Designing Effective Cadastral Reform – Trinidad and Tobago

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Key words: Cadastre, cadastral reform, cadastral records, cadastral system.

ABSTRACT

Many cadastral reform initiatives undertaken in various parts of the world are unsuccessful because the cadastral reform solutions proposed are those of the international institutions' and cadastral experts' experience in developed countries. Sufficient regard is not paid to the societal, institutional and technological contexts in the particular jurisdiction requiring cadastral reform.

In Trinidad and Tobago, beginning in 1992, initiatives that affected the cadastral system and land administration were begun. These initiatives included the re-flying of complete coverage aerial photography, the re-mapping of the country in digital format, the revision and introduction of land-based legislation and the re-structuring and strengthening of cadastral institutions. This paper reviews initiatives with cadastral impact proposed and implemented over the last 10 years in Trinidad and Tobago and identifies possible reasons why these solutions have not yet achieved perceptible change in the cadastral system and its ability to perform its functions. Some cadastral reform analysis mechanisms are investigated. This is expanded into a cadastral reform model. Deriving from this model, a framework for the performance of cadastral reform in Trinidad and Tobago is proposed that would positively impact on the form of the current cadastre.

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1. BACKGROUND

A cadastral system is required to provide societal benefits to the jurisdiction in which it resides and which determines its particular shape and form. It is required to enable certain activities within a jurisdiction such as facilitating land markets, protecting land rights and supporting sustainable development and land management (Williamson 2001). Cadastral reform should ideally improve the ability of the cadastral system to perform these functions. However, it has been observed that the anticipated benefits of cadastral reform are not always attained in practice (Durand-Lasserve 1996; Williamson and Fourie 1998; Morad and Jay 1997, Ballantyne et al. 2001).

A cadastral system is also called a land tenure system since it incorporates the physical description of the limits of tenure and the legal authority to support the tenure. The tenure status of land occupied by individuals in Trinidad and Tobago includes freehold, leasehold on private and state land, rented on private and state land, squatted on state and private land, "rent-free" occupation-at-will and "family land" (Lemel 1993). Studies have been performed and solutions proposed and attempted to regularise the land situation culminating in the current transitional state in some instances of the land tenure. To support its required functions of facilitating land markets and protecting land rights, the cadastre of Trinidad and Tobago is required to formally recognise and record these tenure status types. In this role the cadastral system is part of a land administration system for the country.

A cadastral system is sometimes a multi-purpose cadastre when it provides formats and linking mechanisms that would allow the integration of its data with other spatial data, which facilitates its use for planning and land management purposes. Cadastral data in Trinidad and Tobago does not meet the needs of developers and users of land information in terms of accuracy, currency, comprehensiveness, and accessibility in the formats required. The constraints to the setting up of a National Land/Geographic Information system in Trinidad and Tobago is stated as being the duplication of data collection amongst agencies, lack of integration of data sets, lack of accuracy, quality and credibility in the land data and lack of comprehensiveness and currency in the data (Ministry of Agriculture Land and Marine Resources 1996). To support its required functions of providing for sustainable development and land management, the cadastral system in Trinidad and Tobago is required to acquire and maintain comprehensive and current data on land. In this role, the cadastral system is part of a land information system for the country.

In Trinidad and Tobago, beginning in 1992, initiatives that affected the cadastral system and land administration were begun. These initiatives included the re-flying of complete-coverage aerial photography, the re-mapping of the country in digital format, the revision and introduction of land-based legislation and the re-structuring and strengthening of cadastral institutions.

While these initiatives may not have been part of a focussed cadastral reform process, they impacted on the cadastre as they had the potential to provide the infrastructure for the cadastral database. This paper identifies the initiatives put forward over the last 10 years in Trinidad and Tobago that affected the cadastre, evaluates the impact of the initiatives on the functioning of the cadastre and then investigates alternative ways of proposing cadastral reform before advancing a mechanism for proposing cadastral reform that would result in effective cadastral reform for Trinidad and Tobago.

2. JUSTIFICATION FOR CADASTRAL REFORM IN TRINIDAD AND TOBAGO

Based on a small sample of 219 house parcels on private and state land surveyed by the Land Tenure Center in 1991 and on a Central Statistical Office '1990 Population and Housing Census', Stanfield and Singer (1993) estimate the scope of tenure insecurity existing on private and state land as shown in Table 1.

Table 1 Tenure Insecurity on Residential Parcels – Estimated for Entire Country (After Stanfield and Singer 1993)

	DOCUMENTS POSSESSED BY PARCEL HOLDERS				
TYPE	UP-TO-DATE DEED	UP-TO-DATE LEASE	OTHER DOCUMENT	NO DOCUMENT	TOTAL
House parcels on privately owned land	119,435	34,197	69,926	31,645	255,203
%	46.8	13.4	27.4	12.4	100.0
House parcels on state owned land	0	5,492	17,883	22,014	45,389
%	0	12.1	39.4	48.5	100.0
Total	119,435	39,689	87,809	53,659	300,592
%	39.7	13.2	29.2	17.9	100.0

These figures indicate the extent of the problem of de facto squatting on private lands. Squatting to this extent (12.4% of households on private lands) indicates the existence of inadequate or inappropriate laws, lack of an institutional structure to maintain formalisation or the lack of recognition of de facto property rights.

Opadeyi (1995) determined the level of importance of real property data as being highest of land-related data amongst more users in Trinidad and Tobago as shown in Table 2. This indicates that there should be a priority placed on the provision of current, accurate and comprehensive land data on property.

Table 2. The level of importance of land-related data (after Opadeyi 1995)

	5	4	3	2	1
Vegetation	5	2	4	1	8
Elevation	10	2	5	3	1
Hydrology	10	4	1	2	4
Transportation	13	3	1	3	1
Infrastructure	10	1	4	3	1
Administrative boundaries	6	5	3	5	3
Utilities	12	4	3	0	1
Real property	14	1	2	4	0
Physical geography	8	3	3	3	4

5 = highly important 1 = lowly important

3. CADASTRAL REFORM - IN TRINIDAD AND TOBAGO

Coming out of studies on the land tenure situation in Trinidad and Tobago conducted in the early 1990's, including those of the Land Tenure Center, the Government of Trinidad and Tobago entered into agreements with the Inter-American Development Bank for a project to improve the efficiency of land resource management in Trinidad and Tobago for the purposes of improving the agricultural sector. As part of this project, policy and legislative reforms were proposed. This included the strengthening of the institutions responsible for agricultural land administration and the reform of legislation dealing with improving the tenure in the agricultural sector. Components of this overall project were indirectly aimed at the cadastral system in the country. 10 agencies in 7 ministries were identified as requiring institutional and administrative reforms. Among them, the Lands and Surveys Division, with responsibility for surveying and mapping of the country was identified for reform of both its survey related and land administration functions. A programme of institutional strengthening of the Lands and Surveys Division was approved by the State to include (Ministry of Agriculture Land and Marine Resources 1994):

- A six-month consultancy to manage survey records
- A three-month consultancy to design and implement a national data transfer format
- A six-month contract for aerial triangulation of the aerial photography
- A two-year contract to produce digital topographic maps from the aerial photography
- Upgrading of the stereo-plotting facilities
- Purchase of equipment for the densification of control for the aerial triangulation
- A 12-month consultancy to establish a digital map production facility

More recently, the aim of the project has evolved along with current international thinking to be focussed on achieving a more open, accessible land market. The Land Use and Policy Administration Project (Land Tenure Center 1999) is one of the more recent projects with this mandate. This project is addressing the institutional causes of the tenure problems in Trinidad and Tobago.

As part of the strengthening of support systems for the management of land several new

pieces of legislation were introduced within the last five years, the State Land (Regularisation of Tenure) Act, 1998 (Republic of Trinidad and Tobago 1998[1]), the Land Adjudication Act, 2000 (Republic of Trinidad and Tobago 2000[1]), the Land Tribunal Act, 2000 (Republic of Trinidad and Tobago 2000[2]), and the Registration of Titles to Land Act, 2000 (Republic of Trinidad and Tobago 2000[3]). The latter three pieces of legislation were created to support the systematic titling and registration of all land in Trinidad and Tobago; an action that should provide a mechanism for clarifying questionable title. The Regularisation of Tenure Act was created to support the regularisation of tenure of the informal occupation of state land.

4. CURRENT STATUS OF THE INITIATIVES

The projects were plagued with delays as a result of institutional and technological problems. The six-month consultancy to manage the survey records was concluded in 1996. The implementation of the project encountered a lack of human resources and institutional inability to support the continuation of the project to conclusion. The three-month consultancy to design and implement a national data transfer format was never concluded as the open, off-the-shelf technology used no longer required its use. Equipment was purchased for the aerial triangulation and the contract to perform the activity was concluded successfully. The consultancy to establish a digital map production facility and the upgrading of the stereo-plotting facilities were also concluded successfully but the efficiency of the facility has been hampered by chronic lack of staff. The final deliverables in the contract to produce digital topographic maps from the 1994 aerial photography were received in 2001 already dated and requiring field completion and annotation. Again the lack of staff prevents the creation of user-required products and the creation of a digital cadastral database in the short term.

The legislative initiatives have such a large requirement for cadastral surveying and mapping that it has negatively affected the feasibility of implementation. As suggested by Fourie and Fluck (1999), waiting to achieve a comprehensive cadastral layer would delay the achievement of tenure security for the many informal occupants of both state and private land.

The overall result is that no perceptible change can yet be observed in the cadastral system and therefore no functional improvement has been achieved after 10 years.

5. CADASTRAL REFORM THEORY

The question is whether these reforms were the most appropriate for Trinidad and Tobago. This section examines the key models for evaluation of existing cadastres prior to performing cadastral reform.

5.1. Dale – evaluating Cadastral Systems

Dale (1998) provides a checklist for evaluating a cadastral system prior to proposing improvements to the efficiency of the system. The aim of the evaluation is to ascertain the status of rights and records on the land. The areas for evaluation are the legal, physical, financial, administrative, social and political environments within which the system operates.

A list of requirements for implementing a multipurpose cadastre is provided and it is noted that the list was prepared for North American jurisdictions but could be relevant elsewhere. The options for developing countries in this framework would be limited as the progression of a system is expected to be linear towards a multi-purpose cadastre.

5.2. Williamson and Fourie – The Case Study Methodology

Williamson and Fourie (1998) suggest that the research methodology used for examining the existing cadastre and social situation should be more logical and scientific. Their work proposes that if a sufficiently rigorous cadastral research procedure were followed in a particular jurisdiction then the design of the proposed reforms would also be more logical and scientific and thus be more inclined to achieve the desired outcome. Figure 1. models the case study methodology for performing cadastral reform as suggested by Williamson and Fourie. The methodology provides the rigour required to ensure that the system environment is fully taken into consideration before a solution is proposed. However, the model stops short at the provision of a proposed solution for cadastral reform and does not go on to manage, monitor and evaluate the proposed programme. The institutions in developing countries would benefit from a structured monitoring process for the reform programme.

5.3. Williamson – The 'Tool box'

Williamson (2000) demonstrates that in the design of a cadastral reform programme, a tool box of available options can be consulted. Headings for the available options are given as (Williamson 2000):

- Land policy options
- Land tenure options
- Adjudication options
- Institutional options
- Management options
- Spatial data infrastructure options
- Technical options
- Human resource development options

Clearer indicators as to the most appropriate choice of tools would benefit the evaluation process.

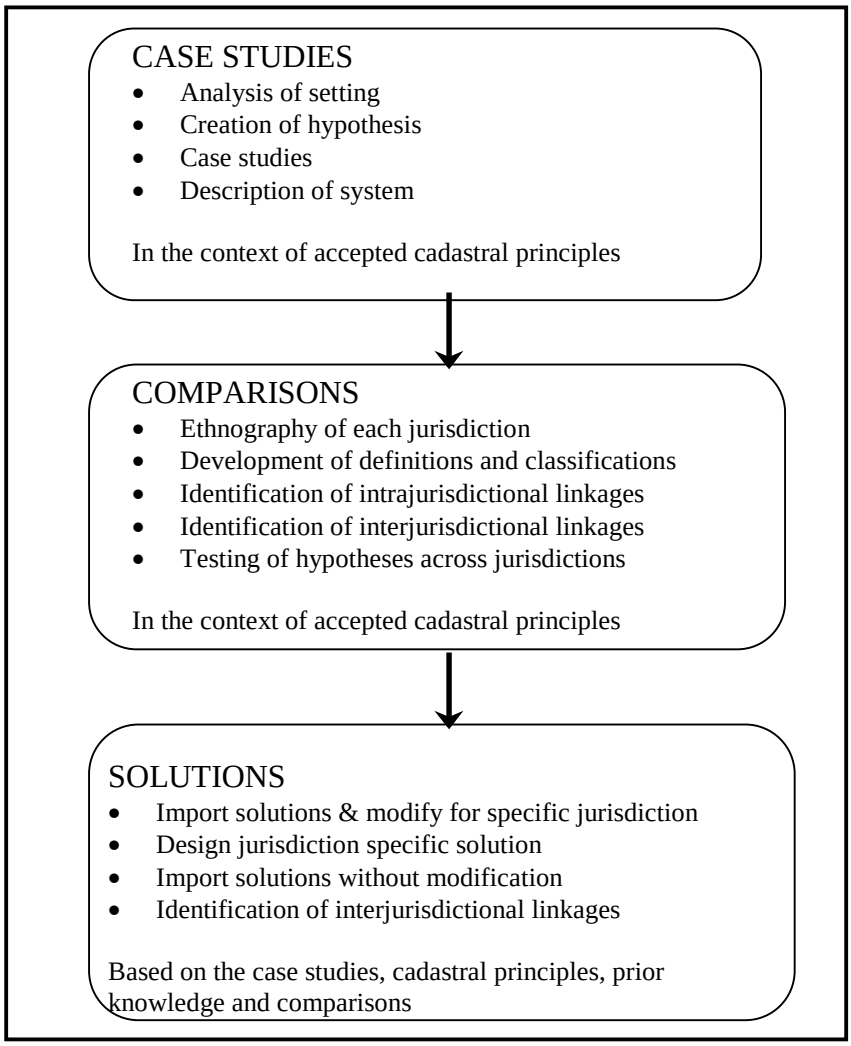

Figure.1. Cadastral Reform Methodology after Williamson and Fourie (1998)

5.4. Tulloch – The Life Cycle of MPLIS

Tulloch (1997) proposes a life cycle that albeit for the development of multipurpose land information systems can be examined as a basis for cadastral reform given the interchangeability of the terms. He gives the proviso that the life cycle be used for description of the development process of the system and not directly for evaluating benefits of the system. Six distinct stages of development are recognised in this model as shown in Figure 2. They are ‘ no modernisation’, ‘system initiation’, ‘database development’ ‘recordkeeping’, ‘analysis’ and ‘democratisation’, the status at which the system is currently being determined by the absence or presence of certain indicators. The performance indicators that used are categorised as Use of Technology, Transfer of Data, Improved Data Quality, Improved Agency Data Management, Education and Training Opportunities, Change in Decision Making Processes and Impacts on Land Related Decisions. This model or an adaptation could be used for designing cadastral reform programmes simply by assessing the current stage of

development and moving toward the next stage. However the limitation on this model is that it was conceived for systems in a particular jurisdiction so that systems elsewhere may not follow the exact route. The assumption is also that all systems would follow a strictly linear path when in reality one system may achieve effective benefits at a particular point and would have no motivation to continue to the next system stage.

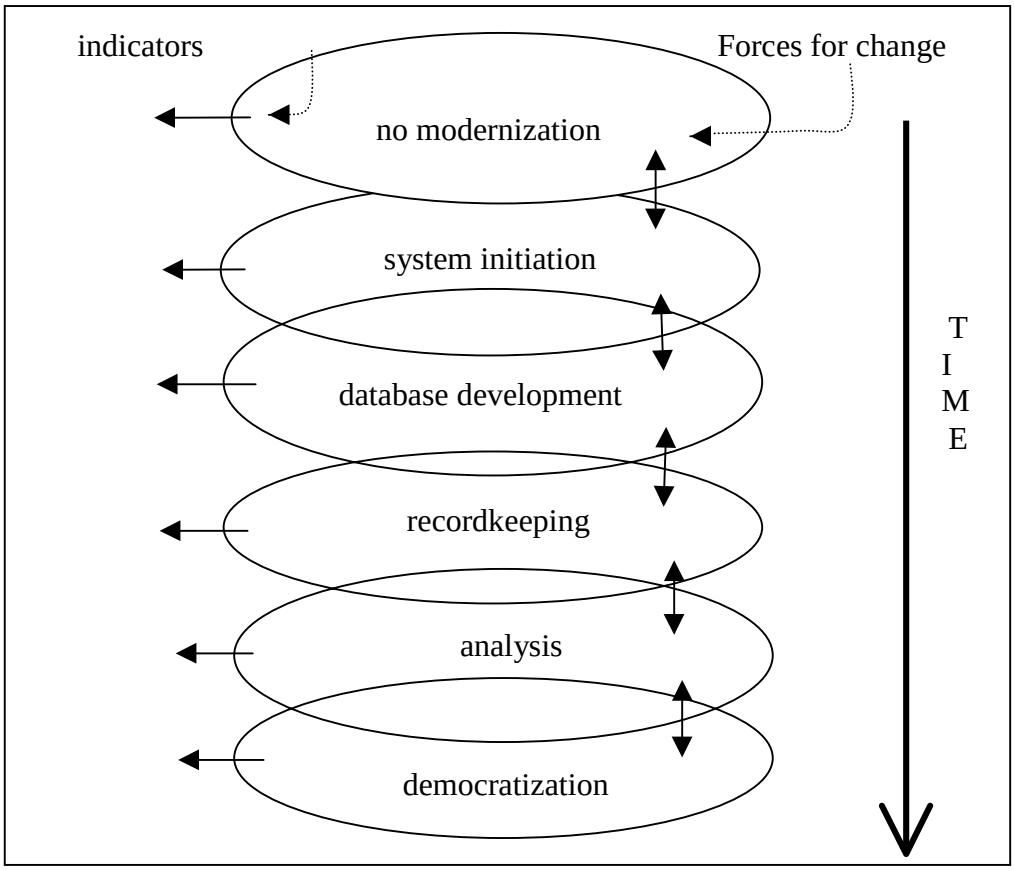

Figure 2 Life Cycle of Development of MPLIS (Tulloch 1997)

5.5. Steudler – Benchmarking Cadastral Systems

Steudler et al. (1997) recognise the fact that societies now require some mechanism for improving the effectiveness of their cadastral system. They advance benchmarking as a tool that could be utilised in this context. For this research, cadastral systems internationally were compared using criteria of size and content, performance and reliability, completeness, structure of personnel, and cost and benefit. The proviso here is that no conclusions have been drawn from the research. Benchmarking could be useful if comparisons are made between countries that are developing along the same paths. Where systems have different structures and differing objectives, difficulties arise in using the comparison for the purposes of proposing cadastral reform programmes. The framework therefore, similar to the life-cycle model of Tulloch is not flexible enough for generic use. Difficulties observed by the researchers in collecting data that could be used in the evaluation of the systems indicated that either the questionnaire did not use the same evaluation procedures that the individual countries did for assessing their cadastral reform programmes or that no evaluation

procedures had been built into the cadastral reform programmes being undertaken by the various countries. This points to a need for best practice guidelines in the performance of cadastral reform programmes particularly in the area of monitoring and evaluation of programmes.

6. FRAMEWORK DESIGN

The design of the framework for conducting cadastral reform must begin with the acknowledgement that current models prescribe similar models for all jurisdictions leading to lack of effectiveness in the outcomes of the programmes. To customise the programme to the particular jurisdiction, a more structured theoretical process for analysing the existing system must be found. The structured process must continue beyond the analysis of the existing system and must be incorporated into the design, management and evaluation of the programme. A framework for effectiveness incorporates the different stages and is not complete until the evaluation of the programme is completed. The design of the proposed framework for effectiveness-based cadastral reform is shown in Figure 3. Kettner et al (1999) provide an effectiveness-based process to designing and managing social service projects. Frameworks of this type taken together with other logical models of analysis such as the case study methodology of Williamson and Fourie can have the potential to assist in the cadastral reform process since they set out logical steps for not only the examination of the existing situation, but also for the assessment of the need for reform. A programme evaluation step is also built into the process to test the effectiveness of the programme. The steps to the process are as follows:

1. Deconstructing the cadastre (system analysis)
2. Problem analysis (case studies)
3. Needs assessment
4. Selecting a 'tool'
5. Program design
6. Management information systems
7. Implementation
8. Budgeting
9. Program evaluation

There should be several possible solutions for societal problems and this should be reflected in the establishment of several different programmes or 'tools' as proposed by Williamson. This would ensure that the particular peculiarities of individuals are taken into account in the solutions provided. This theory has a parallel in the way societies have individual requirements for the cadastre. The reform process should, however, go on to provide mechanisms for continued evaluation to ensure that the process remains functional and produces effective outcomes. In this way the reform process maintains the interest and support required in the typical institutional structure of the developing country.

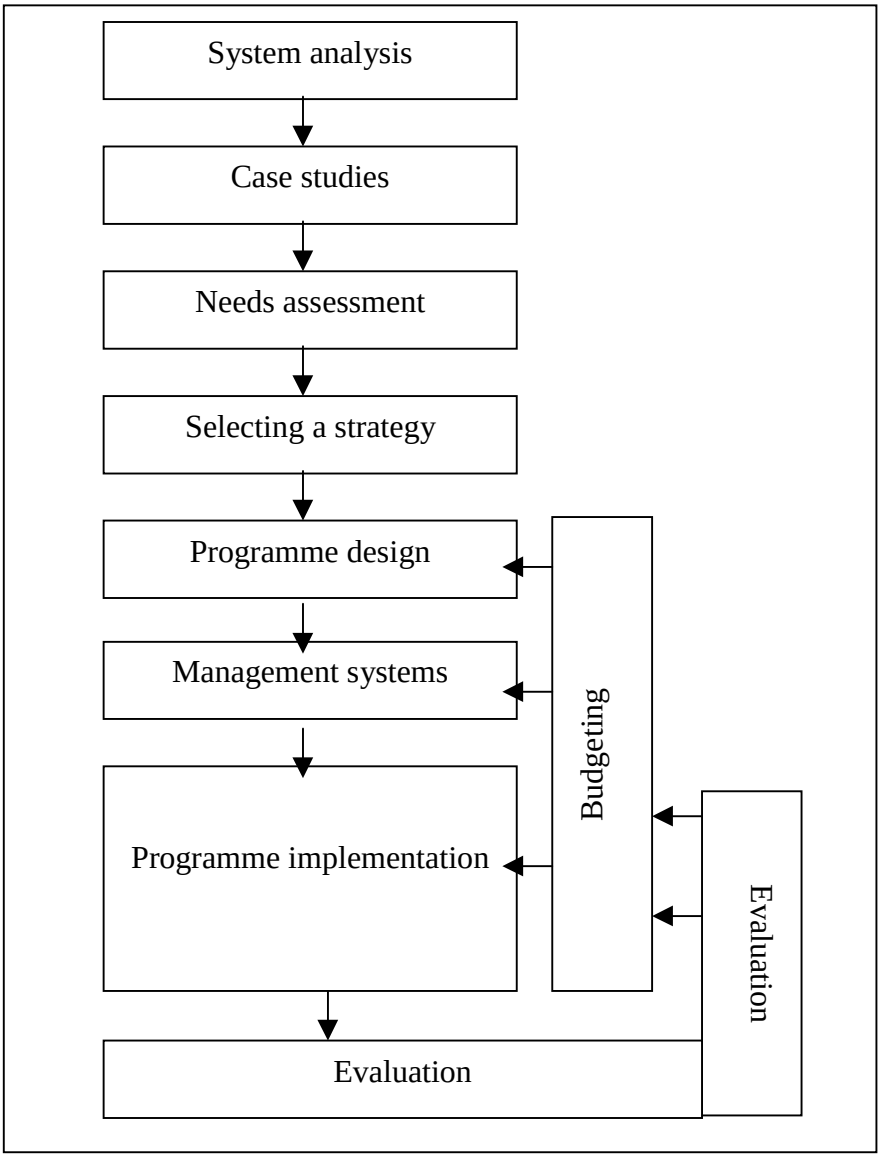

Figure 3. Framework model for the conduct of cadastral reform

7. CONCLUSION

The initiatives that have impacted on the cadastre in Trinidad and Tobago have not achieved a perceptibly effective change in the cadastre. Cadastral reform, including the analysis of the existing cadastre the choice of options for improving the system and the evaluating and monitoring of the process, needs to be focussed and structured so that benefits could be achieved.

REFERENCES

Barnes G. 1995. An Assessment of the cadastral Surveying and Land Registration System in Trinidad and Tobago. Report submitted to the Inter-American Development Bank. 16p.

Ballantyne, B., J. Dobbin, and A. Hunter. 2001. Geomatica. Vol. 55, No. 1. pp23-38

Durand-Lasserve, A. 1996. Regularization and Integration of Irregular Settlement: Lessons from Experience. Urban Management Programme. UM Working Paper Series 6, HABITAT.

Fourie, C. and Fluck, O., N. 1999. Cadastre and Land Information Systems for Decision-Makers in the Developing World. In Proceedings of Joint UN-FIG Conference on Land Tenure and Cadastral Infrastructures for Sustainable Development
http://www.sli.unimelb.edu.au/UNConf99/proceedings.htm

Ministry of Agriculture, Land and Marine Resources. 1996. Implementation of a National Land/Geographic Information System Policy in Trinidad and Tobago. Cabinet Minute 1127.

Ministry of Agriculture Land and Marine Resources. 1994. Programme of Institutional Strengthening of the Lands and Surveys Division, Ministry of Agriculture, Land and Marine Resources. Cabinet Minute 2193 of 1994.

Lemel, H. 1993. Data Analysis and Findings on Tenure, Documentation, and Land Use. In Land Tenure and the Management of Land Resources in Trinidad and Tobago Part I – Land Tenure. Eds D. Stanfield and N. Singer. University of Wisconsin: Madison. pp43-91.

Morad, M. and M. Jay. 1997. Cadastral Reform of Indigenous Land Information and Environmental Sustainability in New Zealand. Surveying and Land Information Systems. Vol 57:2. pp120-123.

Opadeyi, J. A. S. 1995. The Analysis and Design of an Integrated Data-Driven Land Administration System for a Developing Country: Trinidad and Tobago. PhD Dissertation. Department of Geodesy and Geomatics Engineering. The University of New Brunswick: Fredericton, N.B.

Opadeyi, J. A. S. and J. McLaughlin. 1996. Cadastral Records in Trinidad and Tobago. ' Surveying and Land Information Systems, Vol. 56 No.1. pp37-42

Republic of Trinidad and Tobago. 2000[1]. The Land Adjudication Act 2000. Government Printer: Port of Spain

Republic of Trinidad and Tobago. 2000[2]. The Land Tribunal Act 2000. Government Printer: Port of Spain

Republic of Trinidad and Tobago. 2000[3]. The Registration of Titles to Land Act 2000. Government Printer: Port of Spain

Republic of Trinidad and Tobago. 1998. The Land Surveyors Regulations, 1998. . Government Printer: Port of Spain.

Republic of Trinidad and Tobago. 1996. Act No. 33 of 1996. Government Printer: Port of Spain.

Stanfield, D. and N. Singer. 1993. Eds. Land Tenure and the Management of Land Resources in Trinidad and Tobago Part I – Land Tenure. University of Wisconsin: Madison

Williamson, I.P. 2001. Land Administration "Best Practice" Providing the Infrastructure for Land Policy Implementation. Journal of Land Use Policy, Vol. 18 (4), pp297-307

Williamson, I. and C. Fourie. 1998. Using the Case Study Methodology for Cadastral

Reform. Geomatica. Vol. 52 No. 3 pp283-295.

BIOGRAPHICAL NOTES

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