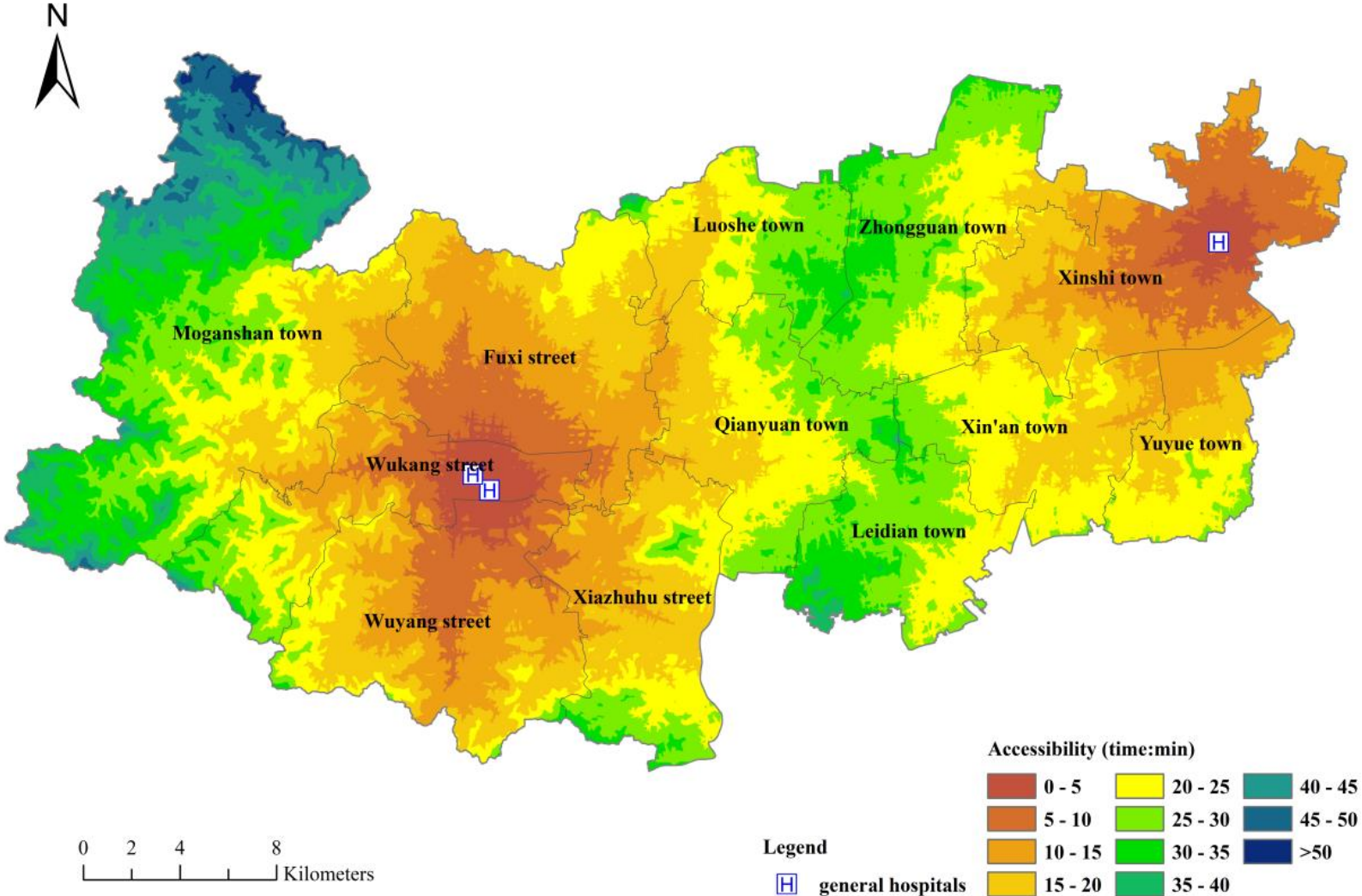
- *general hospitals- 3*
- *township hospitals -19*
- *Health service stations -134*



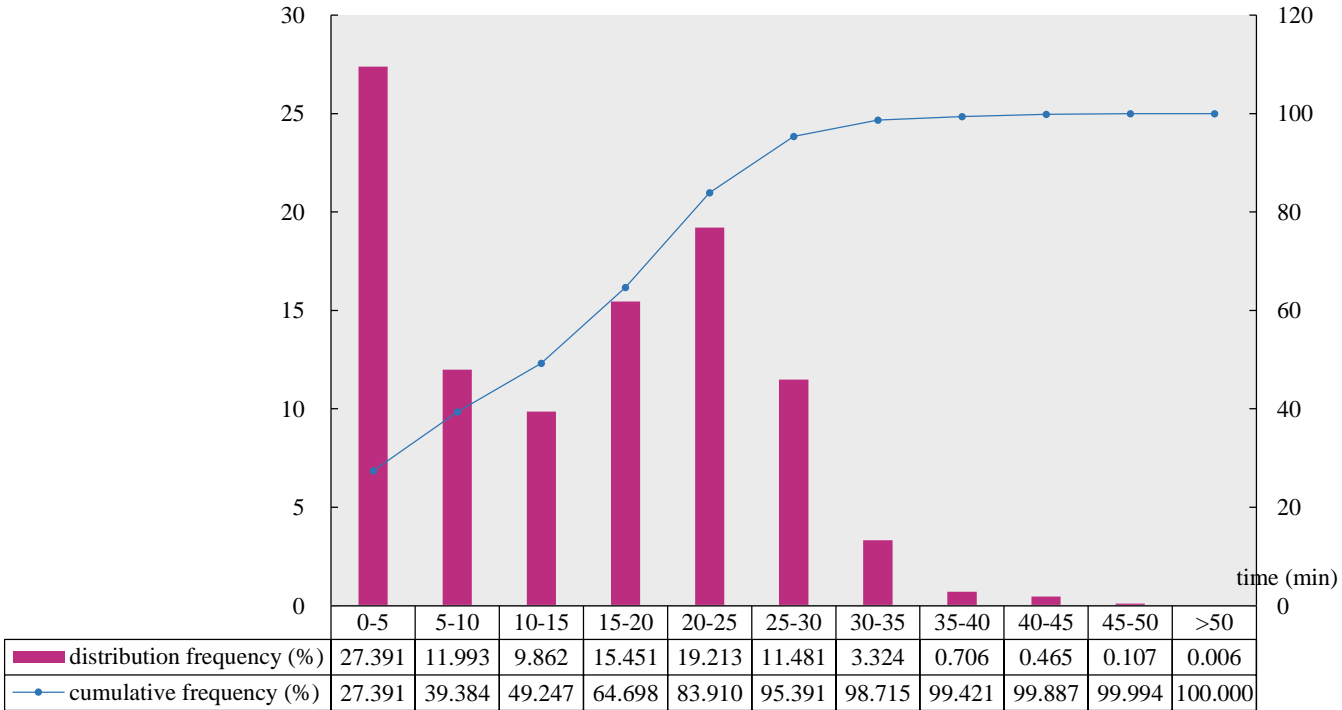
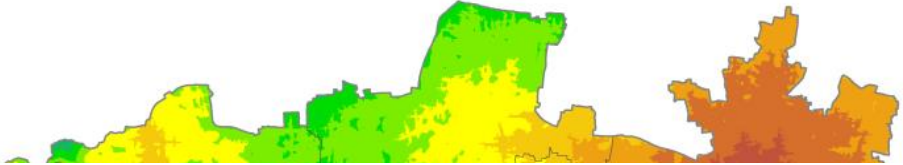
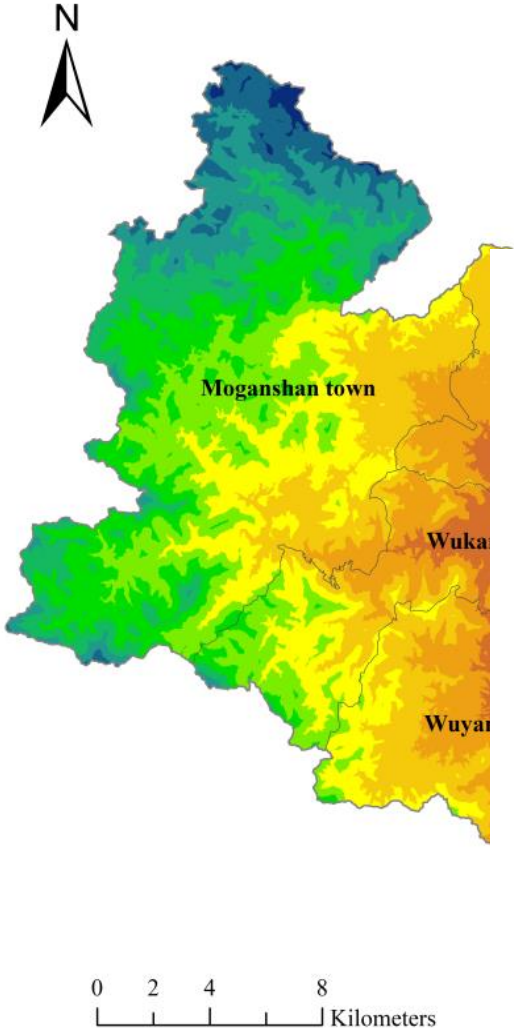
Layout of medical and health facilities in Deqing County



Accessibility of general hospitals



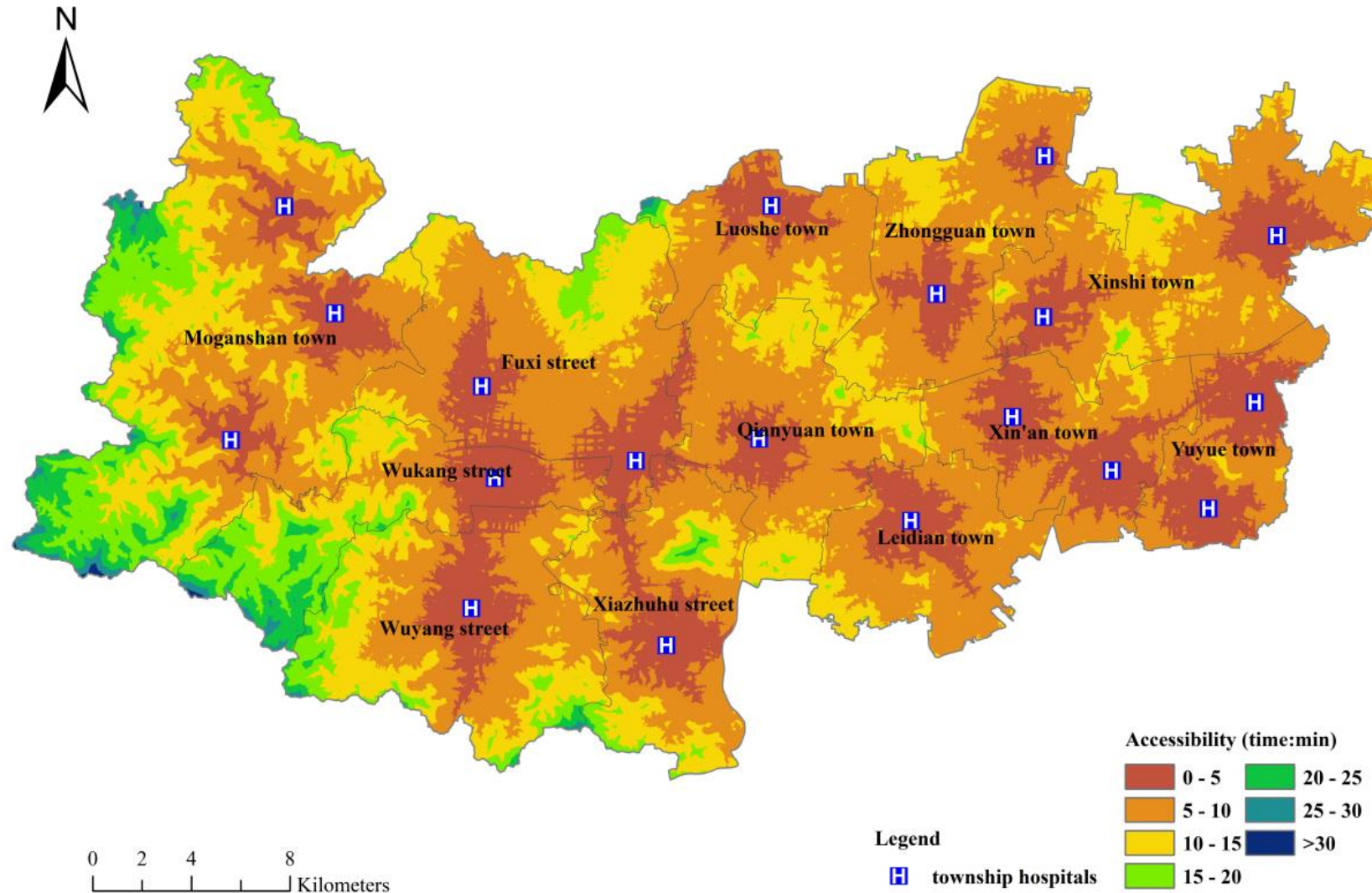
Accessibility of general hospitals



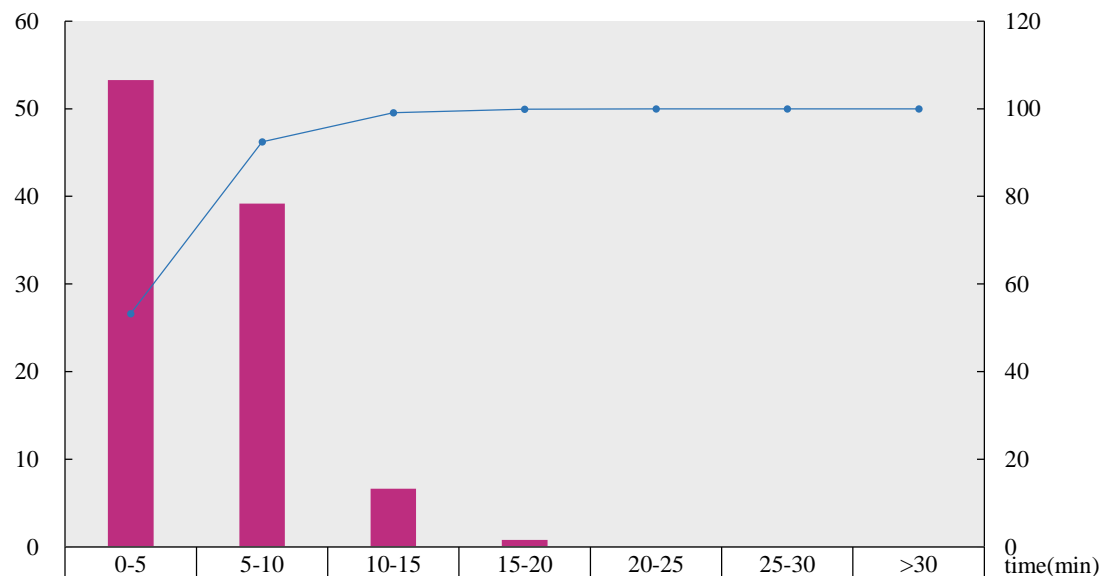
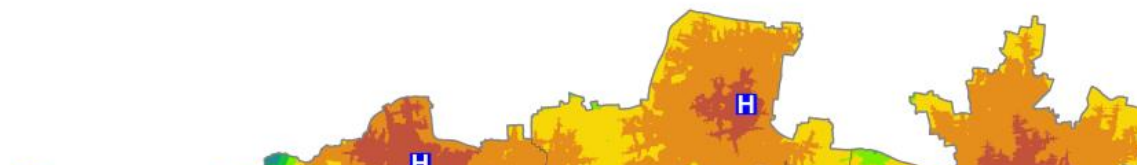
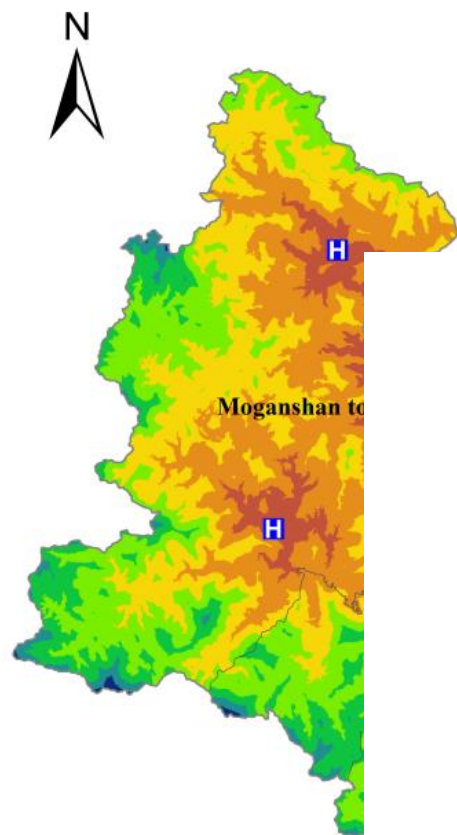
Distribution frequency and cumulative frequency of service population of general hospitals



Accessibility of Township Hospitals



Accessibility of Township Hospitals

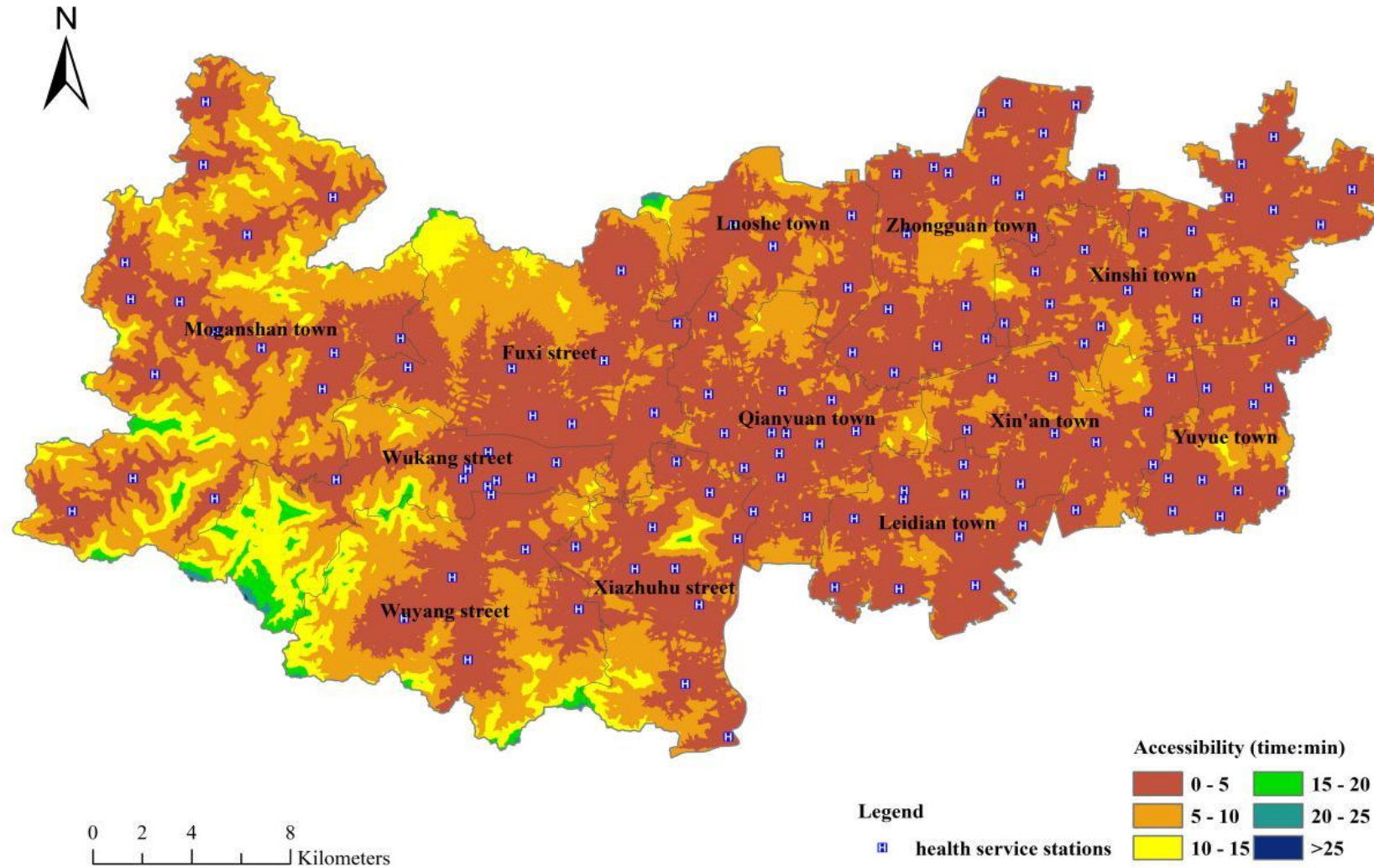


distribution frequency (%)	53.277	39.164	6.670	0.812	0.077	0.002	0.000
cumulative frequency (%)	53.277	92.441	99.110	99.922	99.998	100.000	100.000

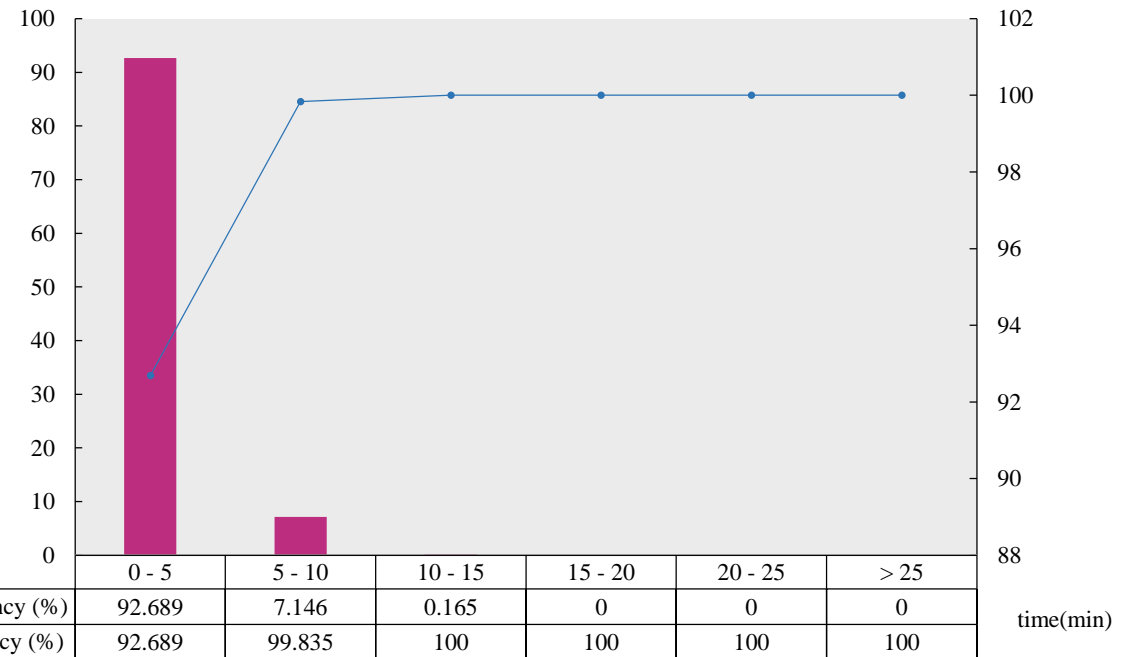
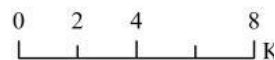
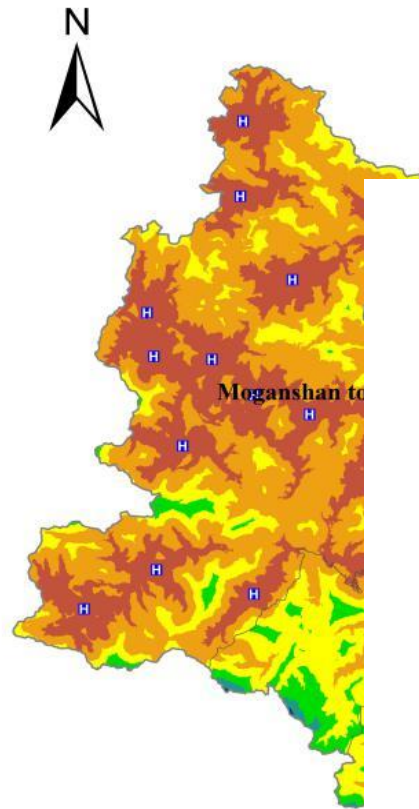
Distribution frequency and cumulative frequency of service population of township hospitals



Accessibility of Health Service Stations



Accessibility of Health Service Stations



Distribution frequency and cumulative frequency of service population in health service station



2.3 Organized a Special Session in UN_WGIC

**Parallel Session : Measuring and Monitoring the SDGs
"GEOSPATIAL DISAGGREGATION AND AGGREGATION FOR THE SDGS"**

Tuesday, 20 November 2018

14:00 – 15:30

[E303, Exhibition Center](#)

Moderator: Prof Zhilin Li Hong Kong Polytechnic University

Presenters/Panellists:

1. Prof. Jun Chen, National Geomatics Center of China
2. Dr. Donna Clarke, University of Southampton
2. Prof Zhilin LI, Hong Kong Polytechnic University
3. Prof. ZHAO Xuesheng, China University of Mining and Technology (Beijing)



Content

Task Stream 1

Activities in last six months



Future Plan

Questions?



Time Schedule

- 2018 Dec: Send out call for good practices/ exemplars, start preparations for a booklet
- 2019 April: Organize a Tele-mtg to discuss the conceptual framework, select the good practices, and prepare the draft technical guideline
- 2019 Aug: Organize a workshop in Chile or China, discuss the Booklet and the technical guideline
- 2019 Nov: Summaries and prepare a report to IAEG-SDGs



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Activities in last six months

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How to get the planned work done?

It depends critically on whether we have an active task force and keep going.

- Major players--- members of IAEG-SDGs: WGGI



- Invited international experts

	Names	Society	Affiliation and Correspondence	
1	Zhilin Li	ISPRS	Professor, Hong Kong Polytechnic University	
2	Sisi Zlatanova	ISPRS	Professor, Melbourne University	
3	Songnian LI	ISPRS	Professor, Rayson University	
4	Monica Sester	ICA	Professor, Hannover University, Germany	
5	Yifang Ban	ICA	Professor, KTH, Sweedn	
6	Liqiu Meng	ICA	Prof. Munich Tech. Uni., Germany	
7	Andrew J Tatem	IGU	Professor, Uni. of Southampton , UK	
8	Giles Foody	IGU	Professor, University of Nottingham	
9	Martin Brady		Australian Bureau of Statistics, Canberra, Australia	
10	Xuesheng Zhao		Prof. China University of Mining & Technology, Beijing	
11	Yungang Hu		Associate professor, Beijing University of Civil Engineering and Architecture	
	



Questions

Question 1: How could an active task force be formed for Task Stream I?

Question 2: What would you contribute to the booklet and the technical guidelines?


Question 3: How should the call for good practices be sent out?

Question 4: How should we invite the invited international experts, through their affiliated international society (such ISPRS, ICA,...)?

Question 5: How should the drafted booklet and technical guideline be reviewed ?

Question 6: What other resources should we mobilize to get the work done ?



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