Land Administration for Sustainable Development

Part 1

Introducing land administration

Part 1 of this book introduces the concept and principles of land administration in addition to providing an overview of the structure and objectives of the book. It explains how the concept of land administration has evolved and continues to evolve as part of a wider land management paradigm. The ingredients of land administration systems (LAS) and the reasons for building and reforming LAS are explored. The differences between land administration and land reform are emphasized, as is the central role of good governance in building and operating successful LAS. Ten principles of land administration that are equally applicable to developed and less developed systems are presented in chapter 1.

A key to understanding the role of LAS in society is understanding the evolving relationship of people to land and how these relationships in different jurisdictions and countries have dictated how specific LAS evolve, as described in chapter 2. A historical perspective of land administration is introduced along with its key components to help set the scene for the rest of the book. The different perceptions of land and how they affect the resulting administration of land are discussed. Lastly, the cadastral concept is introduced and its central role in LAS explained, particularly the cadastre's relationship to land registries and its evolving multipurpose role.
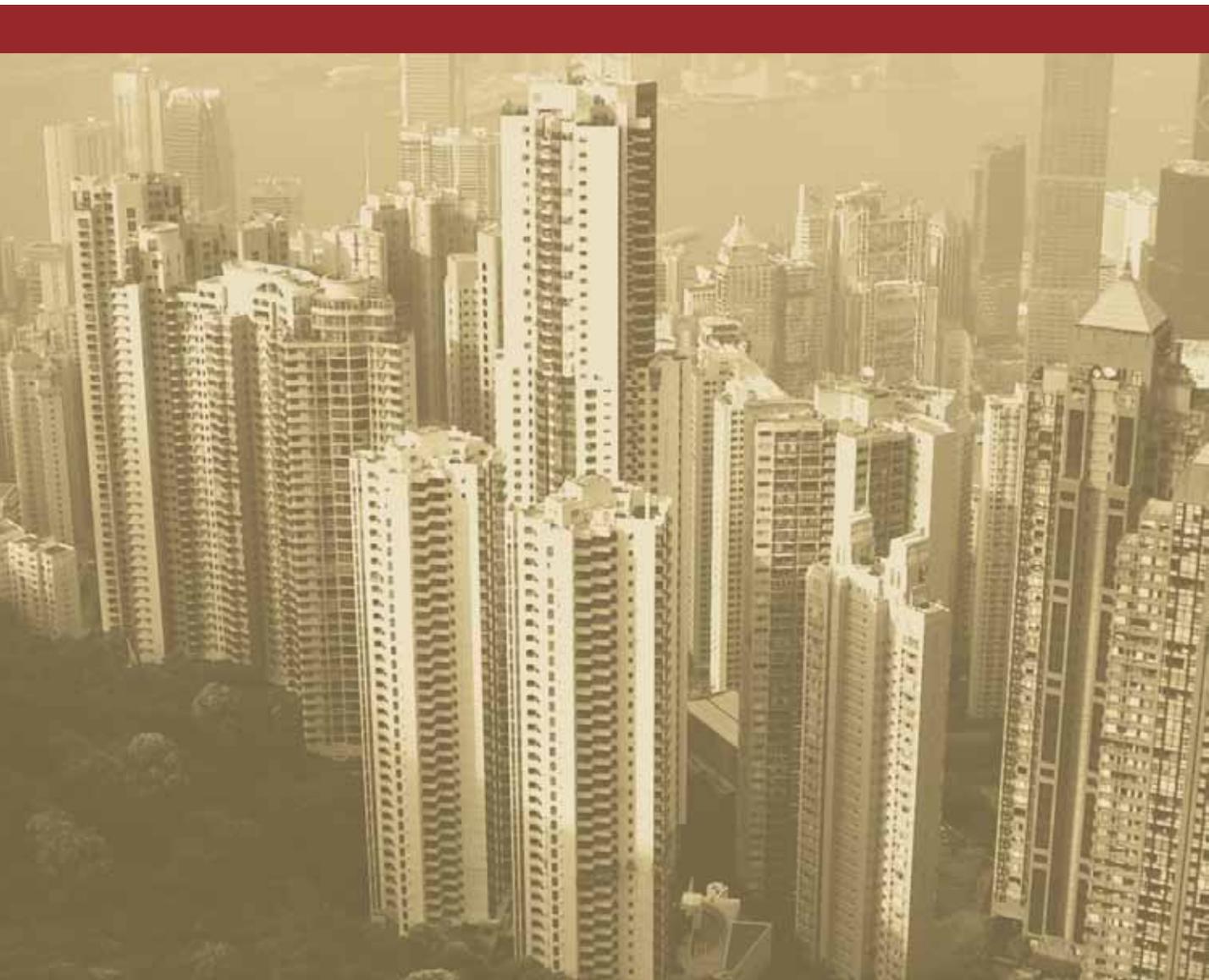
Chapter 1
Setting the scene

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1.1 Integrated land administration

A NEW FRAMEWORK

A land administration system provides a country with the infrastructure to implement land-related policies and land management strategies. "Land," in modern administration, includes resources and buildings as well as the marine environment—essentially, the land itself and all things on it, attached to it, or under the surface.

Each country has its own system, but this book is primarily about how to organize successful systems and improve existing ones. This exploration of land administration systems (LAS) provides an integrated framework to aid decision makers in making choices about improvement of systems. The book is based on the organized systems used throughout modern Western economies where the latest technologies are available, but it is also applicable to developing

countries struggling to build even rudimentary systems. The improvement of integrated land administration involves four basic ingredients in the design of any national approach:

- The **land management paradigm**, with its four core administration functions
- The **common processes** found in every system
- A **toolbox approach**, offering tools and implementation options
- A role for land administration in supporting **sustainable development**

The **land management paradigm** can be used by any organization, especially national governments, to design, construct, and monitor LAS. The core idea is to move beyond mapping, cadastral surveying, and land registration to use land administration as a means of achieving sustainable development. These familiar processes need to be approached holistically and strategically integrated to deliver, or assist delivery of, the four main functions of land management: land tenure, land value, land use, and land development. If the organizations and institutions responsible for administering these processes are multipurpose, flexible, and robust, they can assist the larger tasks of managing land, as well as dealing with global land and resource issues. The land management paradigm encourages developed countries to aim for improved governance, e-democracy, and knowledge management and developing countries to implement food and land security, while improving governance, and, in many cases, building effective land markets.

While the theoretical framework offered by the land management paradigm is universal, implementation may vary depending on local, regional, and national circumstances. In this book, the enigma of open-ended opportunities for implementation is solved by applying an engineering approach that relates design of LAS to management of local practices and processes. **Common processes** are found in all countries and include dividing up land, allocating it for identifiable and secure uses, distributing land parcels, tracking changes, and so forth. Variations in how countries undertake these processes underscore the remarkable versatility of LAS.

But among all the variations, market-based approaches predominate, both in theory and in practice. This popularity arises from the relative success of markets in managing the common processes of land administration while, at the same time, improving governance, transparency, and economic wealth for the countries where land administration is successful. Market-based approaches provide best-practice models for improvement of many national LAS where governments seek economic improvement. The tools used in market-based systems are therefore frequently related to general economic development. This relationship is, however, far from self-evident. Market-based approaches are creatures of their history and culture. Applying them to other situations requires foresight, planning, and negotiation.

This leads to the third ingredient of good LAS design: the **toolbox approach**. The land administration toolbox for any country contains a variety of tools and options to implement them. The tools and how they are implemented reflect the capacity and history of the country. The selection of tools discussed in this book reflects the historical focus of land administration theory and practice in cadastral and registration activities. It includes general tools such as land policies, land markets, and legal infrastructure; professional tools related to tenure, registration systems, and boundaries; and emerging tools such as pro-poor land management and gender equity.

There are, of course, many other tools. Valuation, planning, and development tools raise separate and distinct issues. Many countries include land-use planning and valuation activities in formal LAS. Other countries rely on separate institutions and professions to perform these functions and define LAS more narrowly. For this reason, the book does not discuss the professional tools used to perform functions of valuation, use, and development although these topics are introduced. For all LAS, however, these functions need to be undertaken in the context of the land management paradigm and integrated with the tenure function. The design of a tool by an agency engaged in any of the four primary functions needs to reflect its integration with the others. The cadastre remains a most important tool, because it is capable of supporting all functions in the land management paradigm (noting that the cadastre is more correctly a number of tools within one conceptual framework). Indeed, any LAS designed to support sustainable development will make the cadastre its most important tool.

The list of tools and their design will change over time, as will the suitability of any particular tool for use in national LAS. The appropriate options to deliver LAS will also change. To successfully use the toolbox approach, the LAS designer must understand the local situation, diagnose steps for improvement, and select the appropriate tools and options. Usually, the steps can be clarified by international best practices explained in well-documented case studies, United Nations and World Bank reports and publications, and a wide variety of books and reports.

One of the major problems with LAS design, even in countries with successful systems, is the isolation of various components and agencies. This is generally known as the problem of "silos." Another problem is reliance on single-tool solutions to remedy complex situations. The toolbox approach addresses both these problems. It requires that each tool be considered in the context of all the others and that it be tested against the overall land management paradigm. It relies on using methods and options appropriate to a particular situation, compared with a "one size fits all" suite of policy and technical options.
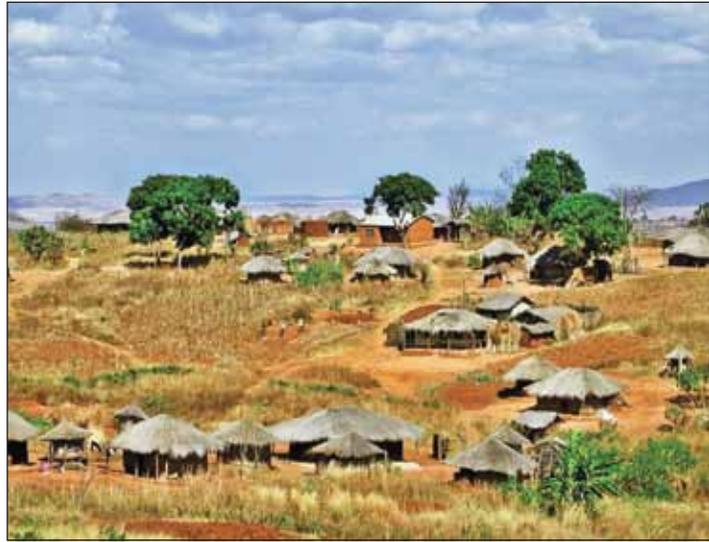
Figure 1.1 Even a traditional village environment such as that in Mozambique can benefit from effective land administration.

The options now available for implementing the tools at hand vary widely and will continue to evolve. The essential theme of this book is to inform the design of LAS by starting with the broad context of the land management paradigm, observing the common processes that are being used, and then choosing the appropriate tools to manage these processes according to a well-grounded understanding of what is appropriate for local circumstances in the light of international best practices.

In practice, from a land administration design perspective, LAS problems are universally shared. Whether or not a country uses private property as the foundation of its land rights, land security and land management are overriding imperatives for the new role of land administration in supporting **sustainable development**. Whether a country is economically successful or resource hungry, betterment and improvement of existing systems are essential. Thus, an overarching theme is developing land administration capacity to manage change. For many countries, such as Kenya, Vietnam, and Mozambique, alleviating poverty, furthering economic development and environmental sustainability, and managing rapidly growing cities pose pressing challenges. The protection of traditional ways of life is also an overarching policy (figure 1.1). For more developed countries, the immediate concerns involve updating and integrating agencies in existing, relatively successful LAS and putting land information to work to support emergency management, environmental protection, and economic decision making. Iran (figure 1.2), for example, struggles to manage urban sprawl, while Chile (figure 1.3) needs LAS to aid delivery of sustainable agriculture.

Figure 1.2 Tehran, Iran, needs land administration to deal with the challenges posed by urban sprawl.

The theoretical concept of a land administration role in delivery of sustainable development relies on using the land management paradigm to guide the selection of tools for managing common processes. Within this framework, a wide range of options and opportunities is available to LAS designers and land-use policy makers. One tool, however, is fundamental: the cadastre, or more simply, the land parcel map. The history and influence of the cadastre, particularly after World War II, demonstrates that modern cadastres have a much more significant role than their original designers envisaged. Within the constant that land administration should be used to deliver sustainable development, the cadastre has extended purposes. Two functionalities of the modern cadastre underpin this philosophy: Cadastres provide the authoritative description of how people relate to specific land and property, and they provide the basic and authoritative spatial information in digital land information systems (LIS).

Even with the help of a clear theoretical framework, an explanation of how cadastres should be used within LAS to support sustainable development is far from easy. Cadastres take on many shapes and sizes. Some countries, for example, the United States, do not yet use a national cadastre, though most assiduously collect parcel information in some form or another. Other countries do not have the resources to build high-end cadastres, and need a well-designed, incremental approach. To deal with varietal situations, this book categorizes cadastres as three general types, depending on their history and function: the European or German approach, the Torrens title approach, and the French/Latin approach (see chapter 5, "Modern land administration theory"). The focus here is on the European, map-based cadastre with integrated land

registration functions. The utility of this tool in land management is seen both in its successful use by its European inventors and in the contrast of lack of land management capacity in countries that use other approaches.

The analysis of land markets in this book shows how LAS organized markets to build economies in developed countries and to accelerate wealth creation by systematically converting land into an open-ended range of commodities. Internationally, market advancement will remain the driver for LAS change. But it should go beyond that. Sustainable development is much more urgent—economic wealth is only one part of the equation. Unless countries adopt LAS informed by the land management paradigm, they cannot manage their future effectively. Our argument is that planned responses to the availability of land and resources will help manage the social, economic, and environmental consequences of human behavior. Only then will nations be able to deal with the water, salinity, warming and cooling, and land and resource access issues facing the globe. Even more important is improvement of the global and national capacity to handle population growth and movement, burgeoning urban slums, and the alleviation of poverty.

Thus, this theory of land administration assumes that resources applied to building a cadastre can pervasively improve an entire LAS, and eventually public and private administration in general, while simultaneously improving land-based services to government, businesses, and the public. Whether the question is how to set up LAS or how to adapt an existing system, designers need to take into account the dynamism in land use, people's attitudes, institutions, and technology—and its potential. An ability to foresee what will happen in the future is helpful for managing this dynamism. The final chapter delves into how spatially enabled governments and societies inform a new vision of land administration. The spectacular growth in spatial technologies affords governments the ability to use this expanded information to focus on sustainable development. This hopeful scenario is offered to challenge those engaged in land administration and related activities, and to provide a clear direction for furthering excellence in LAS.

The theoretical framework for LAS will always be open-ended. Because the framework is under construction, rather than a precise recipe, guidance is offered in the form of **ten land administration principles** (see section 1.6). These principles show how each part of LAS should be designed and integrated. They ensure that people dealing with land-related questions can identify the best tools and options for local LAS. The themes are generic and apply regardless of capacity, economic models, or government arrangements. These statements help define both a generic modern LAS and a system suitable for local circumstances.

Figure 1.3 Land administration has a new role in supporting mixed rural land uses that ensure sustainable agriculture in places like Chile.

Primarily, the book is a "how to" guide, building on sixty years of development of an academic discipline in land administration that grew out of land surveying for cadastral purposes to incorporate multidisciplined approaches to land issues. The discipline now engages planners, valuers, political scientists, sociologists, human geographers, anthropologists, lawyers, land and resource economists, and many others. The expansion of the discipline came from the realization that holistic approaches to land management are essential to secure tenure, improve peace and order in a community, and deliver sustainable development. Achievement of these goals is, in practice, far from easy. Experience suggests that improving LAS design and operations can contribute to their success.

STRUCTURE OF THE BOOK

The book has five parts:

- ◆ **Part 1** Introducing land administration
- ◆ **Part 2** A new theory
- ◆ **Part 3** Building modern systems
- ◆ **Part 4** Implementation
- ◆ **Part 5** The future of land administration

PART 1 INTRODUCING LAND ADMINISTRATION

Chapter 1 explains the approach of the book and its themes. The central activities in land administration are designing, building, managing, and monitoring systems. This chapter explores the difference between land administration and land reform. LAS are seen as fundamental to delivery of global sustainable development. The reasons for building LAS are explained. Ten principles of LAS design distill recent developments in land administration theory and practice into a short but comprehensive description of modern LAS, capable of being used by countries at all stages of development.

Chapter 2 describes how groups of people think about land and the different approaches they take to land administration. These sociological aspects influence how people build systems to organize their unique approaches. These land administration responses to human experience, especially those influenced by colonialism, are described so that the modern concept of a multipurpose cadastre can be seen in its historical context.

PART 2 A NEW THEORY

Chapter 3 explains the relationship between land administration and sustainable development. This broad approach shows how national interests are no longer the only input: International imperatives for sustainable development are making greater impact on national systems, though implementation is highly variable. Within the wide range of approaches, some tools are commonly used, and the cadastre remains fundamental. Even the earliest systems used basic tools of maps and lists. Land administration still relies on maps and records of land usage (as distinct from planning and zoning) and landownership. Modern LAS rely on well-built, technically designed cadastres, which are unique for every system. The result is that the development

of land administration as a distinct discipline changes over time depending on both local and international pressures and influences. The evolution of land administration as a discipline is discussed.

Chapter 4 deals with the basic functions of LAS. While historical analyses are useful, the better approach to understanding a particular LAS involves analysis of its core processes. Tenure processes are illustrative of general approaches used over recent decades to achieve security and sustainability. Basic land administration processes include the transfer of land (through transactions to buy, sell, lease, and mortgage as well as through social changes) and land titling. The land administration functions supporting land tenures and their related processes are the core of the book.

Chapter 5 identifies modern land administration theory. The most important feature is placing land administration within the land management paradigm, so that the processes and institutions in any LAS are focused on delivering sustainable development as their ultimate goal, not on delivering outcomes defined by a silo agency, such as a land registry or cadastral and mapping office. The broad design of LAS allows seamless inclusion of marine areas and other resources. The key tool, the cadastre, is given the formative role in building this approach.

PART 3 BUILDING MODERN SYSTEMS

Chapter 6 focuses on using LAS to build land markets. It approaches the formalization of market activities in five stages. An important but neglected component, the cognitive capacity of the beneficiaries of the formal land market, is explained. Land valuation and taxation systems are briefly described within the overarching task of designing complete and effective LAS.

Chapter 7 discusses managing the use of land. The concept of land use is introduced together with planning control systems. Urban and rural land-use planning and regulations are reviewed in the context of the land management paradigm. The roles of land consolidation and readjustment and integrated land-use management are described. Finally, land development is discussed as part of the paradigm.

Chapter 8 introduces marine administration by recognizing that administration of land and resources does not stop at the water's edge. It explores the extension of administration into coastal zones, seabeds, and marine areas. The concepts of the marine cadastre, marine SDIs, and marine registers are introduced and discussed.

Chapter 9 provides an introduction to how an SDI can be integrated into overall LAS, together with associated spatial technologies. Universal questions about land are linked into the new technological horizon in which spatial information, including information about land and resources, is a national asset, provided it is well managed. The concept of an SDI and the technical architecture supporting it are part of the modern land administration world.

Chapter 10 provides a global perspective of the variety of land administration activities worldwide and of the emerging analytical and comparative literature.

PART 4 IMPLEMENTATION

Chapter 11 highlights the importance of capacity building as a key component of building LAS. It covers the human dimensions of social, government, and individual capacity to devise and run land administration processes capable of meeting land management goals. The need to develop competencies is given prominence as the key to sustainable administration systems. The modern capacity building concept is explored along with capacity development in the context of land administration. Institutional capacity in land management is discussed together with the need for education and research in land administration.

Chapter 12 introduces the toolbox approach that is the core of the book. The early parts of the book are designed to help decision makers understand how tools are developed and what tools might be useful for a local land administration system. Given that LAS in any country or jurisdiction represent a unique response to local customs and traditions, laws, and institutional and governance arrangements, the "one size fits all" approach is unreliable. On the other hand, established and proven policies and strategies, along with the toolbox approach, are proposed to guide development and reform of LAS. What tenures should be available? How should boundaries be identified? What technology should be used? How should land information be collected and accessed? The list of questions is open-ended, but each country has particular concerns that require specific solutions. This chapter presents basic information about the various tools and implementation options and how they can be integrated into a robust and adaptable national system.

Chapter 13 discusses project management and evaluation with respect to land administration. The project-based approach draws the tools together and allows policy makers and system designers to identify the policies, tools, and systems needed amid the choices already identified. The project cycle; the importance of a LAS vision and objectives; the need to understand existing LAS, the components in LAS, and land administration projects (LAP); the use of best

practices and case studies; and, most importantly, the need to engage the community and stakeholders are covered.

PART 5 THE FUTURE OF LAND ADMINISTRATION

Chapter 14 looks at future trends in land administration. It reviews the land administration journey with a particular focus on the role that land administration can play in sustainable development and in supporting a spatially enabled society. It recognizes the inherent dynamism of land administration and the importance of planning its future directions. Globalism, population growth, and government accountability are universally driving change. The challenges ahead, including the impact of new technologies, especially spatial technologies, are discussed. These technologies are likely to extend the capacity to deliver sustainable development objectives if local systems are capable of absorbing them. The trends identified by experts need to be built into planning processes to ensure that LAS remain capable of accommodating new situations and providing effective ways to deal with changing scenarios.

1.2 Why build a land administration system?

INCORPORATION OF INFORMAL LAS INTO FORMAL SYSTEMS

The basic reason that societies manage land is to satisfy human needs. Having a secure home, or even a secure place to sleep or work, satisfies fundamental necessities of life, just as guaranteeing a harvest to the sower of grain delivers food security. Consequently, land is managed by all settled societies, whether they explicitly acknowledge it or not. The systems used can be formal or informal, and either will work well if circumstances permit. From the perspective of land administration theory, the variety of informal systems defies attempts to categorize them. These systems do not institutionalize most of the tools in the toolbox. They use very different options to deliver the tools they use, and they produce results that are unique to the situation. Informal systems are the most common. Even developed nations have informal systems used among slum dwellers, traditional peoples, and other groups. Incorporation of these informal systems into a regional or national LAS framework is an overarching and crosscutting theme in the discipline. Many informal systems are under threat, mostly from population increases, but also as a result of environmental changes, war and dislocation, encroachment on resources, and general transition from traditional to less traditional social, economic, and political orders. LAS design needs to be sensitive to these threats and patterns of change among informal

Figure 1.4 An informal settlement in Vietnam is an example of the types of challenges posed by LAS that develops informally.

administration systems such as those embodied by the informal settlements found in Vietnam (figure 1.4). Each tool needs to be designed with the operation of informal systems in mind.

TRADITIONAL BENEFITS OF LAS

While informal systems constantly emerge and change, the global trend is to manage land through formal systems. The reasons for formalizing land administration are complex and have changed radically over the past century. Most countries still seek the traditional benefits of LAS (table 1.1). These traditional reasons for supporting LAS have wide support in the literature (GTZ 1998; DFID 2003; ILC 2004; UNECE 2005c).

GREATER BENEFITS OF MODERN LAS

While the traditional benefits remain the predominant incentives for a country's investment in LAS, even more compelling reasons flow from global environmental issues and population increases. Also, while the traditional benefits inform the mission statements of the agencies running LAS in developed countries, a modern LAS approach requires these agencies to operate beyond their immediate silos, deliver larger economic benefits, enhance the capacity of land information, and support regional, not just jurisdictional, environmental management. Thus, the broader benefits identified as follows are relevant to all nations.

TABLE 1.1 – TRADITIONAL BENEFITS OF LAS	
Support for governance and rule of law	The formalization of processes used for land management engages the public and business, and, in turn, this engagement leads to their support for the institutions of government.
Alleviation of poverty	A primary means of alleviating poverty lies in recognizing the homes and workplaces of the poor and their agricultural land as assets worthy of protection.
Security of tenure	This is the method of protecting people's associations with land. It is the fundamental benefit of formal land administration. Ensuring security throughout the range of tenures used in a country helps provide social stability and incentives for reasonable land use. Conversion of some of the rights into property is the core process of commoditization of land needed for effective markets.
Support for formal land markets	Security and regularity in land arrangements are essential for successful, organized land markets. LAS manage the transparent processes that assist land exchange and build capital out of land.
Security for credit	International financing norms and banking practices require secure ownership of land and robust credit tenures (that is, tenures which support security interests in land) that can only exist in formal LAS.
Support for land and property taxation	Land taxation takes many forms, including tax on passive land holding, on land-based activities, and on transactions. However, all taxation systems, including personal and company taxation, benefit from national LAS.
Protection of state lands	The coherence of national LAS is dependent on its coverage of all land. Thus, management of public land is assisted by LAS.
Management of land disputes	Stability in access to land requires defined boundaries, titles, and interests. If LAS provide simple, effective processes for achieving these outcomes, land disputes are reduced. The systems also need additional dispute management processes to cover breakdown caused by administrative failure, corruption, fraud, forgery, or transaction flaws.
Improvement of land planning	Land planning is the key to land management, whether the planning is institutionalized within government or achieved by some other means. Impacts of modern rural and urban land uses affect adjoining land and beyond. These impacts need to be understood and managed by effective land planning assisted by LAS.

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TABLE 1.1 – TRADITIONAL BENEFITS OF LAS	
Development of infrastructure	Construction of power grids, gas supply lines, sewerage systems, roads, and the many other infrastructure elements that contribute to successful land use require LAS to balance private rights with these large-scale infrastructure projects, whether provided by public or private agencies.
Management of resources and environment	Integration of land and resource uses is a difficult aspect of LAS design. Land and resource titles require complicated and mutually compatible administrative and legal structures to ensure sustainability in the short and long term.
Management of information and statistical data	Each agency needs to appreciate the importance that the information generated through its processes holds for the public, businesses, and government in general. More importantly, everyone needs to understand the fundamental importance of integrated land information for sustainable development.

MANAGING HOW PEOPLE THINK ABOUT LAND

Attempts to transport modern tools of cadastres and registration systems from Western democracies to other countries have resulted in both successes and failures. Analyses of these experiences raise the issue of how LAS interact with their intended beneficiaries. Especially since 2000, analysis of LAPs and other endeavors to improve LAS have identified a primary, but often neglected, function of LAS: management of the cognitive framework used by a society to understand land and to give significance and meaning to land-related activities. A cognitive awareness of land is unique to every nation, and often to local areas and specific groups within nations. It influences the relationships among land uses, institutions, administrations, and people. Realizing the importance of the cognitive aspects of land led to improved international understanding of how to build a land administration system to fit the context of its intended beneficiaries. A growing analytical literature dealing with the transportability of market-based systems and their associated technical tools (Bromley 2006; Lavigne Delville 2002a) highlights fundamentally different normative realities and the problems of blending them into LAS design to achieve a sustainable result. Demand-driven service models, capacity building, transparency, accountability, conformity with local ideas of land, and incorporation of spiritual and social meanings of land are some of the changes in LAS design flowing from better understanding of the cognitive aspects of land.

DELIVERING SUSTAINABLE DEVELOPMENT

The three dimensions of sustainable development—economic, environmental, and social—which form the "triple bottom line," are at the heart of several decades of reform and have made a global impact on land administration. Increasingly, the bottom line now includes a fourth dimension of good governance. While land administrators can and should play a role in contributing to sustainability objectives (UN-FIG Bathurst Declaration 1999; Williamson, Enemark, and Wallace, eds. 2006), the ability to link the systems to sustainability has been poor and presents many challenges. As a result, a continuing theme for modern LAS is the exploration of the strategies and technologies to deliver sustainable development objectives, particularly through delivery of information in a form that can be used for sustainability accounting—the emerging systems for monitoring and evaluating achievement of sustainability objectives and initiatives.

BUILDING ECONOMIES, NOT JUST LAND MARKETS

Countries with highly successful economies use formal systems containing all the tools in the land administration toolbox. These wealthy and successful economies thrive on regular, predictable, and institutionalized access to land. They provide reliable and trusted institutions to manage land and to deliver security of tenure, equity in land distribution, sensible and attractive development, and fair land taxation (see chapter 6, "Building land markets"). Productivity in the agricultural sectors is much higher. Credit is widely available at comparatively low rates. Personal wealth in the form of real estate assets grows. Business investment in land increases. Countries seeking similar economic advantages tend to modify their local systems to emulate those in successful countries and generally adopt options tried and tested by those countries to institutionalize their own land administration tools.

Much of the literature on land administration and cadastres takes the objective of LAS supporting efficient and effective land markets for granted. But what is a land market in a modern economy? Since LAS was first developed, land commodities and trading patterns have undergone substantial change: Commodities are now complex, international in design, and run by corporations rather than individuals. Markets continually evolve, primarily in response to economic vitality and sustainable development objectives. Developments in information and communications technology also drive land markets. Modern land markets involve a complex and dynamic range of activities, processes, and opportunities, and are impacted by a new range of restrictions and responsibilities imposed on land and land-based activities. Are current LAS capable of supporting modern markets that trade in complex commodities, such as water rights, mortgage-backed securities, utility infrastructure, land information, and the vertical villages in high-rise condominium developments?

ACHIEVING SOCIAL GOALS

There is surely no need to argue that effective land administration improves the lives of people who enjoy its fruits. A comparison of the living experiences in developed countries versus the standard of living of people in undeveloped countries is enough. However, whether we can transfer these social and political effects through land administration tools is a real question. More and more, research is showing that while delivery of security of tenure is the overarching goal, other social goals flow out of protecting people's relationships to land. LAS replace personal protection of land with formal systems, allowing people to leave their homes and crops—their property—to seek markets for their labor and produce. Children who would otherwise mind the home can attend school (Burns 2006). Nutrition and food security are improved, especially for the rural poor, but also for the urban poor through small garden plots. Some newly emerging research on containment of land disputation will likely add to these positive results.

The most significant social goal for LAS is gender equity. Increasing the access of women to land is a goal consistently sought by land projects. Delivery is another question. The pursuit of gender equity has significantly improved the knowledge of status quo opportunities for women in terms of ownership and has generated innovative ideas about increasing women's access (Giovarelli 2006). In the developing world, more than half of all women work in agriculture, but most own no land (figure 1.5). There is, therefore, much work to be done.

MANAGING CRISES

World population is estimated to be 10 billion by 2030, up from 2 billion in 1950, and 6.5 billion in 2000. The population of cities in developing countries will double from 2 billion to 4 billion in the next thirty years. To prevent people from living in slums, developing nations must every week between now and 2036 create the equivalent of a city capable of housing 1 million people (UN–HABITAT 2006a). Water is even more problematic than land. One person in five has no access to potable water. North America's largest aquifer, the Ogallala, is being depleted at a rate of 12 billion cubic meters a year. Between 1991 and 1996, the water table beneath the North China Plain fell by an average of 1.5 meters a year. The Aral Sea in Central Asia, once the world's fourth largest inland sea and one of its most fertile regions, is now a toxic desert. Land disputation infects the social fabric of many nations.

This is a small part of a litany of hard issues faced by national governments and international development agencies. Every day, similar observations cross the newswires. Earthquakes, tsunamis, cyclones, hurricanes and other disasters, and human conflict and war add to the challenges. No

Figure 1.5 Achieving gender equity in land administration is a fundamental issue in places like Malawi.

matter where we start our analysis, the world clearly needs better land and resource management through effective administration. And our responses must be much more carefully designed.

BUILDING MODERN CITIES

A cityscape of even fifteen years ago is nothing like the modern, crowded high-rise megacities like Hong Kong (figure 1.6) that have spread throughout the world. The most successful economies of the world clearly benefit from a land management capacity delivered by well-developed LAS. Successful provision of utilities, organized land allocation, robust property rights, and high levels of land taxation are features of cities in developed economies. These qualities help generate the wealth needed to build urban infrastructure capable of delivering reasonable urban environments with high human and business densities.

By contrast, cities that respond haphazardly to mass rural population movements experience many problems. UN–HABITAT, the UN agency for human settlements (`www.unhabitat.org`), predicts that in many countries, especially in Africa, more people will eventually live in these unmanaged cities, many without adequate water or sanitation, than in managed cities, unless substantial counteraction is taken. Unchecked, demand leads to an inability to provide services or to facilitate and coordinate ordered growth. Jakarta, Indonesia; Lagos, Nigeria; Manila, the Philippines; Kabul, Afghanistan; Tehran, Iran; Mexico City, Mexico, and many other burgeoning urban areas are veritable case histories of cities faced with severe management challenges.

These unmanaged megacities are in desperate need of administrative infrastructure. All would benefit from a large-scale cadastral map, even of the most basic kind, and a path toward a land administration system that is capable of implementing the land management paradigm. Bangkok, Thailand's experience in using such a map illustrates the utility of a systematic approach (Bishop et al. 2000).

DELIVERING LAND INFORMATION FOR GOVERNANCE AND SUSTAINABILITY

Information about land is a major asset of government and is essential for informed policy making in the public and private sectors. The information, in itself, is valuable, even if not sold. In fact, the economic worth of land information is probably greater if it is freely available. The questions of who collects the information and how it is made available are vital to LAS operations. Many countries, including Indonesia, Malaysia, Laos, and China, regard maps and plans as quasi military information and impose substantial restrictions on their availability. Another group, including the United States and New Zealand, makes land and spatial information, including digital maps, generally available at little or no cost to stimulate the economy. And still another group, including Australia and European countries, generally pursues a cost recovery path and relies on the primary audience for land information to pay an estimated price reflecting the cost of maintenance and sometimes data collection. Other common limitations on access to land information in market systems include privacy policies and laws, licensing arrangements, pricing systems (in regard to whether the cost is capital outlay or a tax-deductible and routine business expenditure), and difficulties of access.

Whatever policy decisions about restrictions to access are taken, land and spatial information is a national asset capable of being used to improve the opportunities of citizens and businesses, especially when the processes are in digital form. The availability of information, especially through the creation of an SDI, plays a vital role in a nation's use of land and spatial information. The transparency of land registry operations, given that they document private ownership of land, is important to a nation's public credibility and ability to monitor subsequent changes in landownership and secondary transactions. The development of e-government also makes land information more important.

Accessibility of land information can transform the way governments and private sectors do business in modern economies. In the future, technology-driven, spatially enabled LAS will service a larger range of functions by matching people and activities to places and locations, basically through the spatial identification of a land parcel in a cadastral map. Location or place will

Figure 1.6 Busy high-rise megacities like Hong Kong require a robust LAS.

relate to many more land administration activities and associated data, such as management of restrictions and responsibilities, new forms of tenure, and complex commodity trading. Modern LAS need to be designed in a way that recognizes the potential of land information and capitalizes on its increasing value (see chapter 14, "Future trends").

ENCOURAGING THE USE OF NEW TECHNOLOGY

The next generation of LAS will benefit from advances in spatial and information and communications technology. While a great deal of land administration practice will still concern policy, and institutional and legal issues, technology will stimulate development of entirely new concepts and approaches. Trends in access to land information provided by LAS, particularly through the Internet, the impact of geographic information systems, and the development of appropriate cadastral data models, are now being absorbed by the mainstream.

The next generation of LAS will depend on SDIs to facilitate integration of built and natural environmental databases—a precondition for analyzing sustainable development issues. Currently, integration is difficult: Built (mainly cadastral) and natural (mainly topographic) datasets were developed for different reasons using specific data models and are often managed by independent organizations.

The engagement of the private sector in land administration, especially through new technical products, will also increase.

REDUCING THE DIVIDE BETWEEN RICH AND POOR NATIONS

The contrast between rich and poor nations is readily apparent from a land administration perspective (De Soto 2000). Poor countries need more, not less, comparative land management capacity. While titling land can retrieve the lost capital of the poor, integration of the land administration functions in organized LAS is essential to accommodate planning and other issues experienced by poorer nations. Failure to build a robust infrastructure for land management will also have severe consequences for rapidly developing economies like India's and China's. Escalation of their need for better land management will compound their inability to deliver it because they have not taken the time to plan and build land management infrastructure.

DELIVERING THE MILLENNIUM DEVELOPMENT GOALS

Since 2000, delivery of security of tenure has been driven by the Millennium Development Goals (MDGs) adopted by 189 UN member countries and numerous international organizations as a focus for foreign aid. The goals are

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria, and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

The MDGs, especially goal 7, require social and environmental outputs, not merely economic outputs, and require LAS for delivery (Enemark 2006a). Implementation of global and national land policy at this level requires much more people-based, social information, in addition to information about processes relating directly to land. Newer kinds of information build the capacity of land policy makers and administrators to take local conditions into account, while being aware of intercountry comparisons and world best practices. Women's de jure and de facto access to land, inheritance systems and the capacity of formal LAS to reflect them, the relationship between land and resource tenures, the nature of land disputes, and the performance of

Figure 1.7 In the Philippines, access to basic services can come informally.

related markets in money, agricultural products, and agrarian labor are now additional starting points for information collection, process management, and LAS design.

PROVIDING A FRAMEWORK FOR DELIVERY OF BASIC SERVICES

Western countries are able to provide utilities and services to their homes and businesses in predictable and orderly ways. This capacity arises because they organize access to land. However, millions of people live in places where organized access to land and provision of basic services is not possible, and informal systems such as those in the Philippines are used instead (figure 1.7).

Access to clean water and sanitation is especially problematic in crowded urban slums. The delivery of these basic facilities requires a concerted approach to organizing access to water and sanitation facilities, which is only possible if land itself is organized. The development of new approaches for finance and governance of access to clean drinking water and basic sanitation anticipates recognition of water and sanitation as basic human rights (Tipping, Adom, and Tibaijuka 2005) and envisions concerted global approaches to satisfying these rights. These goals cannot be satisfied outside the national LAS framework.

1.3 The changing nature of land administration systems

Modern land administration, its theories, and tools need to be understood by a diverse audience, including policy makers, administrators, students, and professionals. Their choices about designing, building, and managing LAS and about determining when a system is working effectively will be crucial to national development. These tasks are complicated because the world of land administration involves constant change, reflecting the changes in social, political, and economic systems that influence the way governments and other organizations do things. Moreover, three other influences make LAS especially dynamic. The systems are simultaneously

- ◆ at the center of sustainable development issues;
- ◆ the place where new technologies challenge existing service delivery and institutional operations;
- ◆ often involve a clash between national and international trends.

Given these pressures, the success of LAS requires its designers to identify and address institutional, legal, technical, and knowledge transfer issues, while understanding how land is used within communities. An engineering focus for designing, building, and managing LAS is needed to manage this broad array of issues. Project management; the role of pilot projects; the evaluation and monitoring of LAS; the role of government, private, academic, and nongovernmental organization (NGO) sectors, and public engagement are all important. Moreover, a major commitment to capacity building and institutional development—the overriding components of sustainable LAS—is crucial. The engineering focus therefore expands to incorporate multidisciplinary approaches, especially to take account of the relationships among LAS, the people and businesses they serve, and the governments that build or oversee the systems within the regional and international framework.

Like any evolving discipline, land administration generates discussions, debates, and points of view about how things might be done. These debates generate theory and research that build the discipline, and improve responses by governments to their most pressing and complex land issues. In general, land administration debates revolve around three kinds of issues:

1. *When can LAS tools be successfully transported?* The first kind of issue is generated by land markets and attempts by governments and LAPs to transport familiar land administration tools, particularly systems for land titling, cadastres, and property-based land rights. These tools support the healthy economies of the

thirty-five or so developed countries that have effective formal and free land markets. These familiar market-based tools took hundreds of years to build. They are clever and sophisticated and extremely expensive to install and manage. These tools are deeply embedded in the government of their source countries. Transporting them successfully to other countries, even to those where land markets are planned, involves adapting them to the "best fit" in different contexts. Especially since 1990, improved understanding of how the tools work, and the part that people play in supporting them, has inspired robust and inventive approaches in countries seeking to use a land market approach to improve land management. The case histories of conversion of the centralized land organization in postcommunist countries to market approaches, and the titling programs of successful Asian economies, especially in Thailand and Malaysia, illustrate what can be done.

2. *How can LAS help solve poverty?* The second kind of issue involves upgrading security of tenure, food security, and sustainable livelihoods where land market approaches are not possible or are problematic—for example, in newly occupied peri-urban slums, indigenous and traditionally held land, or postconflict countries. Common contexts involve highly centralized governments, countries experiencing limited governance capacity and endemic mass poverty, and postconflict situations. Responses to these issues of poverty and capacity by the fraternity of aid workers, economists, engineers, sociologists, lawyers, and many others are helping to identify new tools, technologies, and land management approaches to improve land access and organization. Generally, these new ideas encourage flexible and localized approaches to tenures, planning, and provision of basic amenities, especially water and waste systems, for millions of people.

3. *What is land administration?* The third kind of issue involves what constitutes land administration. The most commonly accepted definition of land administration is set out in the United Nations Economic Commission for Europe (UNECE) Land Administration Guidelines (1996): "Land administration: the processes of recording and disseminating information about ownership, value, and use of land when implementing land management policies." Even in a traditional sense, the coverage is broad. Jon Lindsay (2002) saw land administration as management of a system of land rights, including a broad range of subjects:

    ◆ Procedures by which land rights are allocated or recognized

    ◆ The definition and delimitation of boundaries between parcels

- The recording of information about land rights, rights holders, and parcels
- Procedures governing transactions in land, including sales, mortgages, leases, and dispositions
- The resolution of uncertainty or adjudication of disputes concerning land rights and boundaries
- Institutions and processes for the planning, controlling, and monitoring of land use
- Land valuation and taxation procedures

Together, these subjects describe a widely agreed framework for approaching land administration. However, LAS that are capable of producing information and performing functions to deliver sustainable development have an even broader scope. LAS that operate at this higher policy level must include even more subjects, particularly

- Procedures for public engagement
- Support for the cognitive function of LAS by integrating systems with the way their intended beneficiaries think about land
- Management of restrictions on land
- Technologies for land management and information
- Support for trading in complex and secondary commodities
- Support for the management of utilities and provision of services (electricity, drainage, sewerage, communications)
- Monitoring and evaluation processes
- Sustainability accounting

This wider coverage goes beyond a government focus, though government remains the agency responsible for designing, monitoring, and reforming the overall system. As yet, no country has built a land administration system that fully addresses the needs of sustainable development. This broader program for LAS also identifies one of the major issues faced by countries seeking better land management—human resources. Even highly developed nations lack sufficient people with the professional and technical capacities to support their systems.

All participants in these debates, and indeed many other debates about land and resources, assume that constant improvement in land management capacity is necessary, and that an

organized approach can help. The overall land policy choice is a question for each nation and its people. Whatever it is, the land administration response should be to drive the processes and functions of the system toward delivery of sustainable development. This book therefore encompasses all the basic approaches to land policy: traditional, centralist, diversified, and market-based. It is written particularly for countries seeking improvement paths based on a land market approach. In international experience, this is the most common policy choice for advancement. In other words, the land policy direction of nation states generally involves more, not less, of a land market approach, with the intent being to use land to generate national and individual wealth, alleviate poverty, ensure food and land security, and assist equitable land distribution. The market-based approach used here recognizes that many people, including groups in countries with highly successful land markets, do not need or want individual titles, though they certainly require secure access to land. It also recognises that modern land management requires highly developed and successfully implemented restrictions on private ownership.

1.4 Land reform

Land administration projects are different from land-reform projects, though in many practical situations, the distinction is blurred. Many land administration activities are undertaken as part of projects aimed at improving national or regional administration of government and social justice. The growth of international development aid gave land and its administration great significance (Bruce et al. 2006). The contrast between countries capable of organizing land and those where land and food security are tenuous led to concerted attempts to improve LAS design. The predominant reasons articulated for stabilizing and improving administration of land are economic, but, more and more, humanitarian reasons are included. The poor need water and food security and housing. Countries need to manage movement of the rural poor to cities. The estimated 2.7 billion people living on incomes below or around the international poverty line of $2.60 per day remains an overpowering challenge to governments to better organize land and its uses. In other words, the drivers for modern LAS in developing nations emphasize the contrast between living conditions for those with predictable land arrangements and for those without. Here, LAS design strives to deliver predictability, security, and the accoutrements of sanitation, water and housing, using whatever tools, formal or informal, are appropriate.

Land projects of another kind are also undertaken. Land reform programs aimed at redistributing or reconfiguring land are very common (Lindsay 2002). Land reform, consolidation,

restitution, and redistribution are complex processes that inevitably involve politics. They presuppose capacity for both land policy making and land administration of some kind. These processes complicate policy implementation by their relationship with the exercise of power and political activities, especially because of their potential to raise levels of land disputation. The discipline of land administration does not provide an analysis of when and to whom to redistribute land and resources. Rather, it defines the administrative institutions and processes suitable to implement these political decisions. Thus, land administration is not land reform, but it is an important precondition to successful reforms.

Perhaps the most monumental efforts in land redistribution and reform followed the failure of command economies in Central and Eastern Europe, leading to applications by ten countries in 1997 for membership in the European Union (EU)—Estonia, Latvia, Lithuania, Poland, the Czech Republic, Slovakia, Hungary, Slovenia, Romania, and Bulgaria.

Substantial rebuilding of their LAS was needed to reflect the EU standards of functioning market economies, including management of competitive pressures and market forces within the processes of returning state and collectively owned land to private ownership. While each country took a divergent implementation path, with varying degrees of success, they all needed to establish LAS to achieve the objectives of the *Acquis Communautaire* (the "rules" of the EU) (Bogaerts, Williamson, and Fendel 2002; Bruce et al. 2006). Successful implementation of political decisions of how consolidation was to be performed and in whose favor consolidation worked depended on legal and administrative support (Dale and Baldwin 1998, 2000). Land administration in accession countries was recognized as a key component in strategies to achieve the protection of human rights, the Common Agriculture Policy, and an effective free market. The success and longevity of these political processes required carefully designed LAS to minimize disputes and reinforce change. The levels of success were mixed, but the efforts demonstrated that the key features of LAS that facilitate political change are transparency, accessibility, and reliability.

1.5 Good governance

GOOD GOVERNANCE IN LAND ADMINISTRATION

Governance is the process of governing. Land administration, therefore, is essentially about good governance. The UNECE land administration principles (2005c) are built on

the assumption that "sustainable development is dependent on the State having overall responsibility for managing information about the ownership, value, and use of land." The land management paradigm extends this connection by demanding an even wider approach to governance in land administration, in which the government builds infrastructures for management of land in addition to management of information. Thus, the paradigm builds governance directly into land administration.

Governance refers to the manner in which power is exercised by governments in managing a country's social, economic, and spatial resources. It simply means the processes of decision making and the processes by which decisions are implemented. This indicates that government is just one of the actors in governance. The concept of governance includes formal as well as informal actors involved in decision making and implementation of decisions made, and the formal and informal structures that have been set in place to arrive at and implement the decision.

Good governance is a qualitative term or an ideal that may be difficult to achieve. The term includes a number of characteristics—i.e., as identified in the UN–HABITAT Global Campaign on Urban Governance (2002). The characteristics or norms are as follows:

- **Sustainability:** Social, economic, and environmental needs must be balanced while being responsive to the present and future needs of society.

- **Subsidiarity:** Allocation of authority at the closest appropriate level must be consistent with efficient and cost-effective services.

- **Equity of access:** Women and men must participate as equals in all decision-making, priority-setting, and resource allocation processes.

- **Efficiency:** Public services and local economic development must be financially sound and cost-effective.

- **Transparency and accountability:** Decisions taken and their enforcement must follow rules and regulations. Information must be freely available and directly accessible.

- **Civic engagement and citizenship:** Citizens must be empowered to participate effectively in decision-making processes.

- **Security:** All stakeholders must strive for prevention of crime and disasters. Security also implies freedom from persecution and forced evictions and provision of land tenure security.

Once the adjective "good" is added, a normative debate begins. Different people, organizations, and government authorities will define "good governance" according to their own experience and interests. For example, it may be argued that issues such as rule of law, responsiveness, participation, and consensus orientation should be added to the preceding list. The term good governance can also be viewed in several contexts such as corporate, institutional, national, and local governance.

Of these, the standards of transparency, equity, accountability, subsidiarity, and also participation are especially important to sustainable LAS. These standards, in turn, have an impact on the most basic of human needs: the production of food. As the Food and Agriculture Organization (FAO) says:

> *"Adequate institutional arrangements are required to determine rights and access to rural resources, such as land, water, trees, and wildlife, as a prerequisite to agricultural devel- opment and food security. Many countries specifically require advice on such institutional arrangements for property rights, on how to ensure more equitable access by women and men to natural resources, on functioning land markets and land administration to take account of mortgage-secured credit for investment, and (on) good governance of land and natural resources." (2007)*

These general considerations link land administration to governance, so that land stabilization is seen as essential to successful nationhood and civic capacity. The FAO projects and themes on governance illustrate the connection (2006). In its study on Good Governance in Land Tenure and Administration, FAO remarks:

> *"The message to land administrators is that they cannot pursue technical excellence in isolation. Their skills and techniques should serve the interests of society as a whole. … Land administrators act as guardians of the rights to land and the people who hold those rights. In doing so, they act to stabilize public order and provide the preconditions of a thriving economy." (2007)*

The major international agencies demonstrate that successful land administration requires accountable government. Sustainable systems require that the institutions that interact with the citizens who are its intended beneficiaries do so in ways that build their confidence, par- ticularly by negating disputes and managing points of tension relating to landownership, use, and availability. The major engagement should involve policy formation and implementation to ensure that the system reflects the cognitive capacity of the beneficiaries and their beliefs about land. A national capacity to create laws through legislation and subordinate legislation

is also necessary for sustainable LAS. For nations on the development track, rule by law, rather than rule by the elite or ad hoc responses to circumstances, is essential. These conditions apply even if the nation's administration horizon includes land held in social tenures that rely on informal systems of land management.

For successful governance, institutions need to be stable, transparent, and free of corruption. Weak governance in land administration leads to massive overregulation and production of conflicting and gap-ridden bodies of laws, standards, and documents. There is little cohesion and mutual reinforcement of legal and economic norms. Sadly, LAS in developing countries more often exhibits corruption in the collection of fees; multiple rent-seeking and unnecessary processes; delivery of multiple and ineffective titles to parcels; arbitrary allocation of land; and negligible capacity for planning or controlling building standards. Repeated problems in developing countries include legitimation of mass land theft; failure to police uncontrolled evictions; inability to manage interaction among competing tenure holders, especially between landowners and users and resource takers; and inability to manage state assets. Weak governance will never be able to manage the transition of the world's populations from rural to urban areas.

To be sure, good governance is central to delivery of appropriate, effective, and efficient land administration in both developing and developed countries.

1.6 Ten principles of land administration

Despite the uniqueness of local systems, the range of cognitive frameworks about land, and the difficulties in transferring institutions, design of robust and successful LAS is possible. The **ten principles of land administration** in table 1.2 set boundaries for designers, builders, and managers of LAS to help them make decisions about their local system. Overall, the principles are written with the goal of making establishment and reform of LAS easier. The principles implement the modern philosophy in land administration—to develop and manage assets and resources within the land management paradigm to deliver sustainable development. They are universally applicable. Countries at the early stages of development will not be able to use the full array of technical options or professional skills, but they can improve land management through appropriately designed LAS.

The principles reflect a holistic approach to LAS and focus on sustainable development as the overriding policy for any national system, irrespective of whether a country implements

TABLE 1.2 – TEN PRINCIPLES OF LAND ADMINISTRATION

1. LAS	**LAS provide the infrastructure for implementation of land polices and land management strategies in support of sustainable development.** The infrastructure includes institutional arrangements, a legal framework, processes, standards, land information, management and dissemination systems, and technologies required to support allocation, land markets, valuation, control of use, and development of interests in land.
2. Land management paradigm	**The land management paradigm provides a conceptual framework for understanding and innovation in land administration systems.** The paradigm is the set of principles and practices that define land management as a discipline. The principles and practices relate to the four functions of LAS—namely, land tenure, land valuation, land use, and land development, and their interactions. These four functions underpin the operation of efficient land markets and effective land use management. "Land" encompasses the natural and built environments, including land and water resources.
3 People and institutions	**LAS are all about engagement of people within the unique social and institutional fabric of each country.** This encompasses good governance, capacity building, institutional development, social interaction, and a focus on users, not providers. LAS should be reengineered to better serve the needs of users, such as citizens, governments, and businesses. Engagement with society, and the ways people think about land, are at its core. This should be achieved through good governance in decision making and implementation. This requires building the necessary capacity of individuals, organizations, and wider society to perform functions effectively, efficiently, and sustainably.
4 Rights, restrictions, and responsibilities	**LAS form the basis for conceptualizing rights, restrictions, and responsibilities (RRRs) related to policies, places, and people.** Rights are normally concerned with ownership and tenure whereas restrictions usually control use and activities on land. Responsibilities relate more to a social, ethical commitment or attitude toward environmental sustainability and good husbandry. RRRs must be designed to suit the individual needs of each country or jurisdiction and must be balanced among different levels of government, from local to national.
5. Cadastre	**The cadastre is at the core of LAS that provide spatial integrity and unique identification of every land parcel.** Cadastres are large-scale representations of how the community breaks up its land into usable pieces, usually called parcels. Most cadastres provide security of tenure by recording land rights in a land registry. The spatial integrity within the cadastre is usually provided by a cadastral map that is updated by cadastral surveys. Unique parcel identification provides the link between the cadastral map and the land registry and serves as the basis of LAS and the land information it generates, especially when it is digital and geocoded. The cadastre should ideally include all land in a jurisdiction: public, private, communal, and open space.
6. LAS are dynamic	**LAS dynamism has four dimensions:** The first involves changes to reflect the continual evolution of people-to-land relationships. This evolution can be caused by economic, social, and environmental forces. The second dimension is evolving ICT and globalization, and their effect on the design and operation of LAS. The third dimension is the dynamic nature of the information within LAS, such as changes in ownership, valuation, land use, and the land parcel through subdivision. The fourth dimension involves changes in the use of land information.

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TABLE 1.2 – TEN PRINCIPLES OF LAND ADMINISTRATION	
7. Processes	**LAS include a set of processes that manage change.** The key processes concern land transfer, mutation, creation and distribution of interests, valuation, and land development. The processes, including their actors and obligations, explain how LAS operate as a basis for comparison and improvement. While individual institutions, laws, technologies, or separate activities within LAS, such as property in land, a land registry, specific piece of legislation, or technology for cadastral surveying, are important in their own right, the processes are central to overall understanding of how LAS operate.
8. Technology	**Technology offers opportunities for improved efficiency of LAS and spatial enablement in terms of land issues.** The potential of technology is far ahead of the capacity of institutions to respond. Technology offers improvements in the collection, storage, management, and dissemination of land information. At the same time, developments in ICT offer the potential for spatial enablement in terms of land issues by using location or place as the key organizer for human activity.
9. Spatial data infrastructure	**Efficient and effective LAS that support sustainable development require an SDI to operate.** The SDI is the enabling platform that links people to information. It supports the integration of natural (primarily topographic) and built (primarily land parcel or cadastral) environmental data as a prerequisite for sustainable development. The SDI also permits the aggregation of land information from the local to the national level.
10. Measures for success	**A successful land administration system is measured by its ability to manage and administer land efficiently, effectively, and at low cost.** The success of a land administration system is not determined by the complexity of legal frameworks or the sophistication of technological solutions. Success lies in adopting appropriate laws, institutions, processes, and technologies designed for the specific needs of the country or jurisdiction.

property institutions, communal land arrangements, or socializes land. They highlight the importance of information and participation of people in the process. They set the framework in which the historical development of familiar ingredients, such as cadastres and land registries, can be meshed with recent innovations, particularly incorporation of social tenures, new complex commodities appearing in highly organized land markets, and the technical potential of spatial information.