FIT-FOR-PURPOSE LAND ADMINISTRATION

A COUNTRY LEVEL IMPLEMENTATION STRATEGY FOR NEPAL

SECURING LAND AND PROPERTY RIGHTS FOR ALL

SUSTAINABLE LAND MANAGEMENT, PROSPEROUS LIFE AND DEVELOPMENT

Government of Nepal

GLTN
GLOBAL LAND TOOL NETWORK

UN@HABITAT
FOR A BETTER URBAN FUTURE

CSRC
आत्मनिर्भर केन्द्र

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A Country Level Implementation Strategy for Nepal

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Acronyms

ADR	Alternative Dispute Resolution
CBS	Central Bureau of Statistics
CPA	Comprehensive Peace Agreement
CSRC	Community Self Reliance Centre
CTEVT	Centre for Technical Education and Vocational Training
DAO	District Administration Office
DDC	District Development Committee
DGPS	Differential Global Positing System
DLIS	District Land Information System
DOLIA	Department of Land Information and Archive
DOLRM	Department of Land Reform and Management
FFP	Fit-For-Purpose
FFPLA	Fit-For-Purpose Land Administration
FIG	Federation of Surveyors
GEC	Gender Evaluation Criteria
GLTN	Global Land Tool Network
GSD	Ground Sampling Distance
ICCPR	International Covenant on Civil and Political Rights
ICSECR	International Covenant on Social, Economic and Cultural Rights
ICT	Information and Communication Technology
IT	Information Technology
IVR	Identification, Verification and Recording
LA	Land Administration
LAMA	Land Administration and Management Act
LAS	Land Administration System
LIS	Land Information System
LMTC	Land Management Training Centre
LRIMS	Land Record and Information Management System
LRMP	Land Resource Mapping Project
LRO	Land Revenue Office
MOLRM	Ministry of Land Reform and Management
MUD	Ministry of Urban Development
NGIID	National Geographical Information Infrastructure Division
NLUP	National Land Use Project
PE	Parcel Editor
RNRA	Rwandan Natural Resources Authority
SAEx	Spatial Application Extension
SD	Survey Department
SDGs	Sustainable Development Goals
SED	Socially Excluded and Deprived
SOLA	Solution for Open Land Administration
SOP	Standard Operating Procedure
STDM	Social Tenure Domain Model
SWOT	Strength, Weakness, Opportunity and Threat
UDHR	Universal Declaration of Human Rights
UN-FAO	United Nations Food and Agriculture Organization
VDC	Village Development Committee
VGGT	Voluntary Guidelines on the Responsible Governance of Tenure
WB	World Bank

Government of Nepal
Ministry of Agriculture, Land Management and Co-operatives

Foreword

Sustainable land management, prosperous life and development of all is the vision of the new land policy of the Government of Nepal which is currently under intensive discussions. With the view that "nobody is left behind" poverty alleviation is the focus of all development initiatives in Nepal. While our land administration and land management interventions need to address security of tenure, protection of land ownership and security of land and property rights for all, equally important is to address the need for a swift in transition of the existing land administration system into federal restructuring, ensuring optimum use of land and land based resources to achieve sustainable development goals.

In this aspect, we are pleased to work with UN-Habitat and Community Self Reliance Centre (CSRC) with the support of Global land Tool Network to come out with this intensive studies highlighting on the concept of Fit-For-Purpose Land Administration. We are hopeful that this publication will be a valuable asset in this regard. I thank the CSRC team for the valuable study and Joint Secretary Mr Janak Raj Joshi (MOALMC), Mr Uma Shankar Panday (Kathmandu University), Mr Raja Ram Chhatkuli and Mr Danilo Antonio (UN-Habitat) and Prof Stig Enemark for their critical review.

The Ministry will consider, as per requirements, the findings, conclusions and recommendations provided in this report to implement land policy and in its persuasion for good land governance in the country.

Thank you

Mr. Gopi Nath Mainali
Secretary

31 May 2018
Kathmandu, Nepal

Executive Summary

1. The current Nepalese land administration system (LAS) only deals with the formal or statutory land tenure system. This includes only land that has been registered in the national cadastre. In Nepal, almost 28% out of the total area in the country is arable and around 75% of this is formally registered in the cadastre and tenure secured. The LAS does not deal with non-statutory or informal land tenure estimated to be around 25% of the total arable land and settlements and are outside the formal cadaster. In the lack of any firm records, this is grossly estimated to be around 10 million physical parcels on the ground. This means that a significant amount of the Nepalese population is living in informality without any spatial recognition and without security of tenure.

2. There are mainly three types of non-statutory land tenure in the society:

   (i) The land on which rights of the settlers are recognized but not formally registered and categorized as Non-formal. The right is socially unchallenged and established. Such land can be registered under the existing legal framework though lacking due to technical and logistical reasons;

   (ii) The land on which rights of the settlers are neither legally recognized nor registered in the official cadastre is termed as In-formal. The settlers have been occupying the land for quite a long time. Their possessions are normally accepted and not challenged by the society. However the land cannot be registered under the existing legal framework;

   (iii) Illegal holding of settlers over private or public land is termed as illegal possession or encroachment. The land originally belongs to some other private or legal person, institution, Government or public/community which is being captured and settled by the other group of people and in general such tenure is neither socially nor legally recognized.

3. Families holding informal tenure in land are highly vulnerable to eviction due to legally unsecured land tenure. People can neither transfer their land nor mortgage the land. The government cannot impose any kind of property tax or levy registration

fees on any transactions on such land. The settlers hesitate to invest on the land and without investment, production cannot be increased. Unrecognized land tenure restricts the settlers for getting any compensation and government grants and benefits in case of any disasters such as earthquake and floods. All these consequences show that the land under informal tenure is causing huge loss of economy and the valuable land asset is dumped as "dead capital".

4. In this context, the Nepalese Land Administration System requires a new solution to be able to deliver security of tenure for all. The solution must be affordable and flexible. It must be quickly applicable and can then be incrementally improved over time. The Fit-for-Purpose (FFP) approach to land administration has emerged to meet these simple, but challenging requirements. Thus, the main objective is to develop a FFP strategy to design and implement fast, cheap and good enough land administration system.

5. FFP Land Administration approach is characterized with three key components: Spatial, Legal and Institutional frameworks. The spatial framework is related to mapping and recordation of land parcels and the connected land rights. Fit-for-Purpose land administration systems use a low-cost alternative to conventional surveying techniques for data acquisition and cadastral mapping for delineation of the visible or physical boundaries on the ground. The legal framework is related to registration and security of rights in land. Whereas conventional cadastral system is based on legal lines, FFP is a flexible framework designed along administrative outlines. A continuum of tenure approach is supported by FFP rather than just individual ownership as is the case of conventional land administration systems. **The institutional framework** is related with the mechanism of service delivery through certain institutional setup. Whereas conventional land administration system has not delivered appropriately in the developing countries due to bureaucratic barriers etc., the FFP approach is focused on the principles of good land governance based on an integrated institutional framework. The key principles of this approach can be summarized as given in the following table:

Key Principles		
Spatial Framework	**Legal Framework**	**Institutional Framework**
• Visible (physical) boundaries rather than fixed boundaries • Aerial/satellite imagery rather than field surveys • Accuracy relates to the purpose rather than technical standards • Demands for updating and opportunities for upgrading and on-going improvement	• A flexible framework designed along administrative rather than judicial lines • A continuum of tenure rather than just individual ownership • Flexible recordation rather than only one register • Ensuring gender equity for land and property rights	• Good land governance rather than bureaucratic barriers • Holistic institutional framework rather than sectorial siloes • Flexible IT approach rather than high-end technology solutions • Transparent land information with easy and affordable access for all

Source: Enemark et.al (2016)

6. The three framework components are interrelated and form a conceptual nexus underpinned by the necessary means of capacity development. The spatial framework aims to represent the way land is occupied and used. The scale and accuracy of this representation should be sufficient for supporting security of the various kinds of legal rights and tenure forms through the legal framework as well as for managing

these rights and the use of land and natural resources through the institutional framework. The FFP approach therefore needs to be enshrined in the land laws, and for administering this regulatory set-up the institutional framework must be designed in an integrated, transparent and user-friendly way. This administration again requires reliable and up to date land information that is provided through the spatial framework.

7. Various existing issues in Nepalese land administration system are identified in the constitution of Nepal, and the National Land Policy is proposed to deal with the issues. The government needs to resolve these issues efficiently and effectively within a short timeframe and at affordable costs by using a good enough quality of services to address the people's aspiration. Furthermore, the proposed system should be simple, understandable, easy to handle, flexible and upgradable over time. Addressing these issues through the existing LAS in Nepal, is not possible. The FFP approach can be a best suitable solution as it helps to address the major issues within a short timeframe, at affordable costs, and sufficient quality. Under this approach, informal land tenure can be identified, recorded and verified with the help of aerial and satellite images through a participatory process involving the local communities. It ensures spatial recognition of tenants settled informally on the land, which may be helpful in situation like after mega earthquake of 2015.

8. Continuum of rights approach ensures security of tenure at various stages which encourage people for investments and improvements on land for increasing productivity and economic growth. Furthermore, formalization of such kinds of social tenure facilitates access to land for needy people. It also helps to regulate land valuation and taxes, levy registration fee and property taxes formally which contributes strengthening economic condition of the nation.

9. With this approach, a detailed inventory of informally occupied land can be prepared which can be helpful for the state for rehabilitation of internally displaced peoples such as victims of human induced and natural disasters and large construction and development projects. Appropriate compensation should be guaranteed for the people settled on such land.

10. The FFP strategy is feasible for a developing country like Nepal as it uses low cost solutions. For Nepal, it would be almost impossible to carryout standard field survey and provide title for all informally occupied land in 753 local government units which could take over several decades and billions of Rupees. As such, it will be impossible to meet the costs, the capacity, and the legal and institutional challenges within a reasonable timeframe. Instead, the FFP approach uses aerial images for data acquisition, free and open source software such as STDM for data processing, analysis, storage and retrieving, locally trained human resources for conducting the task. All these alternates ensure fast execution at low costs and with adequate accuracy for the purpose of securing peoples tenure right on land, and with an option open for incremental improvement over time. This makes FFP approach the best solution for addressing the existing land and tenure issues explained as above.

11. There are two approaches of recording and registering legal and legitimate land rights under the FFP approach:

    (i) The National approach; starting by recognizing the various kind of informal tenure types to be enshrined in the land law. On this basis the mapping and recording of the unregistered areas can be undertaken in the field through a participatory approach and the result can be recorded in the land register.

(ii)   The local approach; will identify and record the actual legitimate land rights through a participatory approach. These rights can then eventually be considered and recognized at national level and entered into the land register.

12.   The FFP approach to land administration is primarily aimed at implementing national programs to deliver security of tenure for all. It is a pro-poor approach that recognizes and legalizes all legitimate rights. However, local pro-poor recordation initiatives can work in parallel and be a supportive component of the national recordation process - or act as pilot projects as a driver for implementing a National approach.

13.   A key feature of the FFP approach is the use of a network of locally trained land officers acting as trusted intermediaries and working with communities to support the identification of land parcels and adjudication of the connected land rights. The mapping and registration of unregistered areas in Nepal can then, in principle, be undertaken in parallel throughout the country at the same time and, thereby, be completed in a relatively short timeframe.

14.   Current capacity is not enough to implement FFP approach nationwide. There are three levels where capacity can be grown and nurtured; in an enabling environment, in organizations and within individuals. The enabling environment is the broad social system within which people and organizations function. It includes all the rules, laws, policies, power relations and social norms that govern civic engagement. The organizational level refers to the internal structure, policies and procedures that determine an organization's effectiveness. The individual level are the skills, experience and knowledge that allow each person to perform. Some of these are acquired formally, through education and training, while others come informally, through doing and observing.

15.   There are four kinds of human resources currently involved in LAS in Nepal. About 2700 professional of general administration cadre, 2200 surveyor or geomatics technical hands with different professional levels, a few IT professionals and some law professionals are currently involved in the field of land administration. This human resource is quite insufficient to deal with the current land issues in the changed institutional context. Various academic and vocational institutions are producing land related professionals at different levels of proficiency e.g. approximately 120 Geomatics Engineers / Senior Surveyors, 150 Surveyors and 200 Assistant Surveyors annually. This workforce is not sufficient enough to fulfill the demand of qualified human resources required at some 761 levels of government with direct responsibility on LAS in the federal, provincial, local government units of the country. Each unit will be looking for such human resources to run their land administration functions. To fulfill this need, locally trained persons who can carry out the basic functions of land administration will be required. The role of the government owned Land Management Training Centre and also private vocational training centers will be important.

16.   Along with the human resources, appropriate infrastructures, technological arrangements and financial capacity of the institutions should be enhanced in order to implement this strategy and achieve the targeted goals.

1. Introduction

1.1 Background

Recognizing the need of an organized land policy in place, especially after the mega earthquake of 2015, Ministry of Land Reform and Management (MOLRM) is working to review on the draft National Land Policy which has been in the hands of government in past few years but without action. The two events, the mega earthquake of 2015 and the promulgation of a new Constitution, have ignited the need for complete review of the draft land policy and develop a strategy for its implementation in the changed context. Moreover, around 25% of the total arable land and settlements are out of the formal Nepalese cadaster which is estimated to be approximately 7.5 million physical parcels on the ground. On top of this, there also exists land occupancy in government, public as well as private lands legally owned by another person or institution. This kind of occupancy is estimated to 2.5 million. Therefore, 10 million parcels on the ground are estimated with informal land tenure.

Novel solutions are required that can deliver security of tenure for all, are affordable and can be quickly developed and incrementally improved over time. The FFP approach to land administration has emerged to meet these challenging requirements. The study aims at implementing progressive provisions on land tenure and management as outlined in the new Constitution, and in compliance with international concepts and (best) practices as outlined in the Sustainable Development Goals (SDGs), Global Land Tool Network (GLTN) tools and Voluntary Guidelines on the Responsible Governance of Tenure (VGGT) components.

Given the numerous ways of land use and their possession, their identification needs a simple, basic and understandable system. The challenges set by the overall global sustainable development agenda requires good land governance which will only be achieved when effective land administration systems are fully operational. The Fit-For-Purpose (FFP) land administration is as an accelerator and enabler for implementing these global standards in developing countries.

The FFP approach to land administration offers a viable, flexible and practical solution to provide security of tenure for all, quickly and affordably, and to enable control of the use of

all land. It provides a new, innovative and pragmatic solution to land administration where current land administration solutions are not delivering. The solution is directly aligned with a country specific needs, is affordable, is flexible to accommodate several types of land tenure, and can be upgraded when economic opportunities or social requirements arise. It is highly participatory, can be implemented quickly and will provide security of tenure for all. Most importantly, the FFP approach can start quickly using a low-risk entry point that requires minimal preparatory work. It can be applied to all traditions in land tenure across the globe. This strength of FFPLA approach should be considered in the current Nepalese context where land administration (LA) must undergo a thorough transformation to address quick solutions necessitated for allocation of land and recognition of tenure after the mega-earthquake and a state restructuring into a federal system.

Nepal has adopted federal system wherein state power including executive, legislative and judicial authorities are distributed within State, Provinces and Local Level Government bodies of Rural Municipalities (Gaunpalika) and Urban Municipalities (Nagarpalika, Upa-mahanagarpalika and Mahanagarpalika). Implementation of land administration falls mainly under the jurisdiction of local level government. Therefore, local level governments will now have to provide land administration services with limited technical human resources as well as infrastructure. Draft version of Land Policy is under discussion which is expected to be endorsed by the government soon. In this context, the necessity of Fit-For-Purpose land administration is fully recognized.

1.2 Objective

The existing investments on land administration which have mostly been fragmented and have not delivered the required pervasive changes. It requires new solution to be able to deliver security of tenure for all. The solution must be affordable and flexible which can be quickly developed and incrementally improved over time. The FFP approach to land administration has emerged to meet these simple, but challenging requirements. At first, the FFP approach recognizes purpose of the system and then determines and implements the adequate means to meet the purpose. Therefore, FFP approach is intended to meet the purpose rather than just following some inflexible regulations for accuracy. The FFP approach holds three essential features:

- **Focus on the purpose:** It is primarily concentrated on the purpose of providing secure tenure for all rather than blindly being directed by inflexible standards for accuracy and use of high-end technological solutions. The system should be designed to be the best "fit" for the purpose of providing secure tenure for all.

- **Flexibility:** The system should be most flexible in terms of accuracy demands as well as for shaping the legal and institutional frameworks to best achieve the needs of the society. The FFP approach includes flexibility to record and secure the more informal types of land tenure.

- **Incremental improvement:** The system should be designed in such a way that it meets primary needs of the society today, and they can then be incrementally upgraded and improved over time when such requirement arises.

These three characteristics underpin the FFP concept consisting of three components: The spatial, legal, and institutional frameworks as presented in more details in Section 2.1 below.

1.3 Rationale

1.3.1 Socio-economic and cultural dynamics, and importance of Land in Nepalese society

Land ownership pattern still determines economic affluence, social status and the political power of an individual person or family in Nepal. The political process has always favored a certain class of people. Moreover, Nepalese land reform initiatives constantly lead to an unequal and highly skewed land distribution among the land dependent households. Historically, the Nepalese society remained fragmented, economically discriminated and socially hierarchical. Land right is a complex, multiple and inter-woven issue in the Nepalese society. Land tenure and its rules are socially defined and thus tend to mirror the distribution of power within the society. In general, powerful groups enjoy more secure land right whereas vulnerable groups have less secured land right (UN-HABITAT, 2008).

Land is probably the most significant asset in the Nepalese rural-agrarian economy. Traditional land policies were very favorable for the dominant class to maintain old power structures. Land is the prime source of livelihood for many rural households. More than 83% of Nepalese live in the rural area (CBS, 2014) and nearly 75% of them depend on agriculture for their livelihood (CBS, 2006).

Landlessness not only influences individual rights to food, housing, water, health, and work, but also impacts wider social stability and economic development. Where agriculture is the prime source of livelihoods for the majority of Nepalese (nearly 66%), 26.1% of agricultural households do not have land to farm on. Nearly half of all the rural households primarily dependent on subsistence farming are landless or near landless having less than 0.5ha of land (Ministry of Agricultural Development, 2015). Seventy percent of all the Nepalese farmers have less than one-hectare land. Though, agriculture is the chief employment sector in the country, less than 5% people occupy most of the fertile land in rural areas. The situation is so worse that the small farmers/landholders could not meet the yearly food requirement of their family because of inadequate land area and low productivity.

Class and caste inequality is further aggravated by gender inequality where men predominantly own most productive land resources. Only approximately 20% women have ownership of land. Similarly, nearly 44% of the Terai Dalits are landless and the remaining own only small area of land to live on or to cultivate.

A study (C. Adhikari, 2008) analyses the economic relationship between access to land and poverty in Nepal by establishing the link between land and consumption as well as land and income. The study concludes that greater access to land for the poor increases income and consumption, and thereby reduces poverty (C. Adhikari, 2008). The study suggests that an effective land reform policy should be kept in place to alleviate rural poverty.

1.3.2 Landlessness, squatters and informal land tenure

Around 1.3 million Nepalese households are landless or land-poor (United Nations Nepal Information Platform, 2017). The landless and land-poor are found around all regions of Nepal. Around 7.5 million visible parcels on the ground (covering arable land and settlements) are outside the formal Nepalese cadaster. On top of this, there also exists 2.5 million land parcels occupied for decades which are legally either the government, public or private lands legally owned by an illegal entity. Therefore, around 10 million parcels on the ground are to be surveyed. Ownership of agricultural land holdings is extremely skewed.

A study states that in 1985, there were 17 smaller squatter settlements in the Kathmandu Valley (The Kathmandu Post, 2014). The number has expanded in size and number and the valley hosted 40 squatter settlements by 2008. Of these 40 squatter settlements, 24 are on the floodplain of rivers, while most of the remaining settlements are in landslides prone area. One example of squatter settlement from Shankhamul is briefly described in Section 2.2.2 of this document.

Reliable record and database on actual landless Nepalese people is missing. Several commissions have different figures on landless people. Currently, there are several types of informality in land administration yet to be addressed which needs to be properly recognized, recorded and addressed. Only formally registered land comes into the jurisdiction of land administration system.

Government has been trying to address informality for many decades. Some of the major steps are discussed as follows:

- Various land tenure reform activities were performed. Now only three main types of tenure exist and all other were abolished and de-formalized.

- Several commissions such as forest strengthening, settlement, rural housing, landless etc. have been formed to address informality. In the recent years, 12 different commissions have been formed for solving the problems of landless and informal settlers.

- These commissions have made scattered and adhoc collection of information on landless people and informal settlers, but the actual issues are rarely addressed.

An FFP land administration system should be applied to recognize and prepare a database of informal land tenure where landless people are settled. This database will be highly helpful for managing the problem of landlessness and finding out appropriate solution.

1.3.3 Post conflict situation

Land issue is complex, dynamic and contentious in Nepal. After Nepal became a democratic country in 1951, land reform has been a highly discussed issue. Many acts and laws in Nepal have been formulated in the past seven decades of efforts in land reform. However, land reform could not bring the essential changes (e.g. socio-political and economic transformation) in the lives of common people. Occurrence of landlessness, inequality, unequal power structure and social injustice are the primary reasons of decade long armed conflict (1996-2006).

Different terms have been coined in Nepalese political spheres as well as in the Nepalese land reform field like 'revolutionary land reform' and 'progressive land reform' with their own understanding or interpretations. Slogan like, 'land to the tiller' became a common agenda for each political party having different identifications and interpretations on land issue specifically during the decade long armed conflict. To address the issue, a 'scientific land reform' became top priority in the Comprehensive Peace Agreement (in 2006), Interim Constitution (in 2007) and the newly promulgated Constitution of Nepal (in 2015) which carries key essences of equity and efficiency in land right issues.

High-Level Commission for Scientific Land Reform 2008 and High-Level Commission for Land Reform 2009 were formed in which reform issues were broadly discussed in their technical reports, action plan of government and in some land and agriculture related polices and acts. Because of existing unequal power structure in the country and vested interests

of ruling class, these provisions still lack implementation. The Constitution of Nepal (2015) opens doors for their implementations.

Many people occupied land of landlords in western Terai during decade long Maoist conflict. The then rebel had captured the land of landlords and had sold them informally to landless and other people. Now, after Comprehensive Peace Accord, the landlords are claiming back their land as they are the legal owners with formal titles, however, thousands of the households have already settled down and are claiming that they have bought it from the Maoist formed local government. Nepal Government doesn't have any proper cadastral database on how much land has been captured, where are they and how many households are informally living on such lands. This kind of informality is disturbing social peace and harmony and creating conflict in the society.

1.3.4 Post disaster situation

The April and May 2015 earthquakes destroyed 604,254 houses and additionally damaged 288,255 houses (Post Disaster Needs Assessment, June 2015). In the face of such massive destruction, the Government of Nepal formulated a consequent reconstruction policy, promising NRP 300,000 (approximately USD 3,000) to every house owner whose house was damaged which could not be repaired. The Government will have to ensure the disbursement process is consistent and transparent. The Government reconstruction policy might leave some earthquake-affected people with empty handed, including very vulnerable ones such as squatters, undocumented citizens or owners with informal land tenure.

In October 2015, the Ministry of Urban Development (MUD) issued official procedures for the forthcoming distribution of reconstruction grants by the government. To secure the grant, a beneficiary is required to present a citizenship certificate and a land ownership certificate; potentially excluding a sizeable number of undocumented people and persons with informal land tenure.

A cabinet decision revised the procedures in December 2015, significantly lowering the amount of documentation required to get the grant. Applicants will now have to submit a copy of their citizenship certificate, voter ID card or land ownership certificate. The revised procedures even allow the applicants without any of these documents but upon presenting a recommendation from the VDC (now Municipality) Secretary. These new procedures will allow a significantly higher number of households to obtain the reconstruction grant, though the risk for discrimination remains since the new procedures do not provide any criteria the VDC/ Municipality Secretaries should use to recommend the application of an undocumented household. This provision bars poor, vulnerable, socially and politically weak people with informal land tenure to access the reconstruction grant.

2. Understanding Fit-for-purpose (FFP) concept

2.1 Fit-for-purpose concept

In the recent past Fit-for-Purpose Land Administration (FFPLA) concept has been largely advocated by GLTN. Several literature, mainly from GLTN, FIG and Kadaster with main authors being Stig Enemark, Robin McLaren and Christiaan Lemmen are available. To make a broader understanding on the concept, few extracts from their literature (Enemark, Mclaren, & Lemmen, 2016) are presented here.

Many countries have established national land management institutions and laws to record land information and to protect the owners' land rights. The national land administration system provides land administration services to secure and assure land rights. However, in developing countries either such kind of system is not in place or have incomplete land administration system; leaving many citizens without formal land tenure though they have been using the land for decades. This is a human rights issue (Enemark, et.al., 2014). Most of these people without formal land tenure are poor and vulnerable group of people. In the absence of formal title, these people always live in threat of eviction from the land they have been residing for decades or in few cases even for generations.

The lack of secure tenure creates instabilities and inequalities in society and largely limits people's ability to participate in economic development. This also forces the users of such land not to invest or build on the land because of fear of eviction.

The existing/conventional land administration system has failed to address the issues mainly due to availability of weak institutions in developing countries, inappropriate laws and regulations, excessive costs and longer implementation timeframe, complexity, lack of human resource capacity and sufficient infrastructure as well as lack of regular maintenance. Therefore, an innovative solution is needed to build cheap, pro-poor, accessible and sustainable systems to provide land administration services. The Fit-For-Purpose (FFP) approach to land administration has emerged as a solution which offers a promising and realistic solution to provide security of tenure for all, and to control the use of all land. This approach has been recognized and is now supported by International Federation

of Surveyors (FIG) and the World Bank (WB). Fit-For-Purpose (FFP) approach to land administration has recently been tested in Rwanda, Ethiopia, Kyrgyzstan, Europe, Indonesia, and South-East Asia just to name a few.

The Fit-For-Purpose land administration system is based on the following three core components:

• Spatial framework,

• Legal framework, and

• Institutional framework

Spatial Framework
• Aerial Imageries country wide
• Participatory field administration
• Incremental improvement
• Continuum of accuracy

Legal Framework
• Enshrine FFP approach in law
• Secure all land rights for all
• Human rights, gender equity
• Continuum of tenure - STDM

Institutional Framework
• Holistic, transparent & cost effective
• Sustainable IT approach
• Ongoing capacity development
• Continuum of service

Figure 1 Fit-For-Purpose Concept retrieved from (Enemark, Mclaren, & Lemmen, 2016)

Spatial framework

Whereas conventional legal cadastral systems undertake documentation of the land parcels using accurate field-based survey using Plane Table, Theodolite, Total Station or Differential Global Positing System (DGPS), Fit-for-Purpose land administration systems use recording through delineation of the visible or physical boundaries on the ground. For the delineation of physical boundaries aerial or satellite imagery may be utilized in the FFP approach. The FFP is fundamentally a participatory approach with the involvement of all stakeholders and carried on by locally trained non-professionals. Therefore, it is a low-cost alternative to conventional surveying technique for cadastral mapping. While pre-defined and fixed accuracy standards for all types of land holdings relate to conventional/legal cadastral system, accuracy is flexible in case of FFP land administration system which varies according to purpose and the diversity of tenure types to be protected. The FFP land administration system can be upgraded and incrementally improved over time when required. The key

principles of the framework are as per the following:

- Visible (physical) boundaries rather than fixed boundaries
- Aerial/satellite imagery rather than ground based survey
- Accuracy relates to the purpose rather than fixed technical standards
- Demands for updating and opportunities for upgrading and ongoing improvement

Figure 2 Example from Rwanda showing an aerial imagery (left) from which the parcel boundaries are easily identified (right). This is essentially a participatory approach in involving the local community and undertaken by locally trained land officers. (Source: Didier Sagashya, Rwanda).

Legal framework

Whereas conventional cadastral system is based on legal lines, FFP is a flexible framework designed along administrative outlines. A continuum of tenure is supported by FFP rather than individual ownership as in the case of conventional land administration system. Moreover, FFP supports a more flexible recordation of physical cadastral boundaries ensuring gender equity for land and property rights. The chief principles of the framework are as presented below:

- A flexible framework designed along administrative rather than judicial lines
- A continuum of tenure rather than just individual ownership
- Flexible recordation rather than only on register
- Ensuring gender equity for land and property rights

INFORMAL LAND RIGHTS — Perceived tenure approaches — Customary — Occupancy — Anti evictions — Adverse possession — Group tenure — Leases — Registered freehold — **FORMAL LAND RIGHTS**
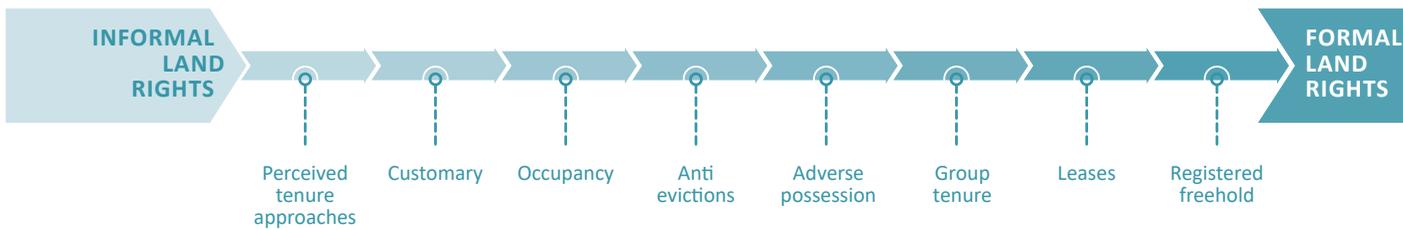
Figure 3 Continuum of land rights (UN-HABITAT, 2008). Each stage of the continuum provides different sets of rights and degrees of security with registered individual ownership (freehold) offering stronger protection than earlier stages.

Institutional framework

While conventional land administration system has not achieved as it should have in the developing countries due to several reasons, one of them is bureaucratic barriers. On the contrary, Fit-For-Purpose approach is focused on good land governance with integrated institutional framework. Further, FFP uses flexible Information Communication Technology (ICT) approach for cadastral mapping, recordation and to provide land administration services. Additionally, FFP approach provides transparent land information with easy and affordable access for all.

Many developing countries do not have nationwide coverage of land tenure (people to land relationship) information between the owners' and the land they hold. Conventional land administration systems are expensive, time consuming, covers only individual ownership information and are focused on fixed accuracy standards for all type of lands. On the contrary, FFP approach provides good, cheap, fast and flexible land administration systems and covers various tenure types. Therefore, FFP land administration systems are more appropriate for developing countries in providing equitable access to land. The main principles of the framework are as provided below:

•	Good land governance rather than bureaucratic barriers

•	Integrated institutional framework rather than sectorial silos

•	Flexible Information and Communication Technology (ICT) approach rather than high-end technology solutions

•	Transparent land information with easy and affordable access for all

The three framework components are interrelated and form a conceptual nexus underpinned by the necessary means of capacity development. The spatial framework aims to represent the way land is occupied and used. The scale and accuracy of this representation should be sufficient for supporting security of the various kinds of legal rights and tenure forms through the legal framework as well as for managing these rights and the use of land and natural resources through the institutional framework. The FFP approach therefore needs to be enshrined in the land laws, and for administering this regulatory set-up the institutional framework must be designed in an integrated, transparent and user-friendly way. This administration again requires reliable and up to date land information that is provided through the spatial framework.

2.2 Fit-for-purpose concept in Nepal

Existing/Conventional Nepalese Land Administration System (LAS), based on the national cadastre, basically deals with formally registered land within the legal framework of the country. However, large amount of land is still out of the formal cadaster which is not registered in the national record. Several areas occupied by people and many settlements developed are not recorded or maintained in the official records. Several settlements in unsafe land are existing and several agricultural plots have been cultivated for decades, nevertheless they have not been officially mapped and registered. These lands have been transacted in informal markets. Because of this informality, in one hand rights and ownership of the people is not registered and security of land tenure is not ensured, on the other hand the state is losing large amount of royalties that could have been collected from land registration and transaction in the formal land market. More seriously, despite decades of use; the poor, landless and vulnerable dwellers and peasants (in informal settlements and agriculture land they farm on) are in constant fear of eviction.

There is a gap in the conventional land administration systems such that informal tenure is not legally recognized and cannot be handled by the existing land administration system. There is a need for complimentary approaches in land administration. The Fit-For-Purpose approach is to bridge this gap by providing a standard for representing 'people–land' relationships independent of the level of formality, legality and technical accuracy.

2.2.1 Land tenure in Nepal

Land tenure in Nepal is either formal (statutory) or informal (non-statutory). Statutory land tenure can be private (Raikar), State (Government and Public) and Trust (Guthi). Non-statutory tenure on land may further be categorize as Non-formal, informal and encroachment. This is explained in more details in Chapter 3 below.

There are mainly three types of non-statutory tenure on land in the Nepalese Land Registration System:

Non-formal: The land on which rights of the settlers are recognized but not registered is known as Non-formal. These people have been occupying and using the lands with full rights. They have some sort of written proofs which support their claim over the land. Their right is socially unchallenged and established. The land can further be registered under the existing legal framework.

In-formal: The land on which rights of the settlers are neither legally recognized nor registered is termed as In-formal: The settlers have been occupying the land since quite a long time (sometimes more than 40 years) but their rights on the land are not defined, however, their possessions are normally not challenged by the society. The settlers do not have any proof to support their claims over the land except the physical possession they are holding.

Encroachment: Illegal holding of settlers over private or public land is called Illegal possession or encroachment. The land originally belongs to some other private or legal person, institution, Government or public/community of high importance which is being captured and settled by the other group of people.

Land Administration System of the country needs to address, at least should have record of, every kind of informality for efficient land management. Cadastral system of Nepal doesn't comprise database of such informality. Consequently, existing land administration system

of Nepal, cannot deal with these kinds of informality. The result is poor land management, violation of basic land rights and conflict in the society and more severely poor and vulnerable groups are deprived of security of tenure. They are living in constant fear of eviction.

2.2.2 Consequences of informal land tenure

Five representative examples are presented here to highlight the consequences of informal land tenure:

1. The photo on the right became viral in the world media during 2015 Gorkha earthquake. The baby seen in the picture below is Mr. Sonish Awal, son of Mr. Shyam Awal. He has been living in Sanothimi area of Bhaktapur District for more than two decades. Their house was destructed by the earthquake and the baby was buried under the collapsed house who was successfully rescued after 22 hours. Nepal Government decided to provide compensation to the earthquake victims who lost their houses. When Mr. Shyam Awal claimed for the compensation, the government asked him to produce the land ownership certificate of his land/destroyed house. Unfortunately, Mr. Awal didn't have one as the land was not registered in the Official Cadastre, a case of informality as mentioned in the previous section. As Mr. Awal was a genuine earthquake victim who lost his home and the whole world knew about his story, and the government later changed the policy, he could get compensation later. But according to the original regulations, he should have produced his land ownership certificate to claim the compensation. Because of the informality, he was previously denied the government's grant for rebuilding his house.

Figure 4 Mr. Sonish Awal as recovered from debris caused by Nepal Earthquake 2015

2. Nepal is to develop a fast track highway joining Kathmandu to the Terai area of Nepal. The alignment has been fixed. However, when the project started, there were several households already settled and cultivating the land along the proposed alignment. The government needed acquisition of the land for highway construction. The government decided to compensate the landowners who would lose their lands and/or houses because of the proposed highway. Unfortunately, many of the settlers/land holders did not have the land registered in their name as the land belongs to the government (*Eilani* land). The lands, according to the record, already belong to the government so they cannot be compensated to the people for the same. On the other hand, the people have been occupying and using the lands for decades, they have built their houses on them.

Later, the Nepal Government formed a high-level taskforce by cabinet decision (Republica, 2011). The taskforce should expedite land acquisition process for the project. The taskforce assessed the compensation amount to be paid to the owners of unregistered land too.

There are several such cases of informality which have been creating severe disturbances on the pace of development and construction of large infrastructures such as hydropower, roads and other development projects.

3. Informal settlement of Thapathali, on the bank of Bagmati River is well known area in Kathmandu. More than five hundred families have been living there for decades. Some of them have developed their colony with permanent houses where the municipality and other service providers have provided basic urban infrastructures and utility services such as roads, drinking water, electricity supply and telephone. However, the area is officially public land along the bank of Bagmati River and the settlers have occupied it informally without having any proof of ownership. The Nepal Government had decided to embank the area to protect it from flood and develop an access road along the river. In addition, a public park is proposed on the area. Nevertheless, the settlers did not agree to leave the place claiming that they are landless, and the government should allow them to reside on the land. In 2011 AD, then Government forcefully evicted some of the settlers and destroyed the houses built on the land. This action of the government was very much criticized by various human right agencies and international humanitarian organizations. The government has withdrawn the decision and the problem still exists. The government doesn't have any records on who are living there, how many of these families and for how long have they been living there. These informal settlers have not been recorded in the national cadastre yet. This is causing further proliferation of slums, obstructing development activities and worsening the beauty of the city.

Figure 5 Thapathali Sukumbasi Area being demolished by Nepal Government

4. Similarly, many people occupied land of some other land owners in some part of the country mainly in the western Terai during decade long Maoist conflict. The then rebel's administration registered land transactions of sometimes the captured land or in other cases due to inaccessibility to the government land registry office. Now, after Comprehensive Peace Agreement (CPA), the legal title-holders or landlords are claiming back their land as they are the legal owners with formal titles, however, thousands of the households have already settled and claiming that they have bought it/registered from the Maoist formed local government. Nepal Government doesn't have any proper cadastral database on how much land has been captured, where they

are and how many households are living on such lands with informality. This kind of informality is disturbing social peace and harmony and creating conflict in the society.

Figure 6 Recaptured house and land by a faction of Maoist, published in (Revolution in South Asia, 2011)

5.   More than three thousand public schools' buildings were either destroyed or partially damaged in districts affected by 2015 Gorkha Earthquake. The schools' activities are being conducted in temporary houses built with zinc sheets even in adverse environmental conditions. Though Nepal Government has allocated budget for reconstructing of those schools, more than one thousand schools are unable to build the schools' building. These schools do not have land owner certificate in the name of the school. As the schools do not have the land ownership certificate the building permit cannot be issued, and they cannot build class rooms on such land.

Figure 7 Classroom after Nepal Earthquake (left), children studying in temporary classroom (right)

Going through the representative cases presented above, it can be concluded that a Fit-For-Purpose (FFP) land administration system is required in Nepal to record the existing situation of informal land tenure quickly which is affordable and require very less human resources and infrastructure. It further necessitates to test such tools in identification, verification and recording (IVR) of spatial and non-spatial data/information on informal land tenure.

2.3 Fit-for-purpose concept around the globe: few cases

There is an imperative requirement to build simple systems using a flexible and affordable approach to identify the way land is possessed and used, especially for developing and less developed countries. The systems should comprise all land and should offer security of tenure for all citizens. Initially, such systems may have less capacities/features but should also be less hungry of resources. The systems should follow Fit-For-Purpose approach that will meet the current needs of a society which can be improved incrementally over time. The FFP land administration system approach has been applied in many countries in Eastern Europe, Africa and Asia. Though there are many works in the field, only few representative cases are briefly described here.

A substantial land related policy and legal reform took place in Rwanda in 2000 for regularizing entire existing lands with private, leasehold, and state tenure types (Koeva et al., 2017). About 10 million parcels were registered and 9 million lease certificates were issued within a timeframe of 5 years and for a unit cost of about 6 USD per parcel (that is of course subject to specific country conditions). The policy reform was welcomed as a good move in terms of gender recognition, marginal group recognition, and overall equality. Portion of program involved a nationwide identification, verification, and recording land information by the Rwandan Natural Resources Authority (RNRA). To cover maximum area faster and cheaper, print of ortho-photos produced from high-resolution aerial/satellite images were used. The accuracy was kept low to record as fast as possible and to achieve maximum coverage. Most boundaries were digitized within 1m to 5m of the 'true' positional accuracy.

In another FFP land administration project, STDM was used in rural Kenya to encourage poverty reduction by improving food security, improve income levels and tenure security of agriculturalists and rural women (GLTN, 2016). This aims to encourage a more efficient and effective use of natural resources safeguarding sustainability. This also intends to present better farming practices particularly on access to water and water management using the STDM tools. Furthermore, it will also help to protect land from further encroachment and to help farmers implement controlled grazing.

Still large parts of sub Saharan Africa remains a challenge to map millions of unrecognized land rights. Since conventional approaches for identifying these land rights have proven inappropriate, time consuming and costly, a novel approach was required to support faster, cheaper, easier, and more responsible land rights surveying and recording. its4land is an European Commission Horizon 2020 project which was developed to design innovative tools inspired by the continuum of land rights, fit-for-purpose land administration, and cadastral intelligence (ITS4LAND, 2017). ITS4LAND is using strategic collaboration between the EU and East Africa to bring innovative, scalable, and transferrable ICT solutions. The innovation process incorporates a broad range of stakeholders and emergent geospatial technologies. The project consists of case study locations in Ethiopia, Kenya, and Rwanda. The project plans to develop 7 new innovative tools that support faster, cheaper, easier, and more responsible land rights surveying and mapping. These tools follow the continuum of land rights and Fit-For-Purpose land administration principles.

3. Brief review of Land Administration System (LAS) of Nepal

3.1 Land tenure

History of land tenure practices in Nepal dates back to several centuries, mainly from the period of Mandev of the Lichchhibi dynasty (5th century AD). Historically, all the land belonged to the state and the monarchs of that time physically owned them. They used to award to or expropriate land from people as per their wish and need of the state. Later during Malla era (17th century), King Jayasthiti Malla started with some regulations for surveying, measuring and keeping record of land.
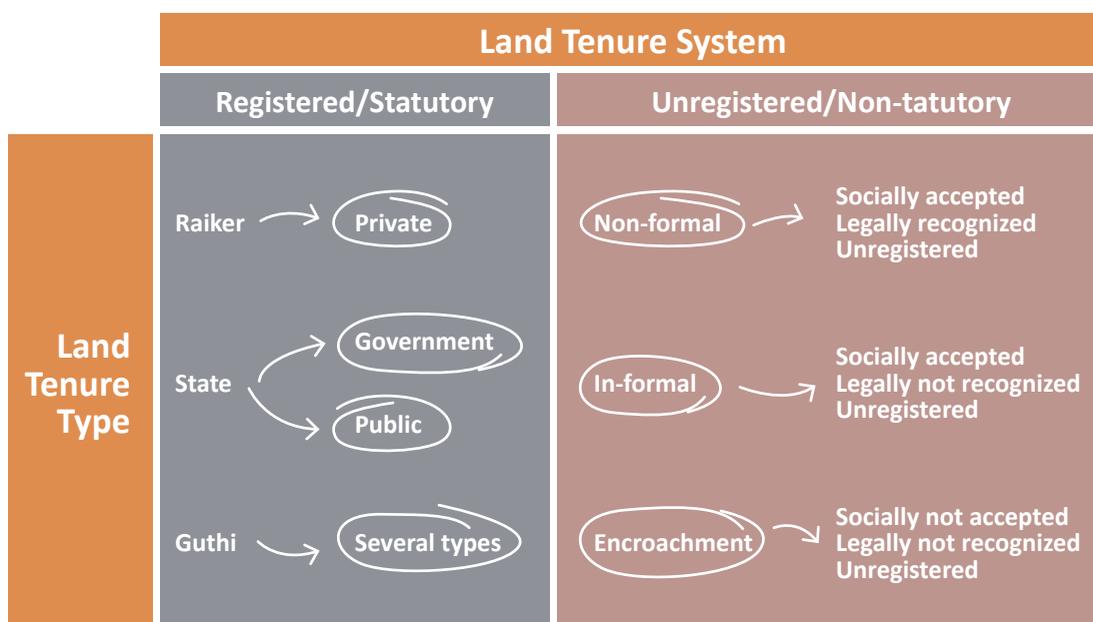

Figure 8 Land Tenure System in Nepal (Source: (JOSHI, CHHATKULI, PANDAY, & DEV, 2017))

Nepal had a history of different land tenure system (Regmi, 1977). After the introduction of land reform in 1963, several tenure systems were de-legalized and mainly two systems of land tenure do exist. Statutory system is one which deals with the registration of legally recognized land tenure. The land parcels are measured, mapped and recorded officially together with land tenure information in the national cadastre. Under this system, mainly three types of land ownership exist; Raikar, State and Guthi (Subedi, 2009). Raikar is private land which is legally hold by legal person (person, group or institution) and enjoys absolute bundle of rights to own, rent, sell, mortgage etc. State land is further classified as Government land and Public land (Acharya, 2008). The Government lands are hold by different government institutions; forest, national parks and other land under control of the government. Public lands are those which are commonly used by the society and community for public benefits. Finally, the Guthi land is hold by different organizations or community in the form of trust and managed for running different social, cultural and religious purposes. Ministry of Land Reform and Management (MOLRM) is responsible for governing all these kind of land tenures.

The other system by which the land is hold is informal and the tenure information is not registered in the national cadstre. There are several modes of non-registered tenure-ship in Nepal which are mainly classified as Non-formal, Informal, and Encroachment. Non-formal land tenure is recognized by the state law, and accepted by the local community; however, this type of tenure is not formally registered in the national cadastre. Informal land tenure is accepted by the local community but, it is neither recognized by the state law nor is registered in the national cadastral record. Encroachment (B. Adhikari, 2002) is a category of land which has been occupied by people for a long period, however, it is neither accepted by the community nor recognized by the state law.

Religious and Customary tenures as are commonly understood worldwide, were illegitimated after the introduction of land reform in 1963 and do not exist as such in Nepal. However, such kind of land tenures may still exist in practice at few places. A brief overview of land tenure system in Nepal is given in Figure 8 (JOSHI, CHHATKULI, PANDAY, & DEV, 2017).

Nepalese LAS is still managed manually in significant extent. Application of digital technology is in preliminary stage. The modern cadastre, which was originally established for fiscal and legal purpose, is graphical in nature. It was initiated sporadically almost 90 years ago, and comprehensive nation-wide survey was carried out after the introduction of land reform program almost 55 years ago. Currently, almost 75% of the arable land and settlements in the country is covered by map-based cadastre. It occupies 27% of the total area of Nepal. Rest of the arable lands and settlements which accounts for approximately 25%, are still out of the formal cadaster. The other land area such as forest, national parks, several barren lands, meadow, mountains, snow covered area etc. are out of existing LAS. The cadastre consists of series of geo-referenced maps (covering half of the mapped area of the country) based on national coordinate system (spatial information) and island maps (covering another half of the mapped area of the country), and registers with descriptive record of parcel, their owners' and rights over the land parcels (attribute information).

After establishment of democratic system in the country, people's voice in favor of good land governance is rising. Society is seeking equitable access and meaningful control of Socially Excluded and Deprived (SED) people over land. Concerns are raised that the current LAS is designed in favor of elite group of the society. There is no exact information on poverty, socially excluded and marginalized families and groups leaving in informal tenure. This lack of inclusiveness and gender disaggregated data in existing LAS is a serious drawback which restricts making informed decision and evidence-based policy formulation in favor of poor and SED people. The major drawbacks of current LAS can be briefly outlined as:

- The cadastre comprises the record of cultivated land and settlement. It doesn't have information on other land such as forest, mountain, riverine, shrubs, wetlands, meadow, and barren lands. These lands are also very important resources for the society.

- The land administration system controls the formally registered land only. It doesn't consist the information on land with informal tenure. Informality is a big issue to be addressed for security of tenure and for sustainable peace and prosperity in the society.

- The cadastre and land administration system focusses mainly on information which are necessary for fiscal and legal purposes. It lacks information that supports other social aspects such as poverty, equity, inclusiveness, marginalization, vulnerability etc. This information plays a vital role for formulation of effective policy and making informed decision.

- Land information acquisition, processing and recording system is traditional and manual. It is less accurate, labor intensive, time consuming and inefficient. It is much more process oriented as well as lacks transparency. People face difficulty in receiving effective and reliable land related services on time and hence, good land governance is a major issue in the Nepalese administration (UNHABITAT-NEPAL, 2016).

- The attribute data currently stored in various systems are based on the existing land ownership certificate, which are mainly issued relating to formally registered land parcel. The certificate contains limited personal information of the land owners. The information contained in the land ownership certificate is not up to date to define complete legal situation of a land parcel as well as complete socio-economic status of the owners.

3.2 Land use

The Government of Nepal enacted National Land Use Policy in 2012. It intended to manage land use according to land use policy of the government which outlined six land use zones such as Agricultural area, Residential area, Commercial area, Industrial area, Forest area and Public use area. Based on the scenario developed after the major earthquake of 25th of April 2015, the Government of Nepal made amendment on the policy in 2015 which emphasized on the safe and secure settlement along with the environmental protection and ensuring food security.

As per the Land Use Policy - 2015, eleven types of fundamental land use zones such as Agricultural Zone, Residential Zone, Commercial Zone, Industrial Zone, Mine and Mineral Zone, Cultural and Archaeological Area Zone, Riverine and Lake Area Zone, Forest Zone, Public Service Zone and Others are defined.

The main concept adopted for land use classification is to promote complementary land use, maintain competitive land use and avoid conflicting land use.

Although the land use policy is enacted, appropriate legal and institutional arrangements are not yet functional to implement the policy effectively. Initiation for implementation has been started. National Land Use Project, under the Ministry of Land Reform and Management is engaged in preparation of present land use, land system, land capability and land use zoning maps. It further looks after to handle the other technical issues on land use planning and its implementation. However, appropriate land use planning at local level is to be done and policy has yet to be implemented by the local institutions which lacks capacity such as

technology, human resources and funds. Recently, the local body election is completed, and newly elected representatives are keen to formulate and implement the land use plan by tying it up to the local development planning.

3.3 Spatial framework of land administration

Nepalese LAS is based on cadastral maps. Cadastral mapping of almost 75% of cultivated land and settlements is already completed, which is about 27% of total area of Nepal. In some part of the country, a few settlements are mapped under a block instead of individual parcel. Similarly, some cultivated lands are still remains unmapped because of various reasons. Other areas such as high mountains, snow covered areas, grazing lands, forests etc. are not covered in the cadastre; instead, they are represented in topographic maps.

The cadastral maps are basically of two-types:

a)   Free-sheet iceland maps which are based on the local control points which are not connected in the national geodetic control networks. Thirty eight out of 77 districts are mapped in this system. Scale of these cadastral maps are 1" = 100' in dense settlement and market areas, 1" = 200' in sparse settlements and developing areas, and 1" = 400' in rural and agricultural areas.

b)   Trig-sheet systematic maps which are based on the national control points and connected in the national geodetic control networks. Thirty nine out of 77 districts are mapped in this system. Scale of these cadastral maps are 1:500 for dense settlements and market areas, 1:1250 for sparse settlements and developing areas, and 1:2500 for rural and agricultural areas.

Both types of maps were prepared graphically using plain table methods in the past. However, in recent time total stations are used for parcel boundary surveying and GIS tools are used for mapping. General boundary principle is used for parcel boundary delineation.

Adjudication of parcel boundary is, however, carried out and rights and ownerships over parcel are identified, verified and recorded in registers and /or databases. Based on the maps and registers, land ownership certificate or titles are issued to the land owners.

The cadastre developed in such a way is regularly updated as per the change in shape, size, area, rights and ownership over the parcels. Ownership transfer and land transaction are registered under the principle of so called "improved deed registration". It is an approach in which the transaction is registered in office along with the consent of the buyer and the seller, with attached deed document along with cadastral map and land ownership certificate.

Since a decade, process of digitalization of both types of land information (Maps and Registers) has started. So far, various digital LAS have been studied, developed and tested by different wings of Ministry of Land Reform and Management (MOLRM). A brief description of these systems is as per the following:

- **District Land Information System (DLIS):** DLIS (Department of Land Information and Archive, 2012) is a tool especially designed to handle attribute data on land. It cannot be used to store, analyze and process spatial data or maps. Therefore, it couldn't be used for integrated land database.

- **Parcel Editor (PE):** PE (Survey Department, 2010) is an extension developed for ArcGIS commercial software. It was specially designed for handling spatial data. This

tool seems more useful for handling newly acquired field data, process them and prepare cadastral database and maps.

- **Spatial Application Extension (SAEx):** SAEx (Department of Land Information and Archive, 2010) is an extension developed for ArcGIS commercial software. It was specially designed for handling spatial data. This tool seems more useful for handling spatial data acquired from existing source such as scanned maps and updating daily transaction and parcel subdivision. As it cannot store owners' information, the tool couldn't be used for providing integrated land services.

- **Land Record and Information Management System (LRIMS):** LRIMS (Maharjan, 2015) is an online tool especially designed to handle attribute data on land. It cannot be used to store, analyze and process spatial data or maps. Therefore, it couldn't be used for integrated land database.

- **Solution for Open Land Administration (SOLA):** In principle, SOLA (Pullar, McDowell, Solovov, Manoku, & Rizzo, 2012) is different than all of the above-mentioned solutions. It is the only open source tool for land administration in Nepal. Moreover, it was designed to handle both spatial and attribute data. It is a centralized system that offers land related facilities through web services. Therefore, this solution has edge over the other as it is cost effective and efficient.

3.4 Legal framework

The preliminary assessment of the Ministry of Land Reform and Management has highlighted 62 Acts being related to Land Management. The ministry has further divided these laws into two categories- a) the Act which is directly related to the daily functions of the ministry and b) the Act which are related with land administration but not directly linked with daily activities of the ministry.

Among 62 Acts, at least eight Acts are directly related with land management issues and a due consideration is to be given to consolidate these provisions into a new legislation. Without integrating provisions scattered throughout these eight pieces of legislation after having an analytical examination, no reform would address the core problem of duplication and overlap.

Other seven Acts were enacted to end the traditional land tenure system in Nepal. Their relevance should have been over many years ago, but these Acts are still in force. Other nine Acts are related with land management but need to be maintained as separate Acts as they cannot be part of land reform legislation. These Acts influence the use of land but their scope is very specific such as city planning, city fund and local governance etc. Remaining thirty-nine Acts have made minor reference to the transaction of land but do not have adequate relevance to the land reform and management issues.

Land management is basically spread in eight Acts. The eight statutory Acts can be categorized under following sub-headings.

a. Land Act 1964

Land Act 1964 is considered as the most important Act to bring about the reform on land management in Nepal. This Act could not be fully implemented but has made a few remarkable changes and set a direction in Nepalese legal reform on land issue.

Land Act has abolished Jimindari (Land lordship) system and ensures the direct relationship between Landowners and State. It has also imposed land ceiling system. The purpose of the land ceiling was to acquire the land from the landlords and redistribute it to the landless people and to increase the productivity. This Act introduced the concepts of cooperative farming, land zoning and land use planning, agriculture saving credit and farmers' cooperative institutions to increase the productivity and ensure optimized land use. It failed to produce any positive reform due to failure to sincerely enforce the Act. This Act and other Land-related Act has defined land, tenants, revenue, rent and mention old land tenure system which is in fact duplication and thus these words should be defined once for all in new land Act.

b. Land Survey and Measurement

Land Survey and Measurement Act 1963 was enacted to carry out the periodic survey and measurement of lands and classification of land. Adjudication of land rights, parcel boundary survey, demarcation, mapping and land registration and land ownership certificate (Title) preparation and dissemination is carried on under this act.

Apart from surveying and mapping and preparing cadastral documents, regular updating and maintenance of cadastre is also regulated by this act.

This act also enforces the mechanism of dispute handling during land surveying and mapping. Surveying and mapping of state land within the cultivated and settlement area is also guided and managed under this act. There are provisions of several committees in this act, which look after different issues such as land registration, cadastral and administrative boundary dispute resolution, issuing survey license, regulate surveying mapping system in the country.

c. Land Revenue

The Land Revenue Act 1978 is brought basically to abolish the traditional taxation system and regulate ownership and tenancy. This Act consolidates the provisions regulating the revenue spread through Land Administration Act, 1967, Land Revenue (Special Provision) Act, 1962, Land Revenue (Remission) Act, 1963, *Madesh Mal ko Sabal*, and *Pahada Mal Sabal*.

The Act sets up Land Revenue Offices in each district and collection of land revenue each year as prescribed by the government of Nepal through fiscal Act. Now the collection of land revenue is done by Rural Municipalities and Municipalities. It has also got an extensive power to auction off the land to recover land revenue which is rarely applied. Ensuring inventory of land record, update the registration of land within district. It maintains the inventory in a manner that all land within the district is recorded without error. The land revenue office has got an extensive power to write to the concerned survey offices to amend and update the particular inventory of land. Upon receiving such written request, the maintenance survey section has to make necessary amendment to the survey and map. The Act defines public and government land and restricts the registration of such land as private. The Act also prohibits cultivation on unregistered land without prior approval.

d. Land Acquisition

Two Acts are enacted by the parliament to regulate the land acquisition. The Immovable Property Acquisition Act 1956 authorizes the government to acquire immovable property,

which is essentially land and permanent structure attached to land, only for public benefit. The legislative scheme restricts the governmental power to acquire the land even if it is for public benefit. The limitation applies in case of school, religious places, hospitals, public library, orphanage, *dharmashala* (lodge for pilgrims) and private residence if it is being used by the owner.

The other Act for land acquisition is the Land Acquisition Act 1977. The Act has authorized the Government of Nepal to acquire any land at any place for any public purpose, subject to compensation under this Act. 'Public purpose' is also defined under this Act. This means the interest of or for the benefit or use of the general public, or functions to be undertaken by Government of Nepal. The assumption of the definition is that any work done by the Government of Nepal would be in public interest, hence, the Act suggested the inclusion of (a) project approved by Government of Nepal; (b) project undertaken by local bodies fulfill the public interest objectives. The Act allows the government of Nepal to acquire the land for private entity established under the prevailing law. However, the acquisition for the private entity is very restrictive.

e. Protection/ Conservation of Public Land

The Local Administration Act 1971 has prohibited the construction of a house in government or public land without establishing such right first. If any person attempts to construct a house or constructs a house, District Administration Office (DAO) would order such person to stop such construction and remove materials. DAO should maintain an inventory of public property in their jurisdiction and send a copy of such document to Land Revenue Office (LRO) and District Development Committee (DDC). No person should use or grant permission to use the public land without getting approval of the government of Nepal. If any person has registered public land in his/her name, such registration would be revoked. No limitation would apply in the cancelation of such record.

3.5 Institutional framework

The main executive organization responsible for land administration and management is Ministry of Land Reform and Management (MOLRM). It has various departments and other wings dealing with the different issues. The organogram of the ministry is given in the Figure 9.
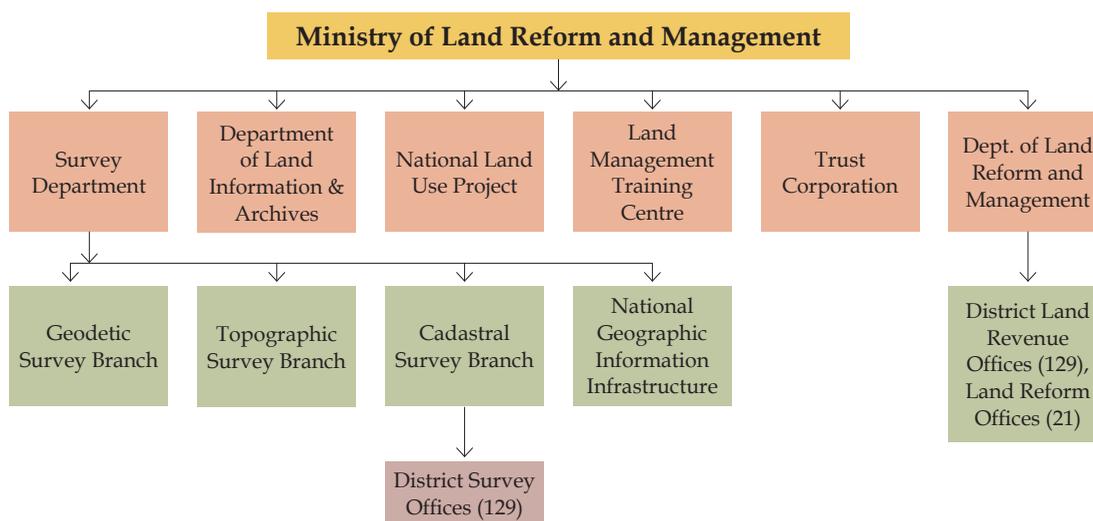

Figure 9 Organogram of the Ministry of Land Reform and Management (MOLRM)

The main functions of the departments and units under the ministry are briefly described below:

3.5.1 Survey Department (SD)

Survey Department was established in 1957 (2014 B.S.) to prepare maps indigenously, and to fulfill the various mapping needs of government as a central mapping agency. The activities of the Survey Department were focused mainly on cadastral mapping in its early days which was meant to assist in the collection of land revenue. A legislation was passed in 1961 (2019 B.S.), which was revised in 1963 (2021 B.S.) to allow it to prepare maps and Land Registers. This helped not only to assess the revenue, but also to give the individual the right to his/her land.

There are four divisions under the department: Geodetic Survey Division, Cadastral Survey Division, Topographic Survey Division and National Geographical Information Infrastructure Division (NGIID). Establishment of national network of control points, studying crustal movement, geoidal surface of Nepal and help to find the parameters in establishing the location of Nepal on the Earth's surface are some of the major tasks of the Geodetic Survey Division. Main activities of Topographic Survey Division include aerial surveying, topographical base maps and databases preparation and updating as well as carrying out international boundary survey.

The mission of NGIID is to strengthen planning and resource management in Nepal through the development of a geographic information infrastructure for access of geographic and related data for decision-making. Developing an NGII platform to facilitate data sharing among Survey Department, Central Bureau of Statistics and participating agencies as well as to disseminate Population and Housing Census results via the NGII platform are the main objectives of the NGIID.

Preparing and updating cadastral plans, land registers and database as well as providing land rights to individuals are the main activities of Cadastral Survey Division. All cadastral mapping works of 77 districts of Nepal are completed by the Cadastral Survey Division. While 39 districts were mapped without National Control Network and the remaining 38 districts were mapped with National Control Network.

3.5.2 Department of Land Reform and Management (DOLRM)

Department of Land Reform and Management (DOLRM) under the Ministry of Land Reform and Management is the only Department of Government of Nepal which undertakes Land Reform, Land Administration and Management functions through its nationwide district offices. These offices are popularly known as *Mal Adda* or *Malpot Office* which have passed a long history in Nepalese land administration. There are 129 land revenue offices and 21 land reform offices under the department. The land reform activities are being carried out by Land revenue office of the same district where no land reform office is available.

Protection of Government and Public Land, helping ministry in formulation of land related policy, act and regulation, eliminating dual land ownership, performing land reform activities such as, monitoring and controlling land-holding ceiling, protection of tenancy rights, fixation of rent, monitoring of land taxes are some of the major roles of the Department of Land Reform and Management.

3.5.3 Department of Land Information and Archive (DOLIA)

The government of Nepal has made a policy decision on developing computer-based land information system and implements it in land administration throughout the country. To ensure this optimistic aim, Nepal Government formed Department of Land Information and Archive (DOLIA) on July 10, 2000 under the Ministry of Land Reform and Management.

DOLIA is now working to transform the traditional system of land administration and archive into the modern system by developing proper and appropriate hardware and software system in close cooperation with the concerned departments like Department of Land Reform and Management (DOLRM) and Survey Department (SD). After completion the computerized program of all land information of a particular office, DOLIA hand over the implementation responsibility to the concerned departments.

3.5.4 National Land Use Project (NLUP)

As Nepal had only regional level database on land use, land system and land capability which were produced by Land Resource Mapping Project (LRMP, 1983/84), National Land Use Project (NLUP) was established in 2000 to prepare local, district and national level land use maps and database. NLUP has prepared Land Resource Maps and Database at 1:50,000 scale for the whole Nepal and is preparing the same for local level at the scale of 1:10,000. Local level land resource maps, database and reports of Whole of Terai as well few local units from hilly area have already been completed.

3.5.5 Trust Corporation (Guthi Sansthan)

Guthi Sansthan has a responsibility of maintaining the traditional culture and national heritage that will benefit all sectors of society. The most important social obligation of the organization is to reconcile and balance the various conflicting interests within the *Guthi*, *Matha*, and community's in the best possible manner. The mains functions of Guthi Sansthan are maintaining and preserving religious, cultural and social establishments, managing Trust Property (including trust land).

3.5.6 Land Management Training Centre (LMTC)

Land Management Training Centre (LMTC) is key institution responsible for human resource development and capacity enhancement of the employee working in the field of land administration and management. It basically conducts the professional courses (short term and long term) and supports conducting academic courses in collaboration with universities. It has produced more than 6000 surveyors and land professionals so far since its establishment in 1968. The main contribution of the training centre is conducting the following (academic and professional) courses:

- Masters in Land Administration (in collaboration with Kathmandu University)

- BE in Geomatics Engineering (in collaboration with Kathmandu University)

- Diploma in Geomatics Engineering (In collaboration with Centre for Technical Education and Vocational Training (CTEVT) and Kathmandu University)

- Senior Survey Course

- Junior Survey Course

- In service professional training, refresher training courses and orientation courses for government employees

Apart from these main institutions under the ministry, there are some other agencies working directly or indirectly in the field of land administration and management which are presented as per the following:

- District Administration Offices are responsible for land acquisition for development and construction activities

- Local institutions such as Municipalities and Rural Municipalities are responsible for public land management, security of state land, land use planning etc.

- Different town development committees and authorities are responsible for land pooling, land development, developing infrastructure for integrated settlement and housing development

- Department of Urban Development and Building Construction is responsible for town planning, infrastructure development and utility services planning

3.6 Human Resources

Four types of human Resources have been employed under MOLRM. They are:

a) **Administrative HR:** Majority of the employee under DOLRM are from administrative background. They are mainly generalist and can be transferred to other department and office after 2 years. These HRs are generally responsible for land registration, land record keeping, taxation, account keeping and other supporting tasks in office management. Under Administrative Services, mainly Managers, Officers, Assistants and other supporting staffs are employed for different tasks and functions. There are almost 2700 administrative HR working altogether throughout the country.

b) **Surveyors:** Surveyors are second largest group of HR under the ministry. They are about 2200 in numbers. Three kinds of surveyors are working under the Survey Department. Officer Surveyors are in planning, policy formulation and supervision duties. Surveyors carryout the survey tasks in the field and Assistant surveyors supports carrying out field surveys and performs survey updating jobs.

Most of these surveyors without formal Surveying University Degrees. They are graduated from a professional Government owned Survey and Land Management Training Centre. Recently, some universities in the country started Surveying and Geomatics Engineering courses and now fresh graduates and Engineers also entered in the surveying profession. But still they are small in numbers.

Provision of private licensed surveyor is made in the land survey and measurement act but it is not effectively implemented. Currently, some private surveying and mapping firms and private surveyors are working in the field of engineering survey field. Formal role of private licensed surveyors in cadastral survey is negligible.

c) **Legal HR:** Currently, HR from legal background are working only in the Ministry and Department level. Such HR are not employed in the district level offices, where there are substantial number of dispute regarding land ownership and land rights.

d) **IT persons:** There are few IT persons employed in district level land revenue offices for updating land record and preparing online system. These HR are managed under DOLRM and DOLIA for development of LIS. But these are not in sufficient in numbers as per demand. Most of the HR from IT background are still under-utilized and just involved in computer typing and other clerical jobs.

Summarizing the status of HR under MOLRM; it can be said that the number of skilled HR, especially the qualified surveyors are insufficient. Moreover, employees from legal and IT background should be encouraged and number of administrative and generalist HR can be reduced.

3.7 Nepalese LAS in relation to FFP

Since a decade, process of digitalization of spatial and attribute information about land parcels and ownership has started. Numerous digital land administration systems have been studied, developed and tested by different wings of Ministry of Land Reform and Management (MOLRM). The following five tools are being used in some part of the country or was piloted whose brief description has been provided in section 3.3 of this report:

• Parcel Editor (PE)

• Spatial Application Extension (SAEx)

• District Land Information System (DLIS)

• Land Record Information Management System (LRIMS)

• Solution for Open Land Administration System (SOLA)

These Nepalese land administration systems are based on conventional cadastral system. Therefore, these systems are inappropriate to map lands with informal tenure system. Moreover, all these systems except SOLA is based on commercial platform in a way or another, meaning they will not bring sustainability in land administration. Further, these systems are costly, time consuming and inflexible. Hence, it can be concluded that existing Nepalese LAS are not FFP land administration systems. The SWOT analysis of existing land administration system is presented in Table 1:

Table 1 SWOT analysis of existing Nepalese LAS

Strength	**Weakness**
• Good for conventional LAS • Legally binding • Provides standard accuracy requirements	• Maps and registers provide land administration services only for lands with formal tenure • No record of lands with informal tenure • Incomplete coverage of land administration • Most of these systems are based on commercial IT-platforms • Costly and time-consuming data collection methods • Bureaucratic system • Highly skilled Human Resources are required
Opportunity	**Threat**
FFP land administration can be integrated into the existing system, so that nationwide coverage can be recorded, and tenure security for all can be achieved	• The existing Nepalese land administration may never have nationwide coverage • Unsecured land tenure and potential land conflicts for squatters, poor and vulnerable groups

4. Constitutional and global drives for adopting FFP LAS in Nepal

4.1 Constitution of Nepal, Land Use Policy 2015 and Land Policy (Draft)

The Constitution of Nepal promulgated in 2015 has the following key mentions on land rights, secured tenure and land management. Land Use Policy, 2015 and the National Land Policy (draft under discussions) are designed to ensure how these constitutional provisions are implemented.

Article 18. Right to Equality

- All citizens shall be equal before law [18(1)]

- No discrimination in any ground but no barrier for positive discrimination for SED people as per law [18(2)/(3)]

- No gender discrimination regarding the right to inheritance is ensured [18(5)]

Article 25: Right to Property

- Every citizen shall have right to own, use, sell, enjoy benefits from (movable/immovable/intellectual) property [25(1)]

- Expropriation of private property is possible only for public usage [25(2)]

- Compensation will be given for any expropriation of private property [25(3)]

- State can carry out land reform, development and regulation for enhancing productivity, environmental protection and urban development [25(4)]

- Private property expropriated for one particular public usage can be used for other public usage [25(5)]

Article 36: Right to Food

- Right to food security [36(2)]
- Right to food sovereignty [36(3)]

Article 37: Right to housing

- Every citizen shall have right to proper housing [37(1)]
- No citizen will be evicted from or encroached on the housing, except in accordance with law [37(2)]

Article 38. Right of Women

- Every woman shall have equal right to lineage without any gender discriminations. [38(1)]
- Both the spouses shall have equal rights in property and family affairs [38(6)]

Article 40. Right of Dalits

- Landless Dalits will be given land for one time [40(5)]

Article 51. State Policies

(b) Policies regarding political and governance system

- Implementing **international treaties and agreements** to which Nepal is a State party [51.b.(3)]
- Guaranteeing **good governance** by ensuring equal and easy access of people to services provided by the State and making public administration clean, competent, impartial, transparent, accountable and participatory. [51.b.(4)]

(e) Policies regarding agriculture and land reform

- Abolishing dual ownership and implementing scientific **land reform** [51.e(1)]
- Discouraging absentee landownership and land consolidation for enhancing productivity [51.e(2)]
- Implementing **land use policy** for enhancing productivity. [51.e(3)]
- Proper use of land [51.e(4)]
- Proper access to agro-market [51.e(5)]

(g): Policy regarding the conservation, management and use of natural resources:

- Fair distribution of the benefits generated by natural resources by giving local people the priority and preferential rights. [51.g(1)]
- Developing a sustainable and dependable irrigation system [51.g(4)]
- Developing forest zone as required [51.g(6)]

4.2 VGGT and other commitments in the international platform

A good land administration system should follow VGGT Guidelines, Universal Declaration of Human Rights (UDHR), International Covenant on Civil and Political Rights (ICCPR), International Covenant on Social, Economic and Cultural Rights (ICSECR) and other international treaties and covenants related to human rights and rights to the access to property and economic resources.

The purpose of VGGT Guidelines is to serve as a reference and to provide guidance to improve the governance of land tenure, fisheries and forests for achieving food security for all and to support the progressive realization of the right to sufficient food in the context of national food security. These guidelines were developed by UN-FAO in 2012.

The ICCPR is a significant international human rights treaty which provides a range of protections for civil and political rights. The ICCPR, collectively with the Universal Declaration of Human Rights (UDHR) and the International Covenant on Economic Social and Cultural Rights (ICESCR), are considered the International Bill of Human Rights. The ICCPR compels countries that have endorsed the treaty to protect and preserve basic human rights, such as: the right to life and human dignity; equality before the law; freedom of speech, assembly, and association; religious freedom and privacy; freedom from torture, ill-treatment, and arbitrary detention; gender equality; the right to a fair trial, and; minority rights. The Covenant obliges governments to take administrative, judicial, and legislative measures to protect the rights enshrined in the treaty and to offer an effective remedy. The Covenant was adopted by the United Nations General Assembly in 1966 which came into force in 1976. As of December 2013, 167 countries including Nepal have ratified the Covenant.

4.3 Emerging technology and GLTN tools

A land tool is a pragmatic way to solve problems in land administration and management. It is a means of implementing principles, policies and legislation into action. It consists of a wide range of methods: from a simple checklist for conducting a survey, a set of software and associated protocols to an extensive set of guidelines and approaches. For land tools to provide benefits to the poor, vulnerable and disadvantaged groups and women, they need to have the following features:

- Affordable

- Equitable and gender-responsive

- Governance

- Subsidiarity

- Sustainable

- Systematic, large-scale

- Pro-poor

The Global Land Tool Network (GLTN) is a coalition of global, regional and national allies contributing to poverty alleviation through land reform, improved land management and security of tenure especially with the development and dissemination of pro-poor and gender-responsive land tools.

"Breaking the poverty cycle by contributing to poverty alleviation through land reform, improved land management and security of tenure" is the objective of GLTN. To achieve

its objective, GLTN has already developed 2 tools [Social Tenure Domain Model (STDM) and Gender Evaluation Criteria (GEC)] and are testing in many countries. Further, it has developed 16 more significant land tools. These tools are embedded in 5 predominant themes and to address 8 cross cutting land related issues (Figure 10).
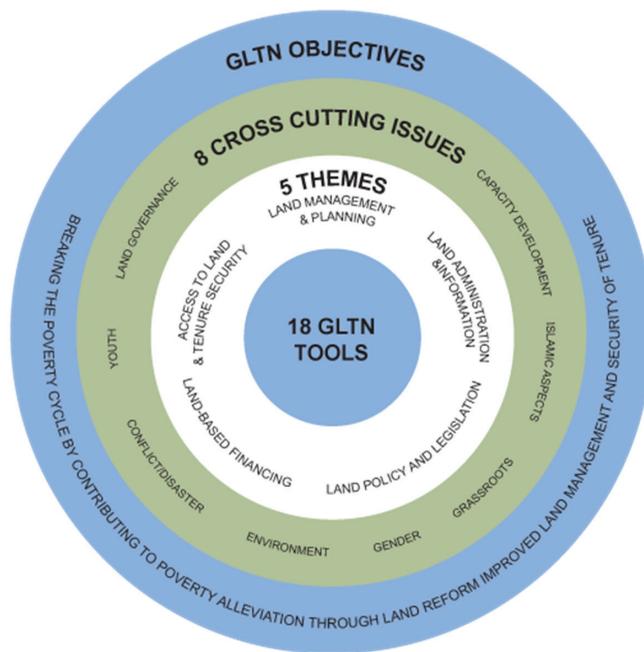
Figure 10 GLTN Objective and Tools

4.4 Sustainable Development Goals (SDGs)

Land governance is about how effectively and efficiently policies, processes and institutions by which land, property and natural resources are managed. A comprehensive land governance necessitates a legal governing framework as well as operational processes for executing policies reliably within a country in a sustainable way. Land administration systems provide an infrastructure for implementing land policies and land management strategies in support of sustainable development. Access to resources including land and security of tenure for Ending Poverty (SDG 1.4), Zero Hunger (SDG 2.3) and Gender Equality (SDG 5a) are required in addition to Safe, Resilient and Sustainable Cities and Human Settlements (SDG 11).

Figure 11 UN Sustainable Development Goals for 2016-2030

A comprehensive land administration system should deliver a range of benefits to society by providing the following support:

- Governance and the rule of law

- Poverty alleviation

- Tenure security

- Formal land markets

- Credit/loan security

- Land and property taxation

- Protection of state and public lands

- Management of land disputes and

- Improvement of land use planning and implementation

The LAS should allow the implementation of land policies to fulfil political and social objectives and to achieve sustainable development. Good land governance should also be a means of supporting the 17 sustainable development goals (SDGs) which has 17 goals and 169 targets. It was endorsed at United Nations summit in September 2015. The SDG goals can be grouped as:

- **Inclusive social development**, including adequate nutrition for all; quality education for all; reduced mortality and morbidity; gender equity; and universal access to clean water and sanitation.

- **Environmental sustainability**, including protecting biodiversity; stable climate; and resilience to natural hazards.

- **Inclusive economic development**, including eradicating income poverty and hunger; reducing inequalities; ensuring decent work and active employment; and ensuring access to land and natural resources.

- **Peace and security**, including freedom from violence, conflict and abuse; and conflict-free access to natural resources.

A good land governance requires these core dimensions of the global agenda to be followed for empowering people through tenure security, food security, access to land and natural resources, and no land conflicts.

5. Developing Specific strategy for implementing FFP in Nepal

The FFP land administration approach recommends that the activities of recording and registering land rights should be conducted by administrative institutions under delegated authority, wherever possible. It will minimize the amount of time involved in recording and registering land rights. The FFP approach to land administration is primarily aimed at being implemented as national level programs to deliver security of tenure for all. It is a pro-poor approach that recognizes and legalizes all legitimate rights throughout the country. However, this requires political commitment up front to design and execute such national level programs within a short timeframe and at affordable costs. In cases where this political commitment is not yet in place or where there is large categorizes of ambiguous occupancy rights, the FFP approach may well be implemented incrementally through local pro-poor recordation initiatives, which starts by recognizing and recording legitimate rights as found in the local communities. These local initiatives may gain sufficient momentum and acknowledgement to eventually trigger wider incremental change and eventually lead to national recognition with corresponding changes to the legal and regulatory framework. The local pro-poor recordation initiatives can therefore work in parallel and be a supportive component of the national recordation process or act as a driver for change to help country adopt the FFP land administration approach. As numerous types of land occupancy with ambiguous rights exist in Nepal, it may be considered that recognition and recordation of such informal lands start by local pro-poor recordation initiatives followed by national level programs. The two approaches are illustrated in Figure 12.

The National approach is shown in the center column starting by recognizing the various kind of tenure types to be enshrined in the land law. On this basis the mapping and recording in the field can be undertaken through a participatory approach and the result can be recorded in the land register. The local approach is shown in the column to the left. This approach will identify and record the actual legitimate land rights through a participatory approach. These rights can then eventually be considered and recognized at national level and entered into the land register.
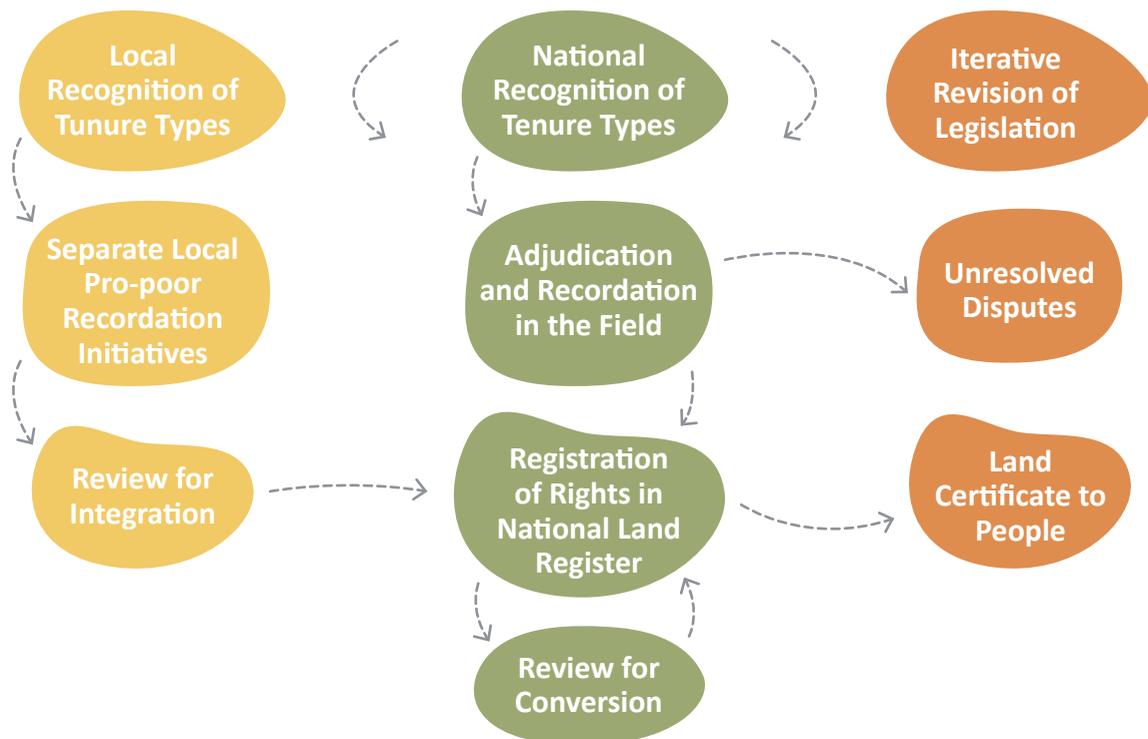
Figure 12 FFP Process for Recognizing, Recording and Reviewing Land Rights (Enemark, et.al., 2016)

This chapter discusses the specific strategies to implement the proposed land policy in Nepal. Discussion is focused mainly on addressing informal/non-statutory land tenure and its management according to the Fit-For-Purpose concept. The spatial, legal and institutional frameworks to be designed and implemented for proper management of such land tenure are briefly discussed in the coming sections.

5.1 Spatial framework

Existing spatial component of the Nepalese land administration system has some spatial issues to be improved. They are already discussed in Chapter 3. This section presents the specific strategical provisions to be adopted for addressing those limitations.

The strategies to be adopted for addressing limitations of spatial aspects of Nepalese LAS can be categorized under the two broad topics: improvements of existing formal LAS; and administering informal land tenure.

5.1.1 Improvements of existing formal LAS

Technology adopted for cadastral data acquisition is heterogeneous such as plane tabling, numerical or digital data acquisition techniques etc. But in recent days the tradition of adopting modern and hi-tech equipment such as very precise total station is increasing without accessing its necessity and demand. Instead of using very high accuracy-based technology everywhere, fit for purpose approach can be used. Suitable technology for different location, situation and demand can be identified and employed. Numerous studies show that the very high resolution remote sensing images (GSD 0.5m or better) are available nowadays and can be useful for achieving required standards fast and cheaply.

Similarly, there is a trend of using very sophisticated hardware and software for data processing, storage and management, which may not be necessary. For example, many expensive commercial and proprietary software are used for cadastral data processing and management. There are substantial number of local government units (753 Rural Municipalities and Municipalities) which are supposed to deliver direct land related services to the customers. It will obviously need a huge investment, which may not be possible for Nepal immediately. Similar results can also be obtained from various Free and Open Source Software (such as QGIS). Therefore, application of appropriate Free and Open Source Software with necessary modification and customization, as per need, can be encouraged.

Methodology and procedures may also need improvements. Nepalese land registration system is gradually moving towards title registration system from current deed registration system. Various governments' policies mention about adopting fixed and legal boundary to demarcate land parcels in near future. This may cost a huge amount of money as well as human and time resources. Instead, an FFP strategy can be adopted for parcel boundary delineation. In the areas where the number of disputes is in huge amount, cost of land is high, parcel shape and size are small, and the land is very much important, legal and fixed boundary can be used in collaboration with the concerned landowners. In most other case general boundary as depicted in image maps will be a viable solution.

Existing Nepalese LIS may also need improvements. Two different databases exist simultaneously; one contains spatial data such as parcel boundary, shape, size, dimension, area etc., and the other contains attribute regarding the parcels such as land owners, identification, types of ownership etc. There is no link between these two databases. Further, the data regarding the land and owners are not complete. In spatial aspect, many parcels are found missing and incomplete. Boundary between parcels are not clearly identifiable. Parcel numbers are missing. Scanning and Georeferencing of existing paper maps is not correct in many cases. Records are not up-to-date. In attribute aspect, the database doesn't provide complete set of information regarding socio-economic, pro-poor and gender responsive context of landowners, which prevents policy makers to formulate evidence based, inclusive and equitable policies. Therefore, a strategy regarding integration of both spatial and attribute databases and insertion of socio-economic pro-poor and gender responsive data is required. Various GLTN tools such as Social Tenure Domain Model (STDM) and VGGT concepts can be adopted. For this, a modification in the conceptual, logical and physical schema of the current database is needed with several other customizations e.g. by introducing a unique parcel identifier as the entry point of multi-purpose land information systems.

Reliability and security of data is also a concern. The database is not secured enough to protect illegal intuition into the records relating to people's property. There are many technical deficiencies and flaws. New security features should be incorporated and make it inaccessible for aliens.

Quality of land related services delivery should be enhanced. Existing procedures are lengthy and complicated. Level of transparency is poor and access to services is difficult. Influence of mediators or broker is very high. Participation of people, civil society and private sector is low. Overhauling in the procedure is needed. Standard Operation Procedure should be developed. Participatory approach and community involvement in adjudication and dispute resolution should be ensured. Audio-visual citizen charter should be inserted in the office. Volunteers and legally recognized mediators should be employed by the institution to help and facilitate people. Formats of several forms and documents needed for transaction may also be simplified. List of transaction should be made public to ensure transparency. Documentation and archive should be scientific and efficient enough to get recovered on time when needed. Electronic display and token system can be used.

Human resources and their capacity is another key point for improvement. Number of skilled human resource are lacking. Available human resources may not have competitive skills and knowledge to satisfy people's demand. Therefore, appropriate coordination with the academic and professional training institution is necessary for quality human resource development. Various orientation, in-service trainings and refresher courses as per the need of the organization should be conducted. Partnership and exchange programs in the international forum is also necessary for sharing experiences and professional exposure. Research and development activities are also very much important for enhanced capacity of organization and staffs.

5.1.2 Mapping and recording non-statutory/informal land tenure

The Nepalese land administration system doesn't deal explicitly with informal land tenure. It means that large areas of land are outside the official cadaster. Therefore, significant Nepalese population, mainly poor and vulnerable, are living in informality with unsecured land tenure and without formal spatial recognition. Around 25% of the total arable land and settlements are outside the formal Nepalese cadaster, which is estimated to represent approximately 7.5 million visible parcels on the ground. On top of this, there also exists land occupancy for decades on government, public as well as private lands (legally owned by another person or institution). This kind of occupancy is estimated to represent about 2.5 million land parcels. In total, around 10 million parcels on the ground are estimated to exist based on informal land tenure. Therefore, new strategy is needed to administer and manage this unregistered land and recognize the tenure of people settled on this land. This section deals with the new strategy to be adopted for recognizing informal tenure on land.

The people to land relationship with regard to this unregistered land was already discussed in Chapter 3 and categorized as non-formal, in-formal and encroachment. To deal with these kinds of non-statutory tenure issues, capacity of the government needs to be increased. To undertake timely, cheaply and sufficiently adequate survey for areas not yet surveyed, appropriate (Fit-For-Purpose) approaches should be applied to acquire the parcel boundary data, and, at the same time, by using a participatory approach, the various kinds of tenure held by people can be recorded.

Currently Nepal doesn't have database on informal/non-statutory land tenure and such settlements in official cadastre. Most of the landless people have occupied government or public land or are leaving in other legal owners' land as tenants without secured or formal rights on it. It is very unjust that the existence of such people on such land is not even recorded in the official register.

Constitution of Nepal has ensured right to housing for every people. This situation is considered as violation of human right according to the Universal Declaration of Human Right and other conventions. Therefore, serious efforts are needed to recognize informal land tenure. To deal with the informal tenure, VGGT principles should be adopted. According to VGGT principle, the state should do the following:

- Recognize and respect all legitimate tenure rights
- Safeguard legitimate tenure rights
- Promote and facilitate enjoyment of legitimate tenure rights
- Provide access to justice to deal with infringements (Violation) of legitimate tenure rights
- Prevent tenure disputes, violent conflicts and corruption.

Likewise, non-state actors/Business Enterprises should;

- Respect human rights and legitimate tenure rights

- Act with due-diligence

- Identify and assess any actual or potential impacts on human rights and legitimate tenure rights

- Adopt appropriate risk management systems

- Adopt non-judicial mechanism to provide remedy

To implement these principles, mapping and Recording Informal land tenure is the first step. In absence of such recognition of the settlement and land tenure, many complications are seen during rehabilitation and resettlement of earthquake and flood victims. Quick and efficient mapping of such land tenure and settlements can be done by using different techniques. High resolution satellite images can be used for mapping. Participatory methods should be applied for adjudicating rights of individual/family in the plots. It can be verified by the community involvement as well. Dense settlements can also be mapped and recorded in the same way e.g. using drones. Point cadastre can also be an alternative for fast and efficient record maintenance. Opensource software can be used for keeping the data. STDM promoted by GLTN/UNHABITAT can be a solution.

5.1.3 Focus on security of tenure for all

The main purpose of land administration systems is to provide security of tenure for all. The other purposes include enabling access to credit and investments, facilitating valuation and taxation, planning and control of the use of land and natural resources, supporting land development, and providing land parcel and land owners information to support decision making on land policy. The systems should identify and delineate the occupancy as well as the use of the individual land parcels. It should be established according to the purpose. Security of land tenure only requires satisfactory identification of the land parcels and buildings on satellite/aerial images or on a map. It does not need accurate boundary surveys using sophisticated equipment and highly skilled human resources with longer survey time as well as high budget requirement.

Accuracy of parcel boundaries should be seen as a relative issue and can always be upgraded over time. Accuracy requirement is obviously lower for low value lands in rural areas than in densely built up and high value urban regions, where accurate field surveys may sometimes be justified. This principle is also being practiced by Nepal Government by producing different scales of cadastral (1:500 for municipalities to 1:2500 for rural areas) and topographic maps (1:25000 and 1:50000). The registration of legal and social tenure rights, in itself, requires identification of physical land parcels and objects. The identification through visible boundaries as seen in the aerial/satellite imagery will be adequate for securing and recording the connected legal and social land rights. Non-visible boundaries can be captured by supplementary measurement using handheld GPS or conventional field surveys, for example. If occupants want the exact boundary delineation for some specific purpose, it can be measured and registered at their costs.

Official inventory of state land is still not realized completely in Nepal. Official cadastre contains the record of arable land and settlement. Huge area of government and public land is outside the official cadastre and hence the record of such land is not up to date. Rights, responsibility and restrictions on such land is not explicitly defined. It may cause sometimes a serious dispute on use of such land and resources. Therefore, mapping of government and public land and creating an inventory of such land is necessary.

To deal with this, rights, restriction and responsibility over the land and land-based resources should also be well defined. Community user groups can be created and Standard Operating Procedure (SOP) of use of such land can be developed in the leadership of local institutions. Various state of the art but cheap and efficient techniques can be used for creating such inventory. Along with high resolution satellite images, drone images and orthophoto (in case of high value land in urban area) can also be used as per specific need and availability.

5.2 Legal framework

The existing legal framework in Nepal does not completely address several provisions made in the new constitution and as proposed in the draft for a new national land policy. Therefore, an appropriate legal framework should be designed for addressing the newly enacted constitutional provisions and the relevant policy issues at federal, provincial and local level.

The strategies to be adopted for addressing the limitations of legal aspects of Nepalese LAS can be categorized under two broad topics: Land tenure issues; and other land administration issues.

5.2.1 Land tenure issues

A new Land Administration and Management Act

A new unified Land Administration and Management Act (LAMA) should be drafted and enacted on the basis of the several existing acts, to improve efficiencies, streamline overlapping provisions and address gaps under the umbrella of: **Enact Constitution and ensure fundamental rights.**

The Constitution of Nepal has made several new provisions to address the inequitable access of socio-economically disadvantaged and marginalized people to land. Solving the problem of landless and squatters, ex-kamaiya and haliya (freed bonded laborers), dalits (so called untouchable caste), equal right of woman in ancestral property and equal right to inheritance, no discrimination on the basis of gender, race or any other basis, addressing the problem of informality and ensuring access to safe and secured housing, rationale land reform and land use etc. are some examples.

Many of these issues are placed under fundamental rights in the new Constitution. There is also a provision that makes implementation of these rights mandatory by making appropriate law within three years of promulgation of the Constitution. So, a new legal framework should be designed and enacted to address all these constitutional provisions as soon as possible.

Implementation of land reform issues

Land reform is one of the important issues to be addressed. Current legal provisions are not equitable and do not adequately address the issues of poor, landless, socio-economically disadvantaged (SED), marginalized people, women, indigenous people, youth and elderly. Lack of inclusiveness in land legislation, unequal access to land and land related benefits are some of the major causes of the decade long armed conflict.

Various efforts have been made in the past to address the issues and implement land reform. Three different High-level commissions along with other commissions suggested various

reforms in land legislations. Some of the important points are to enforce a land ceiling, abolish dual land ownership, register the actual tenant and ensure their rights, register the remaining genuinely occupied land and informal rights and ownership, implement appropriate land use, ensure access to land for landless, squatters, tillers, agro farmers and peasants to the land and abolish absenteeism, tie up the reform process with productivity, economic growth, employment generation, entrepreneurship development and dignified sustainable livelihood. All these issues are not well addressed in the current legal provisions and therefore the new legal framework should incorporate all these issues clearly and without ambiguity.

Addressing informal tenure

In Nepal, most of the arable farm land and settlements are registered with formal titles and tenure security is highly ensured. Nevertheless, there are several other settlements and arable farm land occupied by the people but not registered and, thus, tenure security is at substantial risk.

This informal tenure on land is of several types. Some land parcels can be registered within the existing legal framework whereas many other plots cannot be registered under the existing legal system. The status of tenure security in these situations is low or non-existent. People also suffers from basic infrastructures and services in such places. The government hardly recognize such informal tenure of people within the existing legal framework. It is very likely to get evicted from such places, even without any compensation and resettlement options.

Therefore, new legal provisions should be made to recognize informal tenure and safeguard the rights of informally settled people. The Continuum of Tenure approach can be adopted for recognizing informal tenure rights of these people. In this approach, any types of relations of these people to land are recognized and recorded as it exists on the ground.

Using the STDM approach, Identification, Verification and Recording (IVR) of the people's association and relation to land can be recorded. Field visits and adjudication process can be done in a participatory way to identify peoples claim over land and verify them. Local representatives, adjacent landowners/holders, neighbors, civil society members etc. can participate in the process and decide on their own and the government official can make a proper inventory. Later, it can serve as a database of informally settled people. This database can be very useful for making appropriate policies to address the informality on land. This can further be useful for addressing problem of disaster victims, landless squatters, and informal settlers. Eventually such recording can be recognized by government and entered into the land registry.

Rights of women and communties

Women land users group and community land management approach can also be implemented in the new legal framework. Arable public lands, ponds and lakes, river beds and public land along road sides in the local area can be used for various agricultural purposes. A proper mapping and inventory of these kinds of land can be made and the land leased to various poor farmers or women's user group in the community with user rights for designated time contract.

This kind of land would be helpful for income generation and entrepreneurship development. This concept, in one hand will ensure protection and optimum use of public land at the local level and, on the other hand, production will increase which encourages economic activities, employments, and income generation of local women's group in the community.

Alternative Dispute Resolution (ADR) mechanism

Majority of the disputes registered in different courts are related to land. Most of the other disputes normally do not appear in the court as the victims do not have adequate knowledge on court procedures. Further, the court procedures are lengthy, time consuming and costly. Most of these disputes can be litigated with the involvement of community and/or appropriate mediation methods outside of the court, which can be cheaper, faster and even address the issue with mutual understanding and trust to end it up with a win-win situation.

Therefore, the new legislation should have provisions of Alternative Dispute Resolution (ADR) mechanism such as community involvement and third-party mediation in local level. Judicial Committee under the chairmanship of Deputy Mayor/Vice Chairperson of the local government is a good move in this regard.

Provision of land tribunal

Courts are overloaded and they have limited resources and capacity to deal with various general civil and criminal cases. Land disputes have several dimensions and need specific skills, technology and human resources. Therefore, the new legislation should have provision of constituting Land Tribunals to deal with complicated land disputes, which cannot be resolved by the local efforts. This can facilitate the court process to achieve quality justice in less time and at lower cost.

5.2.2 Other land administration issues

Land valuation and tax

Existing legal mechanism for land valuation is not consistent and well defined. There are several practices and provisions for land valuation. Minimum valuation for registration purpose, valuation for compensation purpose, valuation for mortgaging and collaterals, valuation for expropriation, valuation for sale, all differ from each other. Different institution evaluate land for their purpose, based on their own criteria. It creates confusion and sometime disputes too. New legal provisions should be made on the basis of some well-defined scientific criteria. The new valuation model should have appropriate parameters and should be associated with the land use, productivity and benefit from land.

Land and property tax should also be imposed on the basis of land value and land use. Small holders, peasants and landless farmers leasing other landowners land, squatters etc. can be exempted from the taxes whereas higher tax and/or penalties can be imposed on the absentee land owners, big farmland owners, commercial land owners etc.

Implementation of land use policy

The National land use policy has been enacted in 2015 and land is categorized in 11 different classes. Land use zoning maps are prepared by National Land Use Project under the Ministry of Land Reform and Management. Nonetheless, the zoning cannot be implemented and enforced in absence of appropriate and clear legal provisions.

Appropriate legal mechanism should be established to implement the land use zoning and enforce land use policy which can be essential for protection of agricultural land for increasing agricultural production and support food security, safe and secured housing

and settlements, environmental protection and disaster mitigation, urban infrastructure development and many more.

Land banking

Land banking can be one of the important provision that is not incorporated so far to enhance access to land for poor and marginalized group. It can have an influential role in balancing demand and supply of land in the market.

Land owners who have been involved in the profession other than agriculture can contact the bank for sale, mortgaging, leasing and financing. The small holders, landless, squatters, peasants, ex-kamaiya and ex-haliya can be allocated the land stocked at the bank for their livelihood, employment, economic strengthening and entrepreneurship development. In this way, on one hand the land would not remain uncultivated and production will be increased to support food security and economic growth; on the other hand, livelihood of the socio-economically disadvantaged group of people is sustained because of their access to land.

This approach can further be fruitful for supplying land for various development activities, developing integrated settlements, safe and secure housing, land consolidation and cooperative farming for agricultural growth and development. Therefore, appropriate provisions for establishing, regulating and facilitating land banking and land market should be made in the new legal framework.

Management of state land

Surveying, mapping, record management and security of all state land should be clearly defined in the new legal framework. Various overlapping and contradictory provisions exist in the current legal system. Various laws allocate the responsibility of state land protection and management to different institutions. Functioning of local government act, land revenue act, land survey and measurement act, local administration act etc. allocated the responsibility of state land management to different institutions such as local institution, land revenue office, survey office and district administration offices.

It creates confusion and dispute over the jurisdiction and consequently the protection and management of state land cannot be done efficiently and effectively. Hence, a new clear and unambiguous jurisdiction should be defined, and roles and responsibilities should be allocated to appropriate institution, which can protect, use and manage all state land optimally.

Selection of appropriate technology

One of the prominent issue to be addressed by the land policy is to deliver good, cheap and fast services and ensure 'Good-enough' land governance. This can be achieved on the foundation of reliable and up-to-date land information. Appropriate land data acquisition technology should be used, and proper information system should be designed on top of the data/information.

It is not always possible to demarcate boundary with mathematically coordinated markers and acquire survey data with very high precision total station. The Fit-For-Purpose approach can be adopted to perform this task effectively (good), efficiently (cheap) and timely (fast). Careful choice of technology can be done for this.

High resolution satellite images can be used for data acquisition, Social Tenure Domain Model (STDM) can be used for storage and management. Participatory enumeration approach can be used for IVR process, adjudication and registration. Community involvement can ensure transparency and increase ownership of people. Involvement of civil society and other stakeholders may widen its acceptability and enhance accountability. Collaboration with private sector may reduce the cost. Various other tools suggested by the Global Land Tool Network can be used and incorporated in land administration system. To make the system gender friendly, GEC criteria can be adopted.

New legal systems should be designed in such a way that it can adopt Fit-For-Purpose approach for delivery of land services. Inclusion of all these aspects will certainly ensure the 'good-enough' land governance.

5.3 Institutional framework

Constitution of Nepal has restructured the state in three administrative levels: Federal, Province and Local. Accordingly, the state functions are also federated among these levels. Schedule 5 to 9 of the Constitution has outlined the functions of these three-different levels; the functions related to land administrations mentioned in these schedules are given in the box below:

List of the power of the different level of the Government as per the Constitution of Nepal

Schedule-5: List of Federal Power
- Land use policies, human settlement development policies, tourism policies, environment adaptation
- Any matter not enumerated in the Lists of Federal Powers, State Powers and Local Level Powers or in the Concurrent List and any matter not specified in this Constitution and in the Federal laws

Schedule-6: List of State Power
- House and land registration fee,
- Management of lands, land records
- Management of trusts (Guthi) land

Schedule-7: List of Concurrent Powers of Federation and State
- Transfer of property,
- Acquisition, requisitioning of property and creation of right in property
- Land policies and laws relating thereto

Schedule-8: List of Local Level Power
- Property tax, house rent tax, land and building registration fee, land tax (land revenue),
- Distribution of house and land ownership certificates

Schedule-9: List of Concurrent Powers of Federation, State and Local Level
- Landless squatter's management

In this schedule, bundle of rights and power is generally allocated to the different level of state by the constitution. The Cabinet of Ministers further unbundled the rights and elaborately allocated the state functions to the three levels, as described below.

Table 2 Jurisdictions of governments

Jurisdictions of

Federal Government	Provincial Government	Local Government
1. Policy, acts, standards related to Land use planning and regulations 2. Land use, land capability and suitability mapping 3. Policy, acts, standards related to Housing and settlement development, urban planning and its regulation 4. Policy, acts, standards related to informal settlements 5. Policy, acts, standards related to landless and squatter's management and its regulation 6. Resettlement planning for the displaced persons because of the national development projects 7. Policy, acts, standards related to property transfer and its regulation 8. Policy, acts, standards related to land acquisition, requisition and creation of rights and its regulation 9. Land acquisition and expropriation, valuation, compensation for national level development and construction projects 10. Formulation of national land policy, acts, standards and its regulation 11. National archive of private and state (public and government) land 12. International contacts, cooperation and coordination regarding land administration and management issues 13. National land information system and National geographic information infrastructure 14. Policy, acts, standards related to inclusiveness, equitable access to land for landless, squatters, bonded laborers, and their resettlement and its regulation 15. Geodetic Network establishment, update, upgrade and maintenance 16. Topographic surveying and mapping 17. Provincial and local boundary demarcation, surveying, mapping, record management 18. International boundary demarcation, surveying, mapping, record management, construction and maintenance of boundary pillars	1. Formulation of provincial policy, acts, standards of land and land use related activities and their implementation and regulation 2. Formulation of provincial policy, acts, standards of land administration, land management, land surveying, measurements and mapping and their implementation and regulation 3. Provincial archive of land information management 4. Formulation of policies and standards on first registration of land, deed registration, ownership transfer and update 5. Management of maps, geographic information, data and other land records obtained from federal government 6. Establishing and densifying geodetic control points, surveying and mapping within the territory of the province 7. Systematic cadastral survey and land records management 8. Land use, land consolidation and land reform 9. Formulation of provincial policy, acts, standards on resettlement and rehabilitation of socio-economically disadvantaged groups and its regulation 10. Land dispute resolution 11. Facilitation and coordination in acquiring land for public purpose 12. Formulation of Standards and specification for land ownership certificate distribution 13. Implementation of policy regarding eliminating dual ownership on land 14. Implementation of policy regarding safe and secured housing, land pooling and integrated settlement 15. Formulation of policy, acts, standards, planning and implementation on guthi land management 16. Coordination and cooperation among the federal and local government for guthi land management 17. Formulation of policy, acts, standards on property transfer and its regulation 18. Implementation and regulation of provincial policy, acts, standards on land acquisition, requisition and creation of right on land 19. Implementation and regulation of provincial policy, acts, standards on landless and squatter's settlement 20. Coordination and cooperation with local level on livelihood and settlement of landless on provincial level	1. Formulation of policy, acts, standards on property tax collection, house rent, land and house tax, land and house registration tax, land revenue, land leasing and mortgaging, 2. Collection of the above-mentioned tax and allocation among local level and its regulation 3. Distribution of land ownership certificate as per the standards developed by the provincial government 4. Land Record keeping as per the classification at the local level 5. Parcel sub-division, preparing, updating and protection of land records at local level 6. Identification, verification and recording of landless and squatters 7. Support resettlement and rehabilitation of landless and squatters in the local level

For the implementation of the provisions proposed in Land Policy, it is the right time to develop or strengthen institutional framework in three levels of government. For

this purpose, several informal discussions have been conducted with various experts, professionals and stakeholders.

The main strategies suggested for creating institutional framework for implementing Fit-For-Purpose land administration are categorized under three broad topics: Federal and provincial land authority, Local land authority; and other institutional issues.

5.3.1 Federal and provincial land authority

Federal land authority

Strengthening/restructuring National Land agencies such as Survey Department, Department of Land Reform and Management, Department of Land Information and Archive, National Land Use Project under the Ministry of Agriculture, Land Management and Cooperatives is needed to develop a consolidated and unified Land Authority at federal level. This institution will be responsible for performing the task allocated for the federal level under schedule 5, 7 and 9 of the constitution (see the box above) and cabinet unbundling (see the column 1 of Table 2).

Provincial land authority

Establishing state level or provincial institution which will be responsible to deal with the state level functions as described by the schedule 6, 7 and 9 of the constitution (see the box above) and cabinet unbundling (see the column 2 of Table 2). This structure will be new as there are no such institutions present currently in this level.

5.3.2 Local Land Authority

Establishing local level institution which will be responsible to deal with the local level functions as described by the schedule 8 and 9 of the constitution (see the box above) and cabinet unbundling (see the column 2 of Table 2). This structure will be new as there are no such institutions present currently in this level. However, the district level offices can be merged and restructured to some extent in order to address the local needs. The local land authority will be responsible for addressing the various land administration issues as also discussed in section 5.2 above:

Surveying and mapping: The local land authority may consist of a surveying and mapping unit which would be responsible for preparing and updating cadastral maps and databases. This includes identification of parcels boundaries, adjudication, verification on the ground, parcel measurements, sub-division, taking records, creating parcel maps, updating existing maps and other spatial framework related activities of land administration. At least one graduate Surveyor/Geomatics Engineer along with assistant(s) may be needed for this unit.

Land ownership management and registry: Land tenure and ownership management unit is also needed within the local land authority, which would be responsible for land ownership transfers, registration of deeds regarding land transactions, buy and sale, inheritance, land records maintenance and updating etc. This is mainly administrative, legal and management part of land and records.

Alternative dispute resolution (ADR) mechanism: Local land authority should consist of some Alternative Dispute Resolution (ADR) mechanism for land dispute

resolution. There should be provision of some professional mediators who would work among the concerned disputing parties to get a logical solution that could be acceptable for the parties. It would facilitate the speedy justice for the people and reduce the heavy load of cases in higher courts. Consequently, it ensures efficiency as it reduces time and cost of judicial system with good result.

Land tribunal: Land Tribunal is another institutional mechanism that can be developed for efficient and effective land dispute resolution. The Courts are heavily loaded with the land related cases, but they do not have highly skilled land professional advocates, judges and other technical staff. Instead, land tribunal can be established with appropriate and specialist human resource which can deal with any kind of land disputes and ensure speedy justice. Policy, acts, standards can be formulated by the central agency and can be implemented by the provincial institutions in association with the local government. Monitoring and regulatory tasks can be done by the high courts.

Community user's groups: Best and optimum use of land and land-based resources can be ensured by involvement of community in land management process. Nepal has a very good experience of community forest management which is considered as one of the best examples in the world. Similar approach can be adopted in local land use and land management in community level. Various under-utilized and abandoned barren lands can be highly productive and income generating resources if they would be handed over to community. Therefore, community user's groups can be formed, and certain types of land can be handed over to the group for its proper use and management.

Land valuation: Land valuation unit is needed in the local government. Policy, acts, standards can be formulated in collaboration with the central and provincial agencies and can be implemented by the provincial institutions in association with the local government. This unit is very important for generating fiscal resources as land is one of the most important resource and land taxes will be collected on the basis of valuation.

Land use planning: A specific land use planning and technically facilitating agency may also be needed at the local level. However, the policy and act formulation, decision on technical standards can be done at center and provincial level. This unit will be responsible for formulation and implementation of local land use planning. It ensures and facilitates coordination with infrastructures and other development planning agencies.

Land banking: Land bank, land stock market in local level should be established. However, the policy, acts, standards should be formulated at the federal and provincial levels.

5.3.3 Other Institutional issues

Professional organizations and associations: Professional organizations and associations may play important roles for continuous professional development. Some good practices can be observed in the developed world where the professional societies play key roles in knowledge building, sharing, dissemination and problem solving. Land administration and management sector in Nepal can also benefit from making appropriate institutional mechanisms to accommodate different professional organizations and collaborating with them for good reasons.

Survey licensing board: Survey Licensing Board is needed at the federal and provincial levels to decide on the qualification and skill needed for surveyors. This board may be responsible for awarding appropriate license for private surveyors. Survey Licenses can be categorized as Survey Manager, Senior Surveyor and Surveyor.

Surveyors with higher university degree and more than 15 years of experience in surveying, mapping and various survey project management shall be awarded as Survey Manager License. Fresh university graduates/senior survey training completed qualified surveyors may be awarded with Senior Surveyor license. Surveyors with Survey diploma may be awarded with Surveyor license. A fourth category can be awarded to those who have basic survey courses and can be engaged in assisting in higher survey projects and can carry out basic surveying and measurement functions. The first and second category of license should be awarded from federal institutions whereas the third and fourth category can be awarded from provincial institutions.

Private surveyors: Private surveying companies/individuals can be provided license to carryout surveying and mapping functions. In the current tradition of governance, roles and duties of the government are squeezing and are limited to the regulating, coordinating and facilitating tasks. If the private sector is maturing to deliver such services, the government may not be willing to invest on these functions. Therefore, private survey company may have good opportunity to serve the community. Private surveyors can be awarded with appropriate licensing on the basis of their qualifications and experiences.

Human resources: Currently, there are three kinds of institutions involved in developing human resources in surveying, mapping and land administration in the country. Universities such as Kathmandu University, Tribhuvan University and Purbanchal University are producing qualified Geomatics Engineers. Government owned Land Management Training Centre is producing Survey Graduates with highly skilled professional survey trainings. Government regulated but privately run vocational and technical schools are also producing survey technicians.

All these institutions are producing roughly 120 Geomatics Engineers/Senior Surveyors, 150 Surveyors and 200 Assistant Surveyors annually. Some of these human resources are consumed by the private sector companies, some of them use to go abroad for higher study and some other in foreign employment and remaining in the government sector. Each local government unit will be looking for such human resources in near future to run their land administration functions. To fulfill this need, the role of government owned Land Management Training Centre and private vocational training centres will be important. Some short-term packages which includes basic surveying, measurement and mapping skills, basic GIS, GPS and image interpretation techniques and basic social and legal know-how of land administration can be developed and training courses can be conducted. These human resources, after getting appropriate license, may be involved in various surveying and mapping jobs as per requirements.

Infrastructure and ICT: Physical infrastructures are necessary for sustainable capacity development. Current institutions need basic IT facilities for delivering their services effectively and efficiently. Land administration services also needs modernizing. Application of IT for transparency and winning peoples trust, appropriate infrastructures are most essential for this purpose.

Tools and techniques: Appropriate institutional capacity is needed to handle the various tools and techniques of land administration and management in different levels. Cadastral data acquisitions, record verification and maintenance procedures can be effectively handled by making use of various tools such as remote sensing images, free and open source software. Appropriate institutional capacity can be required to accommodate, modify and customize the systems, making templates, developing uniform and consistent guidelines, standard operating procedures and working manual. A technical team and coordination mechanism would be very important for ensuring effective implementation and achieving consistent results throughout the local government within/among the provinces.

6. Concluding remarks

6.1 Conclusion

Nepalese land administration system is not yet complete and up-to-date. Official cadastre doesn't have a coverage of whole country. Informal land tenure is not yet recognized and recorded in the official cadastre. Even the official cadastre may have several issues to be sorted out.

Fit-For-Purpose approach can be a good concept to incorporate and apply in Nepalese LAS. This concept in one hand may successfully adopted to address the current issues and limitations in formal as well as informal land tenure system; on the other hand, this can be good enough, cheap and fast in comparison to the existing technology and methods of LAS.

Various issues and limitations are identified to improve the spatial, legal and institutional aspects of LAS. Nepal has recently enacted the new constitution. It has made many remarkable and progressive provisions to make land administration system more equitable, inclusive and pro-poor and gender responsive. Various other provisions such as local governance act, National land use policy etc. have been made to achieve good land governance. New land policy is drafted and is under discussion and expected to be endorsed by the government soon. These documents have made several new provisions which may not be easily implemented with the existing and traditional Standard Operating Procedure (SOP) adopted by the government. Hence, new Fit-For-Purpose approach should be suitable for implementing these provisions. This strategy developed under this new concept may be helpful to achieve the goal targeted by the constitution and other documents.

6.2 Recommendation

The following are the recommendation for further streamline this study:

1. Fresh field work and study should be conducted at some locations (at least two: one in rural and another in peri-urban area) regarding the appropriateness of data acquisition and processing using Fit-For-Purpose approach

2. Standard Operating Procedure (SOP) and Working Manual should be developed before implementation

3. Standard Template for uniform use of tool should be developed. Also, appropriate tool should be customized to fit Nepalese context

4. Short-courses focusing application of Fit-For-Purpose land administration should be launched.

5. Capacity of local governments should be developed regarding application of Fit-For-Purpose land administration

6. Existing legal provisions are not barriers for implementation of Fit-For-Purpose land administration. Therefore, new legal provisions favoring Fit-For-Purpose land administration should be in place as soon as possible.

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