



## **DEVELOPING A LAND ADMINISTRATION INDEX**

**MOHSEN KALANTARI**

Department of Infrastructure Eng., The University of Melbourne, Australia  
mohsen.kalantari@unimelb.edu.au

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# Responsible Land Governance: Towards an Evidence Based Approach

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## **Abstract**

Since 1996, there has been significant progress in developing performance evaluation frameworks and benchmarks for individual Land Administration System aspects. Ontological and epistemological differences inherent in each Land Administration System (LAS), however, have stymied attempts to cross-compare performance of Land Administration Systems in their entirety. This paper seeks to establish a foundation of a Land Administration Performance Index.

## **Key Words:**

Land Administration, Index, Benchmarking, Performance, Comparison



## 1. Introduction

Land is the ultimate resource, for no life or economic activity can be sustained without it (Rajabifard, Kalantari, & Williamson, 2013). In order to manage this resource, land administration systems have been continuously developed and used to generate economic output, assist in fair asset valuation, and determine taxation. Ontological and epistemological interpretations of land are not static and all effective Land Administration Systems will adjust in order to meet the needs of people: Western European land administration systems developed methods to facilitate the trade and sale of land as a commodity to meet the desires of a burgeoning bourgeois social class; residential shortages post WWII prompted land administrations to accommodate the concept of subdivisions; the modern information age has forced land administrators to innovate in the realm of land information accessibility and transparency (Figure 1) (Ting & Williamson, 1998).

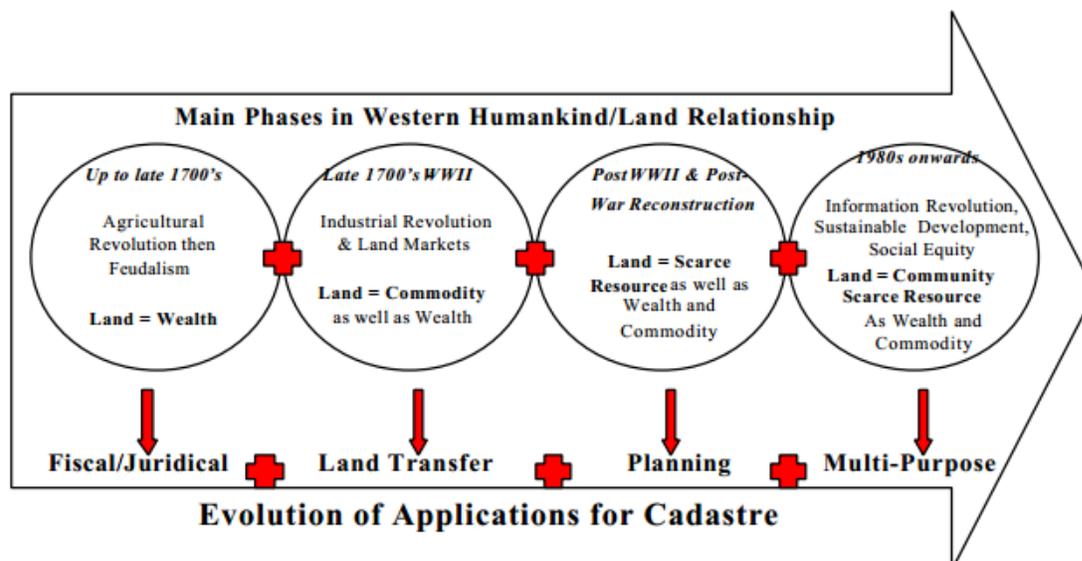


Figure 1: Evolution of society's view of land in developed nations (Ting & Williamson, 1999)

The last 50 years has seen the dominance of globalisation as well as the birth of social equality and sustainability movements. As there is an ever-increasing scarcity of land and land resources (Vidal, 2012), land administration systems must achieve good governance in order to guarantee economic, social, and environmental stability and sustainability.



This recent development has us asking one key question: how does a land administrator measure good governance? While a general conscientious of benchmarks has been reached amongst academics, none attempt to quantify the overall effectiveness of a land administration system as a whole nor have they attempted to index the results so performance can be tracked over a period of time. The aim of this paper is two-fold: (1) to propose a method of indexing a land administration system and (2) to highlight the merits of an index.

## **2. Existing Land Administration System Benchmarks**

While clarity, efficiency and equality make up the basis of a well performing Land Administration System, utilising effective benchmarking and evaluation processes is essential to actually measure how well a Land Administration System is performing (Daniel Steudler, 2004). Taking the definition provided by the AusIndustry-Best Practice Program (1995), a benchmarking and evaluation is “an on-going, systematic process to search for international best practise to be implemented into your own organization”. Adding to this, Daniel Steudler and Ian P. Williamson (2002) suggest that robust benchmarking allows for:

- A framework for comparisons between similar systems and over periods of time.
- The identification of strengths and weaknesses, reflective of successful or unsuccessful policy implementations as well as changing cultural, social and economic circumstances.

In order to benchmark and evaluate a Land Administration System, a set of indicators representing the aspects listed in Table 1 are required. As the depth of indicators can be indefinitely deep and complex, Daniel Steudler and Ian P. Williamson (2002) have suggested that all evaluation methods should limit their evaluation scope to the following six criteria:

1. Land Policy  
This area is related with the how well the policies being constructed to supports sustainable development and good governance.
2. Land Information Policy  
This area is determining about the data standards, pricing policy and accessing the data.
3. Land Management  
The organization structure of how land issues are administrated in terms of types of land rights and the involvement of government agencies (centralized or decentralized) are being evaluated in this area.
4. Land Information Management



The performance of the organization and structure of land administration data are evaluated. In an instance the involvement of private sector, the service to the users, kind of information that are registered.

5. Land Administration

This area is evaluating the financial input and return. The indicators that can be used are: number of land disputes, number of transaction, fees, and time needed per transactions, etc.

6. Land Information Systems

The technical part in land administration is being evaluated in this area. The indicators of this area can be determined by following questions:

- How the information being recorded? Is it paper base or computer base?
- How the data exchange and the distribution mechanism?
- How is the financial input and return?

This identification of what makes a Land Administration System perform well had clearly influenced Tony Burns et al (2006) to develop a three-section benchmarking framework (Figure 2):

1. Legal framework that supports LAS (formal and customary tenure systems)
2. Qualitative indicators of effectiveness the systems
3. Quantitative indicators of the effectiveness of the formal land administration system

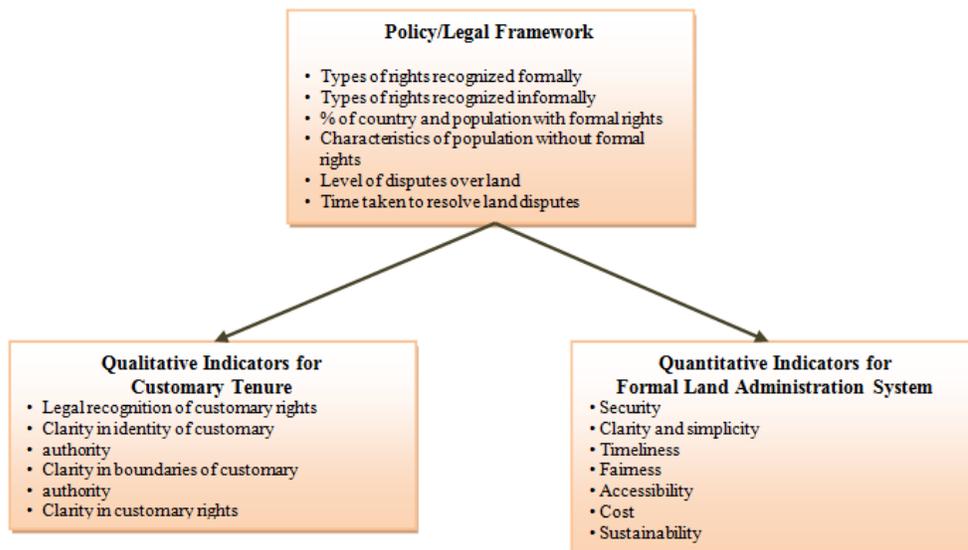


Figure 2: Framework to Assess LAS Efficiency and Effectiveness (Tony Burns et al, 2006)

This benchmarking framework was developed based on the questionnaire data collected from land administrators from numerous different jurisdictions. As the basis of land administration is based on



clarity, equality and transparency, the authors could create a very valid generic approach that could provide a solid foundation for land administrators to create comprehensive but simple methods of evaluating their performance.

Indicators	Security	Clarity & Simplicity	Timeliness Fairness	Accessibility	Cost	Sustainability
% of total parcels registered	Yellow			Yellow		Yellow
% of transfer that are registered	Yellow					Yellow
Annual % registered transactions /transfer	Yellow	Yellow		Yellow		Yellow
Annual registry running costs/registered parcels	Yellow					
Number of staff days/registration		Yellow	Yellow			
Time to produce certified copy of title		Yellow	Yellow		Yellow	
Time to complete registration of transfer		Yellow	Yellow		Yellow	
Transaction cost as a percentage of property value				Yellow	Yellow	
Ratio of revenue/expenditure					Yellow	Yellow

Table 1: Generic Approaches for Quantitative Indicators (Tony Burns et al, 2006).

While no clear universal benchmark or evaluation method has been developed, we believe that this initial framework can provide us with a suitable idea of what a universal Land Administration Performance Index should look like. Indeed, Dorman Chimhamhiwa (2006) specially notes the benefits of multiple jurisdictions and nations using similar indicators and benchmarking methods. The overall goal is not to “name and shame” poorly performing land administration systems but rather highlight strong performances so that they can serve as models to improve the performance of Land Administration Systems with similar country contexts.

### 3. Taxonomic Method of Creating Indices

Index malproduction is a very serious and common risk and must be avoided should a Land Administration Performance Index provide any credible and positive benefit to the future of land administration systems and land policy. The taxonomic method proposed attempts to break down the complex nature of indices into 8 different criteria to assist in the creation of safeguards and regulation strategies (Rauterberg & Verstein, 2013):



Criteria	Description
Goal of Index	The purpose and intent of the index. All indices act as: <ul style="list-style-type: none"> <li>• Blueprints to reduce time and cost of strategies for clients with similar needs</li> <li>• Contract referrals, where values and contracts are based off (eg. Brent Crude Oil Index)</li> <li>• Information sources</li> </ul>
Type of Index	Each index is at least one of three types: <ul style="list-style-type: none"> <li>• Public, which serve to provide information and assist in decision making (eg. Consumer Price Index).</li> <li>• Product, which serve to guide investment and act as blueprints (eg. ASX 200).</li> <li>• Byproduct, which exist to provide value to another product (eg. Libor).</li> </ul>
Index Dependencies	What factors dictate the behavior of the index.
Producer Motives	What is the motive for actors to use the index?
Manipulation Risks	What manipulation risks does the index face?
Underproduction Risks	What may cause insufficient information to be created?
Malproduction Risks	What may cause incorrect and useless information to be created?
Solutions to Issues	What are solutions to many of these issues?

Table 2: Taxonomic method for determining elements those make up indices (Rauterberg & Verstein, 2013)

The taxonomic method, as described in Table 2, allows the index creation process to be methodical and, therefore, minimize the creation of unforeseen risks, biases, and contradictions. It is here that issues that hinder good governance – manipulation, underproduction, malproduction – can be easily identified and thus tackle weak governance practices. While a Land Administration Performance Index cannot stop corruption within institutional and regulatory forces, this taxonomic method has identified a wide range of benefits that are within the interest of earnest land administrators:

- The index can provide information regarding land administration system performance within local, regional, national, and global contexts across a period of time, thus identifying if land and land information policy is truly effective or not.
- Regions with similar country contexts can be identified via the index and thus similar improvement strategies and policy can conceivably be created much more timely and at a much lower cost.
- Stagnation and decrease in index score can identify issues with the land administration system, allowing regulators and institutional forces to quickly identify and remedy risks.

#### 4. Mathematics of Indices

As noted in Section 3 indices are invaluable resources that can measure, and compare, performance between land administration systems, decrease time and cost to create strategies for regions with similar



contexts, and promptly identify land administration systems that are suffering from onsets of weak governance practices. For this to occur, index providers must be aware that indices consist of many incommensurable goods that are mathematically manipulated to achieve a balance of accuracy, tradability, and consistency (Burns & Dalrymple, 2008).

Rauterberg and Verstein (2013) claim that the type and purpose of the index should dictate how accuracy, tradable, and consistent the index is and ultimately dictate the selection criteria, selection period, and the index's mathematics.

There are many different ways to aggregation and it is essential to determine which one is most suitable for a Land Administration Performance Index as they all skew the end result in different ways. That is to say, appropriate methods must be adopted to meet the index's intended goal that would have been identified via the taxonomic method. For an instance, Martin Ravallioni (2010) claims that the United Nations Development Programme opted to avoid linear aggregation when developing the Human Development Index as it would reward uneven human development. As the purpose of a land administration system is to promote equitable and sustainable social, economic, and environmental land use (Rajabifard, Kalantari, & Williamson, 2013), it is within reason to look into methodologies that are biased against land administration systems that have wide gaps between strengths and weaknesses as it suggests extremely weak governance in certain sectors.

For the purpose of most economic indices, the three major types of aggregation are the following (University of New South Wales, 2008). The variable n represents the number of individual elements, indicators in this case, being implemented:

- Linear, which is expressed in the form  $\frac{x+y+c\dots}{n}$
- Geometric, which is expressed in the form  $\sqrt[n]{x * y * z \dots}$
- Harmonic, which is expressed in the form  $\frac{n}{\frac{1}{x} + \frac{1}{y} \dots}$

While it is possible to highlight their mathematical behaviour via logic and proofs, for the purposes of an index, it will be far more useful to highlight their differences via empirical methods. Take, for instance, a student who has done two assignments and one examination. In most cases, a teacher would likely reward students who have been obtaining similar marks throughout the year as it suggests consistency; a teacher may punish students with extremely uneven results as it may suggest undetected collusion and plagiarism. As highlighted in Table 3, linear aggregation does not consider consistency of results; harmonic severely punishes uneven performance; geometric punishes uneven performance but also



appears to recognise strong individual results. Therefore, geometric aggregation is the most suitable for the purposes of the Land Administration Performance Index.

Assignment 1	Assignment 2	Final Exam	Linear	Geometric	Harmonic
50	50	50	50	50	50
40	50	60	50	49	49
30	50	70	50	47	44
20	50	80	50	43	36

Table 3: Linear, geometric, and harmonic mean behaviours with mock assessment data

## 5. Index Indicator Identification and Formula Generation

In order to create a proper index of LAS, the quantitative data of benchmarks are required. Due to how monumental the collection, organisation, and distribution of land information can be, often data indexing is just as difficult as the actual data collection process itself. As such, many adoptions of the Land Governance Assessment Framework adopt a qualitative approach as the qualitative nature only requires rough ballparks rather than detailed statistics.

However as noted by the Australian Bureau of Statistics (2013), quantitative data is a far more uses for assessment as it provides the most flexibility when determining descriptive and inferential statistics. As such, the Land Administration Performance Index we have designed specifically for this data type as our goal is to produce a performance assessment system that not only identifies current performance but also allows prediction of future trends of existing land policy as well as land market regulations.

Using literature by Tony Burns, Ian Williamson, and Daniel Steudler as well as the Land Administration Governance Framework, the following indicators and benchmarks were developed to tackle a wide range of critical factors that influence good governance. As this index attempts to conduct a qualitative assessment of a Land Administration System, all of the indicators chosen fulfil a wide range of criteria – from security to accessibility of information – and can be numerically represented.



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Indicator	Security	Clarity & Simplicity	Timeliness Fairness	Accessibility	Economic	Sustainability
<b>Security and Equality of Land Tenure</b>						
Formal registration and recognition of land tenure	Red			Red		Red
Gender equality of land ownership	Red		Red			Red
Formal recognition and arbitration of rights, restrictions and responsibilities		Red	Red			Red
No. of land policies with some form of public involvement		Red	Red			Red
<b>Management of Public Land</b>						
No. of public land clearly identified with all information	Red	Red		Red		
No. of public land fully accessible by the public	Red	Red				
Is expropriated land actually being used or merely being squatted for illegitimate purposes?					Red	Red
Public -> Private Land Transfer Timeliness		Red	Red			
No. of public asset sales actively advertised to the public		Red	Red			
<b>Transparency, Quality, Efficiency of Cadastre</b>						
Completeness of cadastre	Red	Red		Red	Red	Red
Time required to update / input land information		Red	Red			
Time required to gain access to requested land information		Red	Red			
Affordability of land transfer services				Red	Red	Red
<b>Management of Land Dev + Use</b>						
Transparency of land use changes		Red	Red			
Capacity for land professionals to handle land development demands					Red	Red
Amount of illegal land usage	Red				Red	Red



Speed and predictability of applications for restricted land usage						
Financial Sustainability of Land Services						
Land Valuation and Markets						
Accuracy of valuations						
Foreign investment in land resources						

Table 4. Land Administration Performance Index

As all of the indicators listed in Table 4 all use wildly different scales and types of data, the values used in each indicator (eg. Formal Registration and recognition of Land Tenure) are all normalised in a similar fashion:

$$\frac{\text{Current Value with certain Criteria (eg. parcels with all rights recorded)}}{\text{Total Known Amount of Value Type (eg. parcels)}}$$

This creates an entire set of indicators that all within the range of 0 and 1, allowing them to be aggregated together via geometric mean to create a benchmark for a key aspect of good governance, such as good management of public land. The overall score is a geometric aggregation of all five benchmarks. Geometric mean is used in all cases as this rewards consistency but also recognises strong individual results.

## 6. Applying the index

Another benefit of the Land Administration Performance Index is that it allows comparison between indicators, benchmarks, and overall index score of different jurisdictions. This is useful in identifying the speeds of improvement and deterioration relative to other land administration systems. This is only possible via a quantitative approach as the process of normalisation can only be found with numerical results.

While we do not have enough information to do a full Land Administration Performance Index comparison, we can show an example via a single indicator. For this exercise, we sourced data from the Cadastral Template 2.0 project, which has collected numerous land administration data into a single database for the purpose of comparison.



Despite good initial participation in 2003, the Cadastral Template 2.0 is a good example of how difficult land administration data is to get a hold of. Very few countries have bothered to update their land administration factoids, post-2003, leaving 2003 as the only period where any fair comparison can be made. Ideally, these results should be updated annually as part of a land administration’s *assessment of performance* (Stuedler, et al., 2004) in order to properly gauge a land administration’s progress over time. For this example, we will be comparing *% of land under formal tenure* as this is often one of the most important measures to guarantee good governance.

**“Formal Registration of Parcels” Score:** In the Land Administration Performance Index, we are concerned about the theoretical number of citizens provided with formal tenure as it legally protects one’s right to exist on land (Food and Agriculture Organization of the United Nations, 2002). This benchmark will be determined through the percentage of people that exist on formally recognised land parcels. There will be an assumption that rural/urban land and populations are of equal value. To calculate the value for each country, following the formula that are used:

- Value = (Urban Coverage \* Urban Population Split) + (Rural Coverage \* Rural Population Split)
- Formal Tenure Score =  $\frac{(\text{Value} - 0)}{(10000 - 0)}$

Below is the computed result:

	Japan	Sweden	South Africa	Netherland	Australia	Indonesia	Argentina	South Korea	Uzbekistan	India
Land Parcel Score	2859.60	10000.00	7446.00	10000.00	9900.00	3600.00	N/A	10000.00	5372.00	9900.00
Scores	0.29	1.00	0.74	1.00	0.99	0.36	N/A	1.00	0.54	0.99

Table 5. Score Result for Formal Tenure

As it may be immediately clear, this indicator only measures the number of parcels theoretically formally recorded into the cadastre. However, this does not mean that informal tenure, illegal land use, and unenforced rights, restrictions and responsibilities do not occur. Countries like India are unlikely to be able to provide secure tenure to a significant portion of its populations and likely do not know how many live informally off land. For a proper judgement of how well a land administration system is performing, it must be combined with other indicators and benchmarks to obtain a complete picture.

However, this example still shows the benefit of quantitative analysis as it can show relative performance very clearly (Table 5). Unlike Sweden, the Netherlands and South Korea, Australia has not achieved a



perfect score due to a small number of Crown Land that has not been registered in the system. To people without knowledge of Australia's land administration system, this issue would be difficult to identify through qualitative means. Similarly, the enormity of Japan's issue with regards to formal registration of land parcels would be difficult to highlight without relative comparisons with other jurisdictions of widely different socio-economic progress.

## **7. Conclusion**

This research has developed a working Land Administration Performance Index concept developed from existing accepted quantitative benchmarks for evaluating land administration systems. Quantitative approaches like this are more effective at providing both descriptive and inferential statistics, which allow land administrations to quickly identify not only key weaknesses but also key strengths. With the identification of strengths and weaknesses, a land administrator can quickly evaluate and examine existing policy to help provide the overall performance of the land administration system and therefore achieve good governance sooner.

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