Assessing LARSI-integrated Procedure in Urban Adjudication in China

a case study in Luochuan County

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Outline

Research Problem

The Social Need of Adjudication

- Large coverage
- Efficiency
- Cost

Current Adjudication Procedure

- Legal
- Formal
- Statutory

LARSI-Integrated
Participation Adjudication Procedure
- LARSI images (5 cm)
- Participation

Main objective:

✓ To assess the new LARSI-integrated procedure's suitability in urban adjudication
1. Literature Review

1. Concepts
- Cadastre, registration, adjudication, parcel, boundary

2. Adjudication techniques
- Ground survey
  - Theodolite, plane-tablet, total station, GPS etc.
  - Survey with remote sensing imagery/ aerial photographs (David Siriba, 2009)
- Potential utility of applying HRI (High Resolution Imagery) into cadastral mapping (Prasada Raju, 2003)
  - Simply enlarged. (Kenya)
  - Rectified and enlarged. (Thailand, Botswana, Ethiopia, Turkey)
  - Ortho-rectified and enlarged. (Palestine, Australia, Canada, Namibia)

3. LARSI
- Platforms—UAV & Airship
- Characteristics (Siriba, 2009)

- Easier to interpret and distinguish boundaries of features;
- Potential to meet high precision specifications of cadastral surveying and mapping;
- Less fieldwork is required to supplement the photo-interpreted information
2- Interview & Questionnaire

- Procedure
- Cost
- Efficiency

Preparation
- Organization
- Publicity
- Pilots selection and technical training
- Making the plan

Land right investigation
- Land obligee investigation
- Parcel boundary investigation
- Draw parcel sketch
- Fill in cadastral forms

Cadastre survey
- Ground control surveying
- Parcel boundary surveying
- Draw cadastral maps and parcel maps
- Area Calculation

Last Two stages
- Data compilation
- Verification

Current Adjudication Procedure (Jing, 2011)

3 - Design & Fieldwork

- Interview & Questionnaire

Current Adjudication Procedure (Jing, 2011)

The Newly-designed Adjudication Procedure (Jing, 2011)
3 - Design & Fieldwork (cont')

- Land Obligees delineated the image by pen;
- Fill cadastral forms.

3 - Design & Fieldwork (cont')

[Image of a map being discussed by people, with a magnified section showing a CAD software interface for land registration.]
4 - Modeling & Assessment (cont’)

Data Quality
- Time/Efficiency
- Cost
- Law compliance

Accuracy
- Completeness
- Validity
- Consistency
- Timeliness

Assessment Model to the New Procedure (Jing, 2011)

4 (1). Assessment - Accuracy
UAV Imagery with 5 cm Resolution

(1) Pilot Overview: 1:500
(2) One Parcel: 1:100
(3) One Parcel Point: 1:20
(4) One Parcel Point: 1:50
### 4 (1). Assessment - Accuracy

(X, Y) – form the field in SNLS; 
(X’, Y’) – from the digitized ortho-rectified LARSI in ArcGIS.

### 4 (2). Assessment – Time/Efficiency

<table>
<thead>
<tr>
<th>Efficiency/Time Comparison</th>
<th>Field (Current procedure)</th>
<th>Workshop (Test procedure)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land right investigation</strong></td>
<td>Two days – Inform &amp; delineate</td>
<td>Two hours (Two staff)</td>
</tr>
<tr>
<td><strong>Cadastral surveying</strong></td>
<td>One day (Two surveyors)</td>
<td>One hour (One Cartographer)</td>
</tr>
</tbody>
</table>
### 4 (3). Assessment - Cost

<table>
<thead>
<tr>
<th>Process</th>
<th>Number of Staff</th>
<th>Duration</th>
<th>Salary</th>
<th>Office Rent</th>
<th>Food Subsidy</th>
<th>Telebill</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land right investigation</td>
<td>2*14+28 (2 persons per team &amp; 8 teams)</td>
<td>3 days</td>
<td>¥50 (per capita each day)</td>
<td>¥40 (each day)</td>
<td>¥50 (per capita each day)</td>
<td>¥5 (per capita each day)</td>
<td>¥28<em>3</em>(50+50+5)+40*5= ¥9440</td>
</tr>
<tr>
<td>Cadastral surveying</td>
<td>1*6 (1 person per team &amp; 6 teams)</td>
<td>4 days</td>
<td>¥100 (per capita each day)</td>
<td>¥50 (per capita each day)</td>
<td>¥50 (per capita each day)</td>
<td>¥5 (per capita each day)</td>
<td>¥6<em>4</em>(100+50+5)+40*4= ¥1880</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>34</td>
<td>7 days</td>
<td><strong>¥388040</strong></td>
<td><strong>¥6280</strong></td>
<td><strong>¥9280</strong></td>
<td><strong>¥2880</strong></td>
<td><strong>¥528040</strong></td>
</tr>
</tbody>
</table>

#### Comparison

<table>
<thead>
<tr>
<th>Comparison</th>
<th>The current procedure</th>
<th>The newly-designed procedure</th>
<th>The ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>¥388040</td>
<td>¥6280 (Airships) ¥9280 (UAV)</td>
<td>Around 40:1</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>5 months</td>
<td>7 days</td>
<td>Around 22:1</td>
</tr>
<tr>
<td><strong>Labor amount</strong></td>
<td>60 persons</td>
<td>34 persons</td>
<td>Around 2:1</td>
</tr>
</tbody>
</table>
4 (4). Assessment – Law Compliance

- Not unified for land adjudication accuracy requirement
- Outdated in regulations for adjudication procedure and technical tools

### Indicator | Result
--- | ---
Data quality (Accuracy) | 22 cm
Efficiency/Time | 4.5% of the current procedure time
Cost | 2.5 % of the current one
Law compliance | Non-compliance with the specific rules and specifications
Outline

1. Research Problem
2. Research Method
3. Research Result
4. Conclusion & Recommendation

Conclusion

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Result</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data quality</td>
<td>21 cm</td>
<td>- Not suitable but promising</td>
</tr>
<tr>
<td>(Accuracy)</td>
<td></td>
<td>- Large areas have not yet been registered (e.g. China)</td>
</tr>
<tr>
<td>Efficiency/Time</td>
<td>4.5%</td>
<td>- Greatly enhancing the efficiency</td>
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<tr>
<td></td>
<td></td>
<td>- Savor Labor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Simplify the adjudication procedure</td>
</tr>
<tr>
<td>Cost</td>
<td>2.5%</td>
<td>- Achieve pro-poor adjudication (e.g. Africa)</td>
</tr>
<tr>
<td>Law compliance</td>
<td>Non-compliance</td>
<td>- Outdated and redundant</td>
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<tr>
<td></td>
<td></td>
<td>- To be re-organized and synthesized</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- To be unified and up-to-date</td>
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</tbody>
</table>
Recommendation

- The suitability of the new procedure for other countries
- What is the new procedure development in future
- How to apply the newly-designed adjudication procedure to build a dynamic cadastral system with time series

Thank you!